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Investigating Content Delivery and Tutoring Methods With ASSISTments

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Investigating Content Delivery and Tutoring Methods
With ASSISTments

An Interactive Qualifying Project Submitted to the Faculty of WORCESTER POLYTECHNIC INSTITUTE in partial fulfillment of requirements for the Degree of Bachelor of Science

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Date:
April 30, 2018

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Abstract

In this Interactive Qualifying Project, several randomized controlled trials testing the effectiveness of alterations to ASSISTments problem sets were implemented, and a previously existing data set was analyzed. Strategies for design included use of psychological principles (namely Self-Determination Theory) in addition to more general didactic approaches (e.g., in which order two methods are presented to students).
Acknowledgements

We would like to thank our advisors Korinn Ostrow and Neil Heffernan. We would also like to thank the rest of the ASSISTments team for their support and assistance throughout this project.
Objectives

- Apply psychological principles to design and implement several randomized controlled studies via the ASSISTments online learning platform
- Analyze the data created from these studies, if a large enough sample size is reached

Introduction

Mathematics can be a notoriously difficult subject for students. Its rigid nature means there is not much room for development of personal strategies compared with other areas, placing even more importance on teaching strategies and practice activity design. This poses the challenge of controlling content delivery to a degree that allows objective comparison between teaching methods.

ASSISTments is an online learning platform that allows for such uniform and precisely manipulatable practice content. Using ASSISTments and a combination of custom and curated problem sets, we designed and implemented several randomized controlled trials testing the effect of changes to content that capitalized on various psychological and didactic principles on student learning. The responses and actions of students who participate in an experimental ASSISTments problem set are automatically logged pending retrieval of data at the conclusion of the study.
Process

Throughout A term, we worked to establish the necessary knowledge base needed to create studies in ASSISTments. The first component of this background was psychological theory, specifically Self Determination Theory (SDT). SDT is a theory of motivation that states an individual's own sense of autonomy, competence, and relatedness work together to produce a desirable internal locus of motivation, as opposed to a less desirable external locus (Deci and Ryan, 1985). These characteristics are important areas to target when modifying content delivery, especially when the modifications do not involve examining how the problem set topic itself is taught (e.g., what method to solve quadratic equations is taught first). We worked to gain a solid grasp on these topics by reading relevant research papers, including the ASSISTments IQP report from the previous year.

The other crucial area of background concerned the practicalities of our research, including how to construct experimental problem sets in ASSISTments. We learned this through the ASSISTments TestBed, reading through the examples and attempting to replicate them using the problem set builder. We also familiarized ourselves with the ethics of research with human subjects through PHRP (Protecting Human Research Participants) training, an NIH (National Institutes of Health) compliant online course.

In B term, we designed and built studies to be approved and implemented by C term, during which data would be collected. Mathematics Skill Builders were used, meaning students are tasked with correctly answering three problems in a row before achieving mastery and completing the assignment. Problems also included progressively more detailed hints, called scaffolds. These studies included investigations of:

1. The effect of allowing students to choose the color of text in their problem set, hypothetically increasing feelings of autonomy
2. The effect of presenting students with statistics on students’ historic performance on the problem set, including the percentage of students that used hints, and the average number of problems attempted before mastery was reached. This could potentially increase students’ perception of competence, as they might be less likely to feel they lack competency after using hints or attempting what they feel is too many problems.
3. The effect of color-coding key information in the problem, such as two values used to construct a ratio, as is commonly done in ASSISTments hints. This may increase clarity
during the learning phase, so that the student is more well-equipped to perform well during the non color-coded post test.

4. The effect of word problems on students’ understanding of mathematical concepts.

5. The competence of students solving quadratic equations by factoring versus using the quadratic formula. Since it always works, students who learn how to use the quadratic formula are better equipped to solve quadratic equations.

6. The effect of specific interleaving patterns on students’ understanding of related concepts.

7. The competence of students in unit conversion using the metric system versus using the imperial system. Students are expected to be more comfortable with the metric system since it is based on powers of 10.

Each study is described in detail in the following sections.

In D term, we retrieved the data generated from our studies over C term using the Assessment of Learning Infrastructure (ALI), an ASSISTments tool that provides data when given the problem set code. The student level and problem level data using a python-driven Problem Set Organizer (PSorganizer) tool yields an Excel file containing a row for every student that participated in the study, and every recorded variable (problem results, past problem performance, post test results, treatment group, etc.) in a column. After proper formatting, including the creation of columns containing new variables for measures such as student skill (high or low) and experimental group designation (e.g., control group or treatment group), this file can be brought into another software where the relevant statistical tests are performed. We used SPSS for its variable creation functionality, however the output file can be imported into any software compatible with excel files.

Due to difficulties during this phase, the scope of the analysis portion of the project was reduced. Firstly, none of the newly created studies had accumulated enough participants for analysis to be prudent or meaningful. Because of this, write-ups of studies, excluding analysis, were uploaded to the Open Science Framework (OSF), preserving authorship pending analysis by future ASSISTments IQP students. This also ensures that the studies will be completed as was planned before the data is analyzed; making changes to studies post-hoc is a problem that severely impacts reproducibility across multiple fields, and a common platform for open science addresses this with improved transparency. Secondly, delays in getting ALI and PSorganizer to
properly function meant time for analysis in general was limited. Thus, analysis focused on one study that was implemented in the previous year.

**Study 1: Text Color Choice vs Assignment**

While understood to be a critical determinant of learning in the classroom, motivation is not often considered when constructing problem sets or other practice schema for direct student use. Web-based systems for the administration of these materials to students afford educators and researchers unique opportunities to capitalize on psychological principles of motivation to improve student learning outcomes. To this end, a useful framework is Self-Determination theory, which outlines three major aspects of motivation: autonomy, belonging, and competence (Deci, E.L., and Ryan, 1985).

Here, the area of autonomy was examined. So-called autonomous behaviors are those the subject perceives as having an internal origin of causation. Alternatively, behaviors can be controlled, wherein the origin of causation is perceived to be external (DeCharms, 1968). Autonomous behavior has been demonstrated by Deci and Black as a predictive factor of performance in a classroom environment, as well as being associated with increased perceived competence and reduced anxiety (1985).

Thus, it is desirable to implement content delivery methods that promote autonomy. One approach to doing so is by offering some form of student choice. Here, the ASSISTments E-learning platform was used to assess students’ performance within a mathematics problem set when they were either presented with the choice of the text color (black, red, or blue) used across problems and feedback or randomly assigned to a text color (black, red, or blue). Based on past findings about the motivational effects of choice within ASSISTments even when the repercussions of those choices were not ultimately felt, it was hypothesized that students given a choice of text colors would perform better on the problem set than those randomly assigned, despite text color not directly influencing the difficulty of the underlying mathematics (Ostrow and Heffernan, 2015). The results may offer insight into what level of control over content a student must have to perceive that control as meaningful, and therefore benefit from increased autonomy.
Methods

This study used a 7th grade mathematics problem set on the topic of setting up proportions to solve word problems, assigned through ASSISTments. The study design is outlined in Figure 1. Students were randomly assigned into choice or no choice groups, the former having the option of choosing black, red, or blue text (Figure 2), and the latter being randomly assigned to one of those three text colors. Students were first given a Skill Builder, a problem set that requires three correct responses in a row to complete. Each student was then given three challenge problems involving the use of proportions as a post test, in order to help assess student learning (Figure 3). While performance within the Skill Builder is a useful metric, the use of a few challenging problems after the Skill Builder allows for measurement of the entire effect of the treatment after the intervention is complete, as well as more robustly measuring learning by making students apply the knowledge gained from the Skill Builder in a new way.

Figure 1. Study design flowchart
Figure 2. Prompts presented to the choice treatment group

Figure 3. Post-test Problems
Study 2: Problem Set Statistics Knowledge

Student motivation is a key aspect of education that can have a profound effect on learning outcomes. With the increasing prevalence of online problem sets and study tools, a precise understanding of the psychological principles of motivations can pay significant dividends when used with the controlled content delivery these E-learning technologies offer.

In education, it is widely understood that “confidence” is a key part of student motivation; the student needs to feel that the task at hand is within his or her ability and that he or she is making significant progress towards mastery. In the framework of Self-Determination Theory this corresponds to the innate psychological need for competence, the drive to master an area of activity. Students who have fulfilled this need will shift their source of motivation from outwards (extrinsic) to more inwards (intrinsic), a more effective and desirable origin (Deci, Koestner, and Ryan, 1999).

Establishment of competence is often established through manipulation of content, such as through adaptive difficulty systems (Sampayo-Vargas et al., 2013). Here, we aimed to enhance baseline competency by providing basic statistics on past student performance on a problem set delivered via the ASSISTments E-Learning platform. It was hypothesized that knowing the approximate difficulty of the set would help students believe the material is within their ability, potentially increasing their sense of competency, and improving performance when compared with a control.

Methods

The study utilized a 6th grade ASSISTments problem set tasking students with finding a whole when given a number and the corresponding percent. In this “Skill Builder” problem set, a student must correctly answer three problems in a row to pass. The structure of the study is illustrated in Figure 4. Students were first assigned into one of three groups: control, average number to mastery, and percent hints. In the control group, students were first presented with a brief message explaining the Skill Builder (Figure 5), and then brought to the problem set. In the second group, students first received the same message, but with an additional line stating the average number of problems students attempted before finishing the Skill Builder (Figure 6). By
giving the student this information, it was hypothesized that competency would be promoted in this way by providing the student with an indication the task was within their ability. In the third group, the information given was the percentage of past students who used hints on the Skill Builder (Figure 7). Here, competency could theoretically be promoted by increasing the confidence in the students that used hints; if a student knows a significant majority of past students used hints, he or she would be less likely to feel that doing the same reflects negatively on their ability.

The post test (Figure 8) is a brief series of more challenging problems to gauge learning after the experimental treatment or lack thereof is administered. Correctness on this section is the primary dependent variable used in analysis.

Figure 4. Study design.
You are starting a Skill Builder on Finding the Whole from the Percent and Part.
To master this skill, you need to get 3 problems right in a row.

Select one:
- [ ] Ok!

Submit Answer

Figure 5. Control group message.

You are starting a Skill Builder on Finding the Whole from the Percent and Part.
To master this skill, you need to get 3 problems right in a row.
72% of students use ASSISTments’ hints to master this skill.

Select one:
- [ ] Ok!

Submit Answer

Figure 6. Percent hint usage message.

You are starting a Skill Builder on Finding the Whole from the Percent and Part.
To master this skill, you need to get 3 problems right in a row.
It takes students 10 problems (on average) to master this skill.

Select one:
- [ ] Ok!

Submit Answer

Figure 7. Average problems to mastery.
An art collector paid $7,000 for two paintings, a portrait and a landscape, at the same auction. Each painting cost $3,500. The collector predicts that the value of the landscape painting will increase by 15% per year. If she is correct, what will its value be one year after the date of purchase?

Type your answer below as a number (example: 5, 3.1, 4 1/2, or 3 1/2):

Submit Answer

Ms. Hendricks has 40 students. They get to school in different ways. 
- Half of her students take the bus to school.
- 1/5 of her students walk to school.
- The rest of her students ride to school with their parents.

What percentage of her students ride to school with their parents?

Type your answer below as a number (example: 5, 3.1, 4 1/2, or 3 1/2):

Submit Answer

Rebecca is doing a reading assignment. After 23 minutes of reading, she skims the pages she has left and estimates that she still has 54% of the assignment to finish. If she keeps reading at the same rate, how many minutes will it have taken Rebecca to complete her whole assignment?

Type your answer below as a number (example: 5, 3.1, 4 1/2, or 3 1/2):

Submit Answer

Figure 8. Post-test problems.
Study 3: Color-Coded Content and Student learning

**Introduction:**

Presentation of information plays a major role in education, especially in mathematics, where values are easily confused in the learning phase. A common remedy is color coding, in order to better differentiate between and emphasize each of the key parts of the problem. Color coding in general has been shown to improve comprehension, especially among field-dependent learners (Morre and Dwyer, 1991). ASSISTments Skill Builders already use such color-coded structure in word problems frequently, albeit in problem hints and other tutoring functionality. This study investigates if using color-coded content in the initial presentation of ASSISTments Skill Builder problems improves learning outcomes, as measured by a series of post-test problems.

**Methods:**

A seventh grade mathematics ASSISTments Skill Builder was used for this study. Here, the skills the problem set focus on are important, as color coded questions are more likely to have an effect if multiple, easily confusable values that cannot be used out of sequence are presented. For this reason, a set that tasked students with finding a given percentage of a given “whole” value was used.

The structure of the study is outlined in Figure 1. Students were randomly assigned into one of two groups: a control group, where the entire problem appeared in black text (Figure 2) and the treatment group, where each of the two values are highlighted in a different color (Figure 3). A post test consisting of more difficult problems (Figure 4) was used to measure learning after the Skill Builder, by making students apply the principles taught in the Skill Builder in a new way.
Tom has 883 gumballs. He decides to give 98% of them to a friend as a birthday present. How many gumballs does Tom give away?

Round your answer to the nearest whole number.
Problem ID: PRABUGZ

Tracy is running a lemonade stand. She expects to make $117 for the day, but ends up making 319% of that amount. How much money did Tracy make that day?

Type your answer below:

Submit Answer

Figure 11. Color-coded problem

Problem ID: PRABJJJJ

A map has a scale of 5 in. = 15 mi. If you measured the distance between two cities to be 26 in. on the map, how many miles would it actually be? If necessary, round your answer to the nearest tenth.

Type your answer below (mathematical expression):

Submit Answer

Problem ID: PRABJJUR

The height of the larger parallelogram, STRE, is 64. If the two parallelograms are similar, and the scale factor is 16, what is the height of parallelogram ANDK?

Type your answer below (mathematical expression):

Submit Answer

Problem ID: PRABJUX

Mr. O’Hara found that on a recent trip his car used 12 gallons of gas to drive 396 miles. Assume that m represents the number of miles driven and g represents the number of gallons of gas used.

What value makes the equation \( m = \frac{g}{32} \) represent the relationship between gallons of gas and miles driven?

Type your answer below as a number (examples: 5, 2, 4 1/2, or 3/2):

Submit Answer

Figure 12. Post-test problems
Study 4 – Word Problems vs Math Problems (Volume of a Sphere)

Hypothesis

Word problems help students develop a better understanding of mathematical concepts than just simply solving equations.

Introduction

Word problems are an incredibly useful educational tool. These types of problems show students how mathematical concepts can be applied in real world situations. Word problems also challenge students to make connections between what they are learning and skills they have already acquired. One of the advantages of mathematics as a discipline is that it improves our problem solving and critical thinking skills. Students have to analyze and fully understand the context of the problem before working towards the solution. The ability to derive mathematical equations from the problem description encourages creative thinking as there could be more than one approach to solve it. Some problems may need the application of multiple math concepts in order to reach a solution. Lastly, word problems help with skill retention, as newer concepts tend to stem from the foundations of old ones. (Mathnasium, 2018 & Thiagarajan, 2018)

Methods

The students are assigned to one of four treatment groups. Students assigned to the first and second treatment groups are asked to calculate the volume of a sphere given its radius – the first as math problems and the second as word problems. Students assigned to the third and fourth treatment groups are asked to calculate the volume of a sphere given its diameter – the former as math problems and the latter as word problems. In order to complete the Skill Builder, the students are required to either answer three consecutive questions correctly or to have attempted all 20 available questions. Students who successfully make it through the Skill Builder move on to the post-test.
For this study, the primary explanatory variable being tested is the type of problem that the students are exposed to (math or word). The response variable being measured is how the students perform on the post-test problems (% correct in ASSISTments). In order to eliminate any possible extraneous variables, the 20 questions for all treatment groups are exactly the same, the sole difference being how the questions are phrased. A second explanatory variable that could be tested is the information that is given (radius or diameter).

Figure 13. Study design.

Study 5 – Factoring vs the Quadratic Formula (Solving Quadratic Equations)

Hypothesis
Students who learn how to apply the quadratic formula will be more competent at solving quadratic equations than those who learn how to solve by factoring.

Introduction
Quadratic equations are of the form $ax^2 + bx + c = 0$, where $ax^2 + bx + c$ is a second-degree polynomial with $a, b, c \in \mathbb{R}$ and $a \neq 0$. Equations of this type can be solved using three different methods: factoring, completing the square or the quadratic formula.

*The Factoring Method*
The factoring method involves expressing our given quadratic as a product of two first-degree polynomials and then applying the Zero-Product Property. It states that if the product of two numbers is zero, then at least one of those numbers must equal zero. The advantage of using this method over the others is that it often the least time consuming. However, it can be shown that factoring only works if \(a, b,\) and \(c\) are integers and the solutions are rational numbers (integers and fractions).

Let \(ax^2 + bx + c = 0\) such that \(a, b, c \in \mathbb{Z}\) and \(a \neq 0\).

Find \(p, q \in \mathbb{Z}\) such that \(pq = ac\) and \(p + q = b\).

\[
ax^2 + (p + q)x + c = 0
\]

\[
ax \left( x + \frac{p}{a} \right) + q \left( x + \frac{c}{q} \right) = 0
\]

\[
ax \left( x + \frac{p}{a} \right) + q \left( x + \frac{p}{a} \right) = 0
\]

\[
(ax + q) \left( x + \frac{p}{a} \right) = 0
\]

\(ax + q = 0\) or \(x + \frac{p}{a} = 0\).

\[
x = -\frac{q}{a}, -\frac{p}{a}
\]

Hence by definition, \(x \in \mathbb{Q}\).

(Factoring quadratics: Leading coefficient \(\neq 1\), Khan Academy)

**The Quadratic Formula**

It can be proven that given the general form of a quadratic equation \(ax^2 + bx + c = 0\), the quadratic formula can be obtained by completing the square. The advantage that the quadratic formula has over factoring is that it always works, finding both real number and complex number solutions.
Let $ax^2 + bx + c = 0$ such that $a, b, c \in \mathbb{R}$ and $a \neq 0$.

$$ax^2 + bx = -c$$

$$x^2 + \frac{b}{a}x = -\frac{c}{a}$$

$$x^2 + \frac{b}{a}x + \left(\frac{b}{2a}\right)^2 = -\frac{c}{a} + \left(\frac{b}{2a}\right)^2$$

$$\left(x + \frac{b}{2a}\right)^2 = \frac{b^2}{4a^2} - \frac{c}{a}$$

$$\left(x + \frac{b}{2a}\right)^2 = \frac{b^2 - 4ac}{4a^2}$$

$$x + \frac{b}{2a} = \pm \frac{\sqrt{b^2 - 4ac}}{2a}$$

$$x = -\frac{b}{2a} \pm \frac{\sqrt{b^2 - 4ac}}{2a} = -\frac{b \pm \sqrt{b^2 - 4ac}}{2a}$$

(Quadratic formula proof review, Khan Academy)

The part of the quadratic formula under the square root ($b^2 - 4ac$) is known as the discriminant. The sign of the discriminant plays an important role in determining the number of solutions the equation has, as well as if they are real or complex. If the discriminant is positive, the equation has two real number solutions. If the discriminant is equal to zero, the equation has a repeated real solution. If the discriminant is negative, the equation has two complex number solutions. (Discriminant review, Khan Academy)

**Methods**

The students are randomly assigned to one of two treatment groups. Students assigned to the first treatment group are asked to solve the given problems by applying the quadratic formula. Those assigned to the second treatment group are asked to solve the given problems by factoring. In order to complete the Skill Builder, the students are required to either answer
three consecutive questions correctly or to have attempted all 15 available questions. Students who successfully make it through the Skill Builder move on to the post-test.

For this study, the explanatory variable being tested is the method students use to solve quadratic equations. The response variable being measured is how the students perform on the post-test problems (% correct). In order to eliminate any possible extraneous variables, the 15 questions for both treatment groups are exactly the same, the only difference being how the students are asked to solve the problems (factoring or the quadratic formula).

Figure 14. Study design.
Study 6 – Finding the Mean, Median, Mode, or Range

Research Question
When interleaving, how does the specific ordering of the skills affect the students' understanding of what they are learning?

Introduction
Interleaving is a useful studying technique in which students practice closely related skills in parallel. This way of learning has been shown to be quite beneficial. First of all, interleaving helps develop the brain’s ability to differentiate between concepts. Since each question is different from the last, the brain has to constantly be focused on searching for the proper approach to tackling the problem. It improves one’s ability to identify the key features of skills and concepts, enabling them to better understand what they are learning. Interleaving also results in the long-term retention of acquired knowledge. Because the correct solution differs from one question to the next, the brain constantly retrieves different responses and stores them in the student’s short-term memory. The repetition of this process can help students establish connections between different tasks and their proper response. (Pan, 2015 & University of Arizona, n.d.)

Methods
Since the study focuses on developing four closely related skills, there are 4! = 24 unique interleaving patterns, each which corresponds to its own treatment group. Students are assigned to one of 24 treatment groups. The explanatory variable being tested is the specific ordering of the problems. The response variable being measured is how the students perform on the Skill Builder (% correct, # problems to mastery, etc). The students are required to answer four consecutive questions correctly in order to complete the assignment, demonstrating mastery of all four skills.
Figure 15. Study design.
Study 7 – Metric vs. Imperial Conversion

Hypothesis
Students are more competent at converting between units in the Metric system than the Imperial system.

Introduction
The metric system is a system of measurement whose units are all related by a powers of 10. The base units of length, mass and liquid volume are the meter, gram and liter. The different units in the metric system are named by adding a prefix to the base unit. The table below shows the most commonly used prefixes and their corresponding power of 10.

<table>
<thead>
<tr>
<th>Prefix</th>
<th>Power of 10</th>
</tr>
</thead>
<tbody>
<tr>
<td>micro</td>
<td>$10^{-6}$</td>
</tr>
<tr>
<td>milli</td>
<td>$10^{-3}$</td>
</tr>
<tr>
<td>centi</td>
<td>$10^{-2}$</td>
</tr>
<tr>
<td>kilo</td>
<td>$10^3$</td>
</tr>
<tr>
<td>mega</td>
<td>$10^6$</td>
</tr>
<tr>
<td>giga</td>
<td>$10^9$</td>
</tr>
</tbody>
</table>

(The Metric System, n.d.)

The imperial system has multiple units for measuring length, mass and liquid volume. Length is measured in inches, feet, yards or miles. Mass is measured in ounces, pounds or tons. Liquid volume is measured in fluid ounces, cups, pints, quarts, or gallons. The table below illustrates the relationships between the imperial units.

| Length | 1 foot = 12 inches  
         | 1 yard = 3 feet  
         | 1 mile = 1760 yards |
|--------|---------------------|
| Mass   | 1 pound = 16 ounces  
<pre><code>     | 1 ton = 2000 pounds |
</code></pre>
<table>
<thead>
<tr>
<th>Liquid Volume</th>
<th>1 cup = 8 fluid ounces</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>1 pint = 2 cups</td>
</tr>
<tr>
<td></td>
<td>1 quart = 2 pints</td>
</tr>
<tr>
<td></td>
<td>1 gallon = 4 quarts</td>
</tr>
</tbody>
</table>

(Introduction to US Standard Units, n.d.)

Methods

Students are assigned to one of two treatment groups. Students assigned to the first treatment group practice converting between units in the metric system. Those assigned to the second treatment group are exposed to unit conversion using the imperial system. In order to complete the Skill Builder, the students are required to either answer five consecutive questions correctly or to have attempted all 20 available questions. Students who successfully make it through the Skill Builder move on to the post-test.

For this study, the explanatory variable being tested is the measurement system that the students are working with (metric or imperial). The response variable being measured is how the students perform on the Skill Builder (% correct, # problems to mastery, etc). The primary function of the post-test is simply as an extra challenge for the students. It contains one metric system conversion problem, one imperial system conversion problem, and two challenge problems that involve unit conversion between the two measurement systems.

Figure 16. Study design.
Analysis of Problem Set PSA59VC: Adaptive Difficulty and Competence

Since sufficient data was not available for the studies developed during this IQP, we decided to analyze a study developed in 2017-2018 by previous IQP student Nathaniel Dennler. This particular study focuses on adapting the difficulty of questions being asked to students’ performance in order to build a sense of competence, improving performance as suggested by SDT (Dennler, 2018). The structure of the study is outlined in Figure 17. Students were first randomly assigned into the adaptive (treatment) or non-adaptive (control) group. The non-adaptive group received an unaltered Skill Builder. The Adaptive Group was first given a diagnostic problem. If a student responded incorrectly to the diagnostic problem, that student first completed a series of problems that focused on fundamental skill, before advancing to the Skill Builder. These fluency problems, in theory, help prepare struggling students for the content of the problem set.

This study was chosen for having a relatively simple structure as well as being relevant to the high skill and low skill cross-section we can create in our data. In addition, the focus on self-perception of confidence is relevant to many of our own experimental designs.

Figure 17. Study Flowchart (Dennler, 2018).
Notes

- Not Applicable refers to students who were assigned to the non-adaptive control group, proceeding directly to the Skill Builder.
- Did not Receive Fluency Problem refers to students who were assigned to adaptive treatment group and answered the diagnostic question correctly, allowing them to proceed to the Skill Builder.
- Received Fluency Problem refers to students who were assigned to the adaptive treatment group and answered the diagnostic question incorrectly, requiring them to complete the easier problems before proceeding to Skill Builder.

Among the “low skilled” students, those assigned to the non-adaptive group answered, on average, approximately $0.3873 = 38.73\%$ of the post-test problems correctly (SD $\approx 0.3091$). Students assigned to the adaptive group and did not receive the easier fluency problems answered, on average, approximately $0.3985 = 39.85\%$ of the post-test problems correctly (SD $\approx 0.3109$). Students who were assigned to the adaptive group and had to complete the easier fluency problems answered, on average, approximately $0.3315 = 33.15\%$ of the post-test problems correctly (SD $\approx 0.3176$).
The ANOVA table gives an F statistic of 1.054 and a p-value of 0.349. Since the F statistic is small and the p-value is large, we have enough statistical evidence to conclude that among students that are considered low skilled, the effect of the easier fluency problems is insignificant. This conclusion is further supported by observing the 95% confidence intervals of the difference of means and noticing that every interval contains zero.

The ANOVA table gives an F statistic of 1.054 and a p-value of 0.349. Since the F statistic is small and the p-value is large, we have enough statistical evidence to conclude that among students that are considered low skilled, the effect of the easier fluency problems is insignificant. This conclusion is further supported by observing the 95% confidence intervals of the difference of means and noticing that every interval contains zero.
Among the “high skilled” students, those assigned to the non-adaptive group answered, on average, approximately 0.5544 = 55.44% of the post-test problems correctly (SD ≈ 0.3160). Students assigned to the adaptive group and did not receive the easier fluency problems answered, on average, approximately 0.5997 = 59.97% of the post-test problems correctly (SD ≈ 0.3188). Students who were assigned to the adaptive group and had to complete the easier fluency problems answered, on average, approximately 0.4246 = 42.46% of the post-test problems correctly (SD ≈ 0.2716).

### ANOVA

#### Posttest Results

<table>
<thead>
<tr>
<th>Sum of Squares</th>
<th>df</th>
<th>Mean Square</th>
<th>F</th>
<th>Sig.</th>
</tr>
</thead>
<tbody>
<tr>
<td>Between Groups</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>1.292</td>
<td>2</td>
<td>.646</td>
<td>6.633</td>
<td>.001</td>
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<tr>
<td>Within Groups</td>
<td>455</td>
<td>.097</td>
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<tr>
<td>Total</td>
<td>457</td>
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a. High Skill = High Skill

### Multiple Comparisons

<table>
<thead>
<tr>
<th>(I) Fluency</th>
<th>(J) Fluency</th>
<th>Mean Difference (I-J)</th>
<th>Std. Error</th>
<th>Sig.</th>
<th>95% Confidence Interval</th>
<th>Lower Bound</th>
<th>Upper Bound</th>
</tr>
</thead>
<tbody>
<tr>
<td>Did not Receive Fluency</td>
<td>Received Fluency Problem</td>
<td>.17507003*</td>
<td>.048073622</td>
<td>.001</td>
<td>.059555602 – .290584454</td>
<td>.059555602</td>
<td>.290584454</td>
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<tr>
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<td></td>
<td>.045314965</td>
<td>.031500372</td>
<td>.453</td>
<td>–.03037618 – .121006106</td>
<td>–.03037618</td>
<td>.121006106</td>
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<tr>
<td>Received Fluency Problem</td>
<td>Did not Receive Fluency</td>
<td>–.17507003*</td>
<td>.048073622</td>
<td>.001</td>
<td>–.29058445 – .05955560</td>
<td>–.29058445</td>
<td>.05955560</td>
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<tr>
<td>Not Applicable</td>
<td></td>
<td>–.1297551*</td>
<td>.046454666</td>
<td>.016</td>
<td>–.24137936 – .01813077</td>
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<td>Did not Receive Fluency</td>
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<td>Received Fluency Problem</td>
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<td>.046454666</td>
<td>.016</td>
<td>.01813077 – .241379355</td>
<td>.01813077</td>
<td>.241379355</td>
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* The mean difference is significant at the 0.05 level.
a. High Skill = High Skill

The ANOVA table gives an F statistic of 6.633 and a p-value of 0.001. Since the F statistic is large and the p-value is small, we have enough statistical evidence to conclude that among students that are considered high skilled, the effect of the easier fluency problems is significant. The specific details of this conclusion can be found by observing the 95% confidence intervals of the difference of means.
The 95% confidence interval (0.0596, 0.2906) does not contain zero, hence we have sufficient evidence to conclude that among students that are considered high skilled, those who did not receive the easier fluency problems performed significantly better on the post test than students who did.

The 95% confidence interval (–0.2414, –0.0181) does not contain zero, hence we have sufficient evidence to conclude that among students that are considered high skilled, those who received the easier fluency problems performed significantly worse than students assigned to the non-adaptive control group.

Discussion

From most of these analyses, it is difficult to prove the directionality of effect; low skill students are expected to be less likely overall to perform well on the post test. Therefore, the most meaningful conclusions that can be drawn are those that keep within the high and low skill strata that were determined using the students’ historical performance in ASSISTments Skill Builders. Those below median correctness were considered low skill, and those above the median were high skill.

This adaptive problem set was mainly intended to boost the performance of low performing students by identifying those who need remedial, or “fluency” problems. To this end, it was determined that there was no significant difference between the mean post test correctness of low skill students in the non adaptive and adaptive experimental group, as well as between those within the adaptive group that did and did not pass the diagnostic problem. Interestingly, high skill students appeared adversely affected by the presence of a fluency problem. Directionality is an important and likely explanation; high skill students closer to the low skill cutoff may receive the fluency problem and go on to perform worse on the post test due to their skill, not the intervention. However, it is possible that high skill students who are given fluency problems believe they are performing below their level, thus damaging their perception of competence and leading to worse performance. This response, if established with further experimentation, may be mitigated by modifying the message that appears before fluency problems such that it is not implied the student has performed poorly.

It is important to note throughout this analysis the low number of post test questions, and the lack of sensitivity this confers to statistical techniques. Increasing the number of post test
problems may be able to show the presence of a more subtle effect among low skill students. As previously described, specific testing may reveal the fluency problem message to be significant in the efficacy of the adaptive intervention.

Conclusion

In this IQP, the entire course of an ASSISTments study (theory, design, implementation, and analysis) was performed, with adjustments due to logistical limitations. Pending the collection of more data, our own study designs have been saved on the OSF, to be analyzed at a later date. From the study we analyzed, we found no significant positive effect of adaptive intervention, but discovered an interesting trend among high-skill students that may suggest a significant negative effect, warranting further investigation.

We hope the seven studies currently accumulating participants are of use to the next IQP group, or other ASSISTments researchers, and yield useful data.

References


Appendix: Problem Sets
1) Problem #PRABWY4 "PRABWY4 - Setting Up Proportions"
When making tea, you use 14 spoons of sugar for every 5 quarts of tea. Which of the following equations can be used to calculate \( c \), the number of spoons of sugar needed when using 20 quarts of tea?

A. \[
\frac{20}{5} = \frac{14}{c}
\]

B. \[
\frac{20}{14} = \frac{c}{5}
\]

C. \[
\frac{5}{14} = \frac{c}{20}
\]

D. \[
\frac{14}{5} = \frac{c}{20}
\]

Multiple Choice:

A. ✗
B. ✗
C. ✗
D. ✔

Hints:
The problem is about the following ratio

number of spoons of sugar : number of quarts of tea
Line up the labels that are on the top and bottom of the fractions.

spoons of sugar on the top

____________________
quarts of tea on the bottom

We know that 14 spoons of sugar is needed for every 5 quarts of tea used. This means that

14 : 5
We also know that \( c \) spoons of sugar is needed for every 20 quarts of tea used. This means that

\[
\frac{c}{20}
\]

or

\[
\frac{c \text{ spoons of sugar}}{20 \text{ quarts of tea}}
\]

The labels on the two equations from the previous two hints are lined up on the top and bottom.

This means that the proportions are equal to each other. Therefore,

\[
\frac{14}{5} = \frac{c}{20}
\]

This is an equation that can be used to find \( c \), the number of spoons of sugar needed for 20 quarts of tea. So the answer is D. Select D.

2) Problem #PRABWV8 "PRABWV8 - Setting Up Proportions"
When making tea, you use 7 spoons of sugar for every 8 quarts of tea. Which of the following equations
can be used to calculate $c$, the number of spoons of sugar needed for 9 quarts of tea?

**Multiple Choice:**

- ✔️ $\frac{7}{8} = \frac{c}{9}$
- ✗ $\frac{7}{8} = \frac{9}{c}$
- ✗ $\frac{7}{9} = \frac{8}{c}$
- ✗ $\frac{9}{8} = \frac{7}{c}$

**Hints:**

The problem is about the following ratio:

number of spoons of sugar : number of quarts of tea

This ratio means that

spoons of sugar on the top

__________________________

quarts of tea on the bottom
We know that 7 spoons of sugar is needed for every 8 quarts of tea used. This means that

\[ 7 : 8 \]

or

\[
\frac{7 \text{ spoons of sugar}}{8 \text{ quarts of tea}}
\]

We also know that \( c \) spoons of sugar is needed for every 9 quarts of tea used. This means that
When doing the laundry, you use 4 cups of detergent for every 16 gallons of water. Which of the following equations can be used to calculate \( c \), the number of cups of detergent needed for 29 gallons of water?

**Multiple Choice:**
- ✔️ \( \frac{4}{16} = \frac{c}{29} \)
- ☓️ \( \frac{4}{16} = \frac{29}{c} \)
- ☓️ \( \frac{4}{29} = \frac{16}{c} \)
- ☓️ \( \frac{29}{16} = \frac{4}{c} \)

**Hints:**
The problem is about the following ratio

number of cups of detergent : number of gallons of water
This ratio means that

cups of detergent on the top
_________

gallons of water on the bottom

We know that 4 cups of detergent is needed for every 16 gallons of water used. This means that

4 : 16
or

4 cups of detergent

16 gallons of water

We also know that $c$ cups of detergent is needed for every 29 gallons of water used. This means that

$c : 29$

or

$c$ cups of detergent

$\frac{\text{c}}{\text{29 gallons of water}}$

Notice labels on the two equations from the previous two hints are lined up on the top and bottom.

This means that the proportions are equal to each other. Therefore,

$\frac{4}{16} = \frac{c}{29}$

This is an equation that can be used to find $c$, the number of cups of detergent needed for 29 gallons of water.

So the answer is $4/16 = c/29$. 
4) Problem #PRABWXT "PRABWXT - Setting Up Proportions"
When making tea, you use 8 spoons of sugar for every 12 quarts of tea. Which of the following equations can be used to calculate \( c \), the number of spoons of sugar needed when using 21 quarts of tea?

A. \[
\frac{12}{8} = \frac{c}{21}
\]

B. \[
\frac{8}{12} = \frac{c}{21}
\]

C. \[
\frac{12}{21} = \frac{c}{8}
\]

D. \[
\frac{21}{8} = \frac{c}{12}
\]

Multiple Choice:

- A
- B
- C
- D

Hints:
- The problem is about the following ratio:

  \[
  \text{number of spoons of sugar} : \text{number of quarts of tea}
  \]

- Line up the labels that are on the top and bottom of the fractions.

  \[
  \text{spoons of sugar} \text{ on the top}
  
  \text{quarts of tea} \text{ on the bottom}
  \]

- We know that 8 spoons of sugar is needed for every 12 quarts of tea used. This means that

  \[
  8 : 12
  \]
8 spoons of sugar
---
12 quarts of tea

- We also know that \( c \) spoons of sugar is needed for every 21 quarts of tea used. This means that
  \[
  c : 21
  \]
  or
  \[
  \frac{c \text{ spoons of sugar}}{21 \text{ quarts of tea}}
  \]
- Notice the labels on the two equations from the previous two hints are lined up on the top and bottom.
  This means that the proportions are equal to each other. Therefore,
  \[
  \frac{8}{12} = \frac{c}{21}
  \]
  This is an equation that can be used to find \( c \), the number of spoons of sugar needed for 21 quarts of tea.
  So the answer is B. Select B.

---

5) Problem #PRABWXF "PRABWXF - Setting Up Proportions"
When making tea, you use 11 spoons of sugar for every 21 quarts of tea. Which of the following equations can be used to calculate \( c \), the number of spoons of sugar needed when using 35 quarts of tea?

A. \[
\frac{21}{11} = \frac{c}{35}
\]

B. \[
\frac{11}{21} = \frac{c}{35}
\]

C. \[
\frac{21}{35} = c
\]
Multiple Choice:

- A
- ✔️ B
- ✗ C
- ✗ D

Hints:
- The problem is about the following ratio
  \[ \text{number of spoons of sugar} : \text{number of quarts of tea} \]
- Line up the labels that are on the top and bottom of the fractions.

  - spoons of sugar on the top
  - quarts of tea on the bottom

- We know that 11 spoons of sugar is needed for every 21 quarts of tea used. This means that
  \[ 11 : 21 \]
  - or
  \[ 11 \text{ spoons of sugar} : 21 \text{ quarts of tea} \]

- We also know that \( c \) spoons of sugar is needed for every 35 quarts of tea used. This means that
  \[ c : 35 \]
  - or
  \[ c \text{ spoons of sugar} : 35 \text{ quarts of tea} \]

- Notice the labels on the two equations from the previous two hints are lined up on the top and
This means that the proportions are equal to each other. Therefore,

\[
\frac{11}{21} = \frac{c}{35}
\]

This is an equation that can be used to find \( c \), the number of spoons of sugar needed for 35 quarts of tea. So the answer is B. Select B.

6) Problem #PRABWZF "PRABWZF - Setting Up Proportions"

When doing the laundry, you use 17 cups of detergent for every 13 gallons of water. Which of the following equations can be used to calculate \( c \), the number of cups of detergent needed when using 28 gallons of water?

A. \[
\frac{28}{13} = \frac{17}{c}
\]

B. \[
\frac{28}{17} = \frac{c}{13}
\]

C. \[
\frac{13}{17} = \frac{c}{28}
\]

D. \[
\frac{17}{13} = \frac{c}{28}
\]

Multiple Choice:

X X A
X X B
X X C
✓ D

Hints:

- The problem is about the following ratio
number of cups of detergent : number of gallons of water

- Line up the labels that are on the top and bottom of the fractions.

  cups of detergent on the top

  ________________________________

gallons of water on the bottom

- We know that 17 cups of detergent is needed for every 13 gallons of water used. This means that
  
  \[ 17 : 13 \]
  
  or
  
  \[ \frac{17 \text{ cups of detergent}}{13 \text{ gallons of water}} \]

- We also know that \( c \) cups of detergent is needed for every 28 gallons of water used. This means that
  
  \[ c : 28 \]
  
  or
  
  \[ \frac{c \text{ cups of detergent}}{28 \text{ gallons of water}} \]

- The labels on the two equations from the previous two hints are lined up on the top and bottom.

This means that the proportions are equal to each other. Therefore,

\[
\frac{17}{13} = \frac{c}{28}
\]

This is an equation that can be used to find \( c \), the number of cups of detergent needed for 28 gallons of water. So the answer is D. Select D.

7) Problem #PRABWZE "PRABWZE - Setting Up Proportions"

When making tea, you use 20 spoons of sugar for every 14 quarts of tea. Which of the following equations can be used to calculate \( c \), the number of spoons of sugar needed when using 18 quarts of tea?
A. \[
\begin{array}{c}
18 = 20 \\
14 \quad c
\end{array}
\]

B. \[
\begin{array}{c}
18 = c \\
20 \quad 14
\end{array}
\]

C. \[
\begin{array}{c}
14 = c \\
20 \quad 18
\end{array}
\]

D. \[
\begin{array}{c}
20 = c \\
14 \quad 18
\end{array}
\]

Multiple Choice:

- **X** A
- **X** B
- **X** C
- **✓** D

Hints:

The problem is about the following ratio:

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The problem is about the following ratio...
number of spoons of sugar : number of quarts of tea

Line up the labels that are on the top and bottom of the fractions.

spoons of sugar on the top

quarts of tea on the bottom

We know that 20 spoons of sugar is needed for every 14 quarts of tea used. This means that

20 : 14
or

20 spoons of sugar

14 quarts of tea

We also know that $c$ spoons of sugar is needed for every 18 quarts of tea used. This means that

$$c : 18$$

or

$$c \text{ spoons of sugar}$$

$$18 \text{ quarts of tea}$$
The labels on the two equations from the previous two hints are lined up on the top and bottom.

This means that the proportions are equal to each other. Therefore,

\[
\frac{20}{14} = \frac{c}{18}
\]

This is an equation that can be used to find \( c \), the number of spoons of sugar needed for 18 quarts of tea. So the answer is D. Select D.

---

8) Problem #PRABWV9 "PRABWV9 - Setting Up Proportions"

When doing the laundry, you use 10 cups of detergent for every 19 gallons of water. Which of the following equations can be used to calculate \( c \), the number of cups of detergent needed for 29 gallons of water?

**Multiple Choice:**

- ✅ \( \frac{10}{19} = \frac{c}{29} \)
- ✗ \( \frac{10}{19} = \frac{29}{c} \)
- ✗ \( \frac{10}{29} = \frac{19}{c} \)
- ✗ \( \frac{29}{19} = \frac{10}{c} \)

**Hints:**
The problem is about the following ratio

**number of cups of detergent : number of gallons of water**

This ratio means that

**cups of detergent** on the top

**gallons of water** on the bottom
We know that 10 cups of detergent is needed for every 19 gallons of water used. This means that

\[ 10 : 19 \]

or

\[ \frac{10 \text{ cups of detergent}}{19 \text{ gallons of water}} \]

We also know that \( c \) cups of detergent is needed for every 29 gallons of water used. This means that...
Notice labels on the two equations from the previous two hints are lined up on the top and bottom. This means that the proportions are equal to each other. Therefore,

\[
\frac{10}{19} = \frac{c}{29}
\]

This is an equation that can be used to find \( c \), the number of cups of detergent needed for 29 gallons of water. So the answer is \( \frac{10}{19} = \frac{c}{29} \).

9) Problem #PRABWWT "PRABWWT - Setting Up Proportions"

When making tea, you use 2 spoons of sugar for every 15 quarts of tea. Which of the following equations can be used to calculate \( c \), the number of spoons of sugar needed for 20 quarts of tea?

**Multiple Choice:**

✓ 2/15 = c/20
\[ \frac{2}{15} = \frac{20}{c} \]
\[ \frac{2}{20} = \frac{15}{c} \]
\[ \frac{20}{15} = \frac{2}{c} \]

**Hints:**

The problem is about the following ratio

number of spoons of sugar : number of quarts of tea

This ratio means that

spoons of sugar on the top
quarts of tea on the bottom

We know that 2 spoons of sugar is needed for every 15 quarts of tea used. This means that

$$\frac{2}{15}$$

or

$$\frac{2 \text{ spoons of sugar}}{15 \text{ quarts of tea}}$$
We also know that \( c \) spoons of sugar is needed for every 20 quarts of tea used. This means that

\[
\frac{c}{20}
\]

or

\[
\frac{c \text{ spoons of sugar}}{20 \text{ quarts of tea}}
\]

Notice labels on the two equations from the previous two hints are lined up on the top and bottom. This means that the proportions are equal to each other. Therefore,

\[
\frac{2}{15} = \frac{c}{20}
\]

This is an equation that can be used to find \( c \), the number of spoons of sugar needed for 20 quarts of tea. So the answer is \( 2/15 = c/20 \).

10) Problem #PRABWWK "PRABWWK - Setting Up Proportions"

When doing the laundry, you use 18 cups of detergent for every 14 gallons of water. Which of the following equations can be used to calculate \( c \), the number of cups of detergent needed for 31 gallons of water?

Multiple Choice:
\[ \frac{18}{14} = \frac{c}{31} \]

**Hints:**

- The problem is about the following ratio

  number of cups of detergent : number of gallons of water

- This ratio means that

  cups of detergent on the top

  \[ \frac{\text{cups of detergent}}{\text{gallons of water}} \]

- We know that 18 cups of detergent is needed for every 14 gallons of water used. This means that

  \[ 18 : 14 \]

  or

  \[ \frac{18 \text{ cups of detergent}}{14 \text{ gallons of water}} \]

- We also know that c cups of detergent is needed for every 31 gallons of water used. This means that

  \[ c : 31 \]

  or

  \[ \frac{c \text{ cups of detergent}}{31 \text{ gallons of water}} \]

- Notice labels on the two equations from the previous two hints are lined up on the top and bottom.

  This means that the proportions are equal to each other. Therefore,

  \[ \frac{18}{14} = \frac{31}{c} \]
This is an equation that can be used to find $c$, the number of cups of detergent needed for 31 gallons of water.
So the answer is $18/14 = c/31$.

11) Problem #PRABWYG "PRABWYG - Setting Up Proportions"

When doing the laundry, you use 2 cups of detergent for every 11 gallons of water. Which of the following equations can be used to calculate $c$, the number of cups of detergent needed when using 15 gallons of water?

A. \[
\frac{2}{11} = \frac{15}{c}
\]

B. \[
\frac{2}{15} = \frac{11}{c}
\]

C. \[
\frac{2}{11} = \frac{c}{15}
\]

D. \[
\frac{15}{2} = \frac{c}{11}
\]

Multiple Choice:

- A
- B
- C
- D

Hints:

- The problem is about the following ratio

  number of cups of detergent : number of gallons of water

- Line up the labels that are on the top and bottom of the fractions.

  cups of detergent on the top

  gallons of water on the bottom
We know that 2 cups of detergent is needed for every 11 gallons of water used. This means that

\[ \frac{2}{11} \]

or

\[ \frac{2 \text{ cups of detergent}}{11 \text{ gallons of water}} \]

We also know that \( c \) cups of detergent is needed for every 15 gallons of water used. This means that

\[ \frac{c}{15} \]

or

\[ \frac{c \text{ cups of detergent}}{15 \text{ gallons of water}} \]

The labels on the two equations from the previous two hints are lined up on the top and bottom. This means that the proportions are equal to each other. Therefore,

\[ \frac{2}{11} = \frac{c}{15} \]

This is an equation that can be used to find \( c \), the number of cups of detergent needed for 15 gallons of water. So the answer is C. Select C.

12) Problem #PRABWXJ "PRABWXJ - Setting Up Proportions"

When making tea, you use 16 spoons of sugar for every 5 quarts of tea. Which of the following equations can be used to calculate \( c \), the number of spoons of sugar needed when using 10 quarts of tea?

A. \[ \frac{5}{16} = \frac{c}{10} \]

B. \[ 16 = c \]
Multiple Choice:

Hints:
- The problem is about the following ratio

number of spoons of sugar : number of quarts of tea
- Line up the labels that are on the top and bottom of the fractions.

spoons of sugar on the top

--------------------
quarts of tea on the bottom

- We know that 16 spoons of sugar is needed for every 5 quarts of tea used. This means that

16 : 5

or

16 spoons of sugar

--------------------
5 quarts of tea

- We also know that c spoons of sugar is needed for every 10 quarts of tea used. This means that

c : 10

or
Notice the labels on the two equations from the previous two hints are lined up on the top and bottom. This means that the proportions are equal to each other. Therefore,

\[
\frac{16}{5} = \frac{c}{10}
\]

This is an equation that can be used to find \( c \), the number of spoons of sugar needed for 10 quarts of tea. So the answer is B. Select B.

13) Problem #PRABWYQ "PRABWYQ - Setting Up Proportions"
When making tea, you use 12 spoons of sugar for every 10 quarts of tea. Which of the following equations can be used to calculate \( c \), the number of spoons of sugar needed when using 13 quarts of tea?

A. \[
\frac{12}{10} = \frac{13}{c}
\]

B. \[
\frac{12}{13} = \frac{10}{c}
\]

C. \[
\frac{12}{10} = \frac{c}{13}
\]

D. \[
\frac{13}{12} = \frac{c}{10}
\]

Multiple Choice:
- ✗ A
- ✗ B
- C
Hints:

- The problem is about the following ratio

  number of spoons of sugar : number of quarts of tea

- Line up the labels that are on the top and bottom of the fractions.

  spoons of sugar on the top
  ____________________________
  quarts of tea on the bottom

- We know that 12 spoons of sugar is needed for every 10 quarts of tea used. This means that

  12 : 10

  or

  12 spoons of sugar
  ____________________
  10 quarts of tea

- We also know that c spoons of sugar is needed for every 13 quarts of tea used. This means that

  c : 13

  or

  c spoons of sugar
  ____________________
  13 quarts of tea

- The labels on the two equations from the previous two hints are lined up on the top and bottom.

  This means that the proportions are equal to each other. Therefore,

  \[
  \frac{12}{10} = \frac{c}{13}
  \]
This is an equation that can be used to find \( c \), the number of spoons of sugar needed for 13 quarts of tea. So the answer is C. Select C.

14) Problem #PRABWY6 "PRABWY6 - Setting Up Proportions"
When making tea, you use 17 spoons of sugar for every 4 quarts of tea. Which of the following equations can be used to calculate \( c \), the number of spoons of sugar needed when using 17 quarts of tea?

A. \[
\frac{17}{4} = \frac{c}{17}
\]

B. \[
\frac{17}{4} = \frac{c}{17}
\]

C. \[
\frac{4}{17} = \frac{c}{17}
\]

D. \[
\frac{17}{4} = \frac{c}{17}
\]

Multiple Choice:

- A
- B
- C
- D

Hints:
- The problem is about the following ratio

  \text{number of spoons of sugar} : \text{number of quarts of tea}

- Line up the labels that are on the top and bottom of the fractions.

  \text{spoons of sugar} \text{ on the top}

  \text{quarts of tea} \text{ on the bottom}

- We know that 17 \text{spoons of sugar} is needed for every 4 \text{quarts of tea} used. This means that
17 : 4

or

17 spoons of sugar

____________________
4 quarts of tea

- We also know that \( c \) spoons of sugar is needed for every 17 quarts of tea used. This means that

\[ c : 17 \]

or

\[ \frac{c \text{ spoons of sugar}}{17 \text{ quarts of tea}} \]

- The labels on the two equations from the previous two hints are lined up on the top and bottom. This means that the proportions are equal to each other. Therefore,

\[ \frac{17}{4} = \frac{c}{17} \]

This is an equation that can be used to find \( c \), the number of spoons of sugar needed for 17 quarts of tea. So the answer is D. Select D.

15) Problem #PRABWW5 "PRABWW5 - Setting Up Proportions"
When making tea, you use 12 spoons of sugar for every 17 quarts of tea. Which of the following equations can be used to calculate \( c \), the number of spoons of sugar needed for 18 quarts of tea?

Multiple Choice:
1. \( \frac{12}{17} = \frac{c}{18} \) [✓]
2. \( \frac{12}{17} = \frac{18}{c} \) [✗]
3. \( \frac{12}{18} = \frac{17}{c} \) [✗]
4. \( \frac{18}{17} = \frac{12}{c} \) [✗]

Hints:
- The problem is about the following ratio
number of spoons of sugar : number of quarts of tea

- This ratio means that

  spoons of sugar on the top

  ______

  quarts of tea on the bottom

- We know that 12 spoons of sugar is needed for every 17 quarts of tea used. This means that

  12 : 17

  or

  12 spoons of sugar

  ______

  17 quarts of tea

- We also know that c spoons of sugar is needed for every 18 quarts of tea used. This means that

  c : 18

  or

  c spoons of sugar

  ______

  18 quarts of tea

- Notice labels on the two equations from the previous two hints are lined up on the top and bottom. This means that the proportions are equal to each other. Therefore,

  12  c

  ______ = ______

  17  18

This is an equation that can be used to find c, the number of spoons of sugar needed for 18 quarts of tea. So the answer is 12/17 = c/18.

16) Problem #PRABWY5 "PRABWY5 - Setting Up Proportions"
When doing the laundry, you use 13 cups of detergent for every 13 gallons of water. Which of the following equations can be used to calculate c, the number of cups of detergent needed when using 28 gallons of water?
Multiple Choice:

A. \[
\frac{28}{13} = \frac{13}{c}
\]

B. \[
\frac{28}{13} = \frac{c}{13}
\]

C. \[
\frac{13}{13} = \frac{c}{28}
\]

D. \[
\frac{13}{13} = \frac{c}{28}
\]

Hints:
- The problem is about the following ratio
  \[
  \text{number of cups of detergent} : \text{number of gallons of water}
  \]
- Line up the labels that are on the top and bottom of the fractions.
  \[
  \text{cups of detergent} \quad \text{on the top}
  \]
  \[
  \text{gallons of water} \quad \text{on the bottom}
  \]
- We know that \text{13 cups of detergent} is needed for every \text{13 gallons of water} used. This means that
  \[
  13 : 13
  \]
  or
  \[
  \frac{13 \text{ cups of detergent}}{13 \text{ gallons of water}}
  \]
• We also know that \( c \) cups of detergent is needed for every 28 gallons of water used. This means that

\[
c : 28
\]

or

\[
\frac{c \text{ cups of detergent}}{28 \text{ gallons of water}}
\]

• The labels on the two equations from the previous two hints are lined up on the top and bottom. This means that the proportions are equal to each other. Therefore,

\[
\frac{13}{28} = \frac{c}{c}
\]

This is an equation that can be used to find \( c \), the number of cups of detergent needed for 28 gallons of water. So the answer is D. Select D.

17) Problem #PRABWWC "PRABWWC - Setting Up Proportions"
When making tea, you use 16 spoons of sugar for every 18 quarts of tea. Which of the following equations can be used to calculate \( c \), the number of spoons of sugar needed for 23 quarts of tea?

Multiple Choice:

✓ 16/18 = c/23
✗ 16/18 = 23/c
✗ 16/23 = 18/c
✗ 23/18 = 16/c

Hints:
• The problem is about the following ratio

number of spoons of sugar : number of quarts of tea

• This ratio means that

spoons of sugar on the top

________________________

quarts of tea on the bottom
• We know that 16 spoons of sugar is needed for every 18 quarts of tea used. This means that

\[ 16 : 18 \]

or

\[
\begin{array}{c}
16 \text{ spoons of sugar} \\
\hline
18 \text{ quarts of tea}
\end{array}
\]

• We also know that \( c \) spoons of sugar is needed for every 23 quarts of tea used. This means that

\[ c : 23 \]

or

\[
\begin{array}{c}
c \text{ spoons of sugar} \\
\hline
23 \text{ quarts of tea}
\end{array}
\]

• Notice labels on the two equations from the previous two hints are lined up on the top and bottom. This means that the proportions are equal to each other. Therefore,

\[
\frac{16}{18} = \frac{c}{23}
\]

This is an equation that can be used to find \( c \), the number of spoons of sugar needed for 23 quarts of tea. So the answer is \( 16/18 = c/23 \).

18) Problem #PRABWYU "PRABWYU - Setting Up Proportions"
When making tea, you use 20 spoons of sugar for every 19 quarts of tea. Which of the following equations can be used to calculate \( c \), the number of spoons of sugar needed when using 21 quarts of tea?

A. \[
\frac{21}{19} = \frac{20}{c}
\]

B. \[
\frac{21}{20} = \frac{c}{19}
\]
Multiple Choice:

A
B
C
D

Hints:

- The problem is about the following ratio:

  \[ \frac{\text{number of spoons of sugar}}{\text{number of quarts of tea}} \]

- Line up the labels that are on the top and bottom of the fractions.

  - spoons of sugar on the top
  - quarts of tea on the bottom

- We know that 20 spoons of sugar is needed for every 19 quarts of tea used. This means that

  \[ 20 : 19 \]

  or

  \[ \frac{20 \text{ spoons of sugar}}{19 \text{ quarts of tea}} \]

- We also know that c spoons of sugar is needed for every 21 quarts of tea used. This means that

  \[ c : 21 \]

  or

  \[ \frac{c \text{ spoons of sugar}}{21 \text{ quarts of tea}} \]
21 quarts of tea

- The labels on the two equations from the previous two hints are lined up on the top and bottom.

This means that the proportions are equal to each other. Therefore,

\[
\frac{20}{19} = \frac{c}{21}
\]

This is an equation that can be used to find \( c \), the number of spoons of sugar needed for 21 quarts of tea. So the answer is D. Select D.

19) Problem #PRABWWJ "PRABWWJ - Setting Up Proportions"
When making tea, you use 5 spoons of sugar for every 19 quarts of tea. Which of the following equations can be used to calculate \( c \), the number of spoons of sugar needed for 27 quarts of tea?

Multiple Choice:
- \( \frac{5}{19} = \frac{c}{27} \)
- \( \frac{5}{19} = \frac{27}{c} \)
- \( \frac{5}{27} = \frac{19}{c} \)
- \( \frac{27}{19} = \frac{5}{c} \)

Hints:
- The problem is about the following ratio

number of spoons of sugar : number of quarts of tea

- This ratio means that

spoons of sugar on the top

\[ \frac{\text{spoons of sugar}}{\text{quarts of tea}} \]

- We know that 5 spoons of sugar is needed for every 19 quarts of tea used. This means that

\[ 5 : 19 \]

or

\[ 5 \text{ spoons of sugar} \]
We also know that \( c \) spoons of sugar is needed for every 27 quarts of tea used. This means that

\[
\frac{c}{27} = \frac{5}{19} = \frac{c}{27}
\]

Notice labels on the two equations from the previous two hints are lined up on the top and bottom. This means that the proportions are equal to each other. Therefore,

\[
\frac{c}{27} = \frac{5}{19} = \frac{c}{27}
\]

This is an equation that can be used to find \( c \), the number of spoons of sugar needed for 27 quarts of tea. So the answer is \( \frac{5}{19} = c/27 \).

---

20) Problem #PRABWX9 "PRABWX9 - Setting Up Proportions"

When making tea, you use 21 spoons of sugar for every 18 quarts of tea. Which of the following equations can be used to calculate \( c \), the number of spoons of sugar needed when using 30 quarts of tea?

A. \[
\frac{21}{18} = \frac{30}{c}
\]

B. \[
\frac{21}{30} = \frac{18}{c}
\]

C. \[
\frac{21}{18} = \frac{c}{30}
\]

D. \[
\frac{30}{18} = \frac{c}{c}
\]
Multiple Choice:

- A
- B
- C
- D

Hints:
- The problem is about the following ratio

\[ \frac{\text{number of spoons of sugar}}{\text{number of quarts of tea}} \]
- Line up the labels that are on the top and bottom of the fractions.

\[ \frac{\text{spoons of sugar}}{\text{quarts of tea}} \]

- We know that 21 spoons of sugar is needed for every 18 quarts of tea used. This means that

\[ 21 : 18 \]

or

\[ \frac{21 \text{ spoons of sugar}}{18 \text{ quarts of tea}} \]

- We also know that \( c \) spoons of sugar is needed for every 30 quarts of tea used. This means that

\[ c : 30 \]

or

\[ \frac{c \text{ spoons of sugar}}{30 \text{ quarts of tea}} \]

- The labels on the two equations from the previous two hints are lined up on the top and bottom.

This means that the proportions are equal to each other. Therefore,

\[ 21 \quad c \]
This is an equation that can be used to find \( c \), the number of spoons of sugar needed for 30 quarts of tea. So the answer is C. Select C.

21) Problem #PRABWYA "PRABWYA - Setting Up Proportions"
When doing the laundry, you use 18 cups of detergent for every 12 gallons of water. Which of the following equations can be used to calculate \( c \), the number of cups of detergent needed when using 16 gallons of water?

A. \[
\frac{18}{12} = \frac{16}{c}
\]

B. \[
\frac{18}{16} = \frac{12}{c}
\]

C. \[
\frac{18}{12} = \frac{c}{16}
\]

D. \[
\frac{16}{18} = \frac{c}{12}
\]

Multiple Choice:
- \( \times \) A
- \( \times \) B
- \( \checkmark \) C
- \( \times \) D

Hints:
- The problem is about the following ratio

  \text{number of cups of detergent : number of gallons of water}

- Line up the labels that are on the top and bottom of the fractions.

  \text{cups of detergent on the top}
We know that 18 cups of detergent is needed for every 12 gallons of water used. This means that

\[ \frac{18}{12} \]

or

\[ \frac{18 \text{ cups of detergent}}{12 \text{ gallons of water}} \]

We also know that \( c \) cups of detergent is needed for every 16 gallons of water used. This means that

\[ \frac{c}{16} \]

or

\[ \frac{c \text{ cups of detergent}}{16 \text{ gallons of water}} \]

The labels on the two equations from the previous two hints are lined up on the top and bottom. This means that the proportions are equal to each other. Therefore,

\[ \frac{18}{12} = \frac{c}{16} \]

This is an equation that can be used to find \( c \), the number of cups of detergent needed for 16 gallons of water. So the answer is C. Select C.

22) Problem #PRABWWX "PRABWWX - Setting Up Proportions"
When making tea, you use 8 spoons of sugar for every 12 quarts of tea. Which of the following equations can be used to calculate \( c \), the number of spoons of sugar needed for 25 quarts of tea?

**Multiple Choice:**

\( \checkmark \) 8/12 = \( c/25 \)
\[ \begin{align*}
8/12 &= 25/c \\
8/25 &= 12/c \\
25/12 &= 8/c
\end{align*} \]

**Hints:**
- The problem is about the following ratio

\[
\text{number of spoons of sugar} : \text{number of quarts of tea}
\]
- This ratio means that

\[
\begin{array}{c}
\text{spoons of sugar on the top} \\
\hline
\text{quarts of tea on the bottom}
\end{array}
\]

- We know that 8 spoons of sugar is needed for every 12 quarts of tea used. This means that

\[
8 : 12
\]

or

\[
\frac{8 \text{ spoons of sugar}}{12 \text{ quarts of tea}}
\]

- We also know that \( c \) spoons of sugar is needed for every 25 quarts of tea used. This means that

\[
c : 25
\]

or

\[
\frac{c \text{ spoons of sugar}}{25 \text{ quarts of tea}}
\]

- Notice labels on the two equations from the previous two hints are lined up on the top and bottom. This means that the proportions are equal to each other. Therefore,

\[
\begin{align*}
\frac{8}{12} &= \frac{c}{25} \\
8/12 &= c/25
\end{align*}
\]

This is an equation that can be used to find \( c \), the number of spoons of sugar needed for 25 quarts of tea. So the answer is 8/12 = c/25.
When making tea, you use 6 spoons of sugar for every 4 quarts of tea. Which of the following equations can be used to calculate \( c \), the number of spoons of sugar needed for 15 quarts of tea?

**Multiple Choice:**

- ✓ \( \frac{6}{4} = \frac{c}{15} \)
- × \( \frac{6}{4} = \frac{15}{c} \)
- × \( \frac{6}{15} = \frac{4}{c} \)
- × \( \frac{15}{4} = \frac{6}{c} \)

**Hints:**

- The problem is about the following ratio

  \[
  \text{number of spoons of sugar} : \text{number of quarts of tea}
  \]

- This ratio means that

  - spoons of sugar on the top
  - quarts of tea on the bottom

- We know that 6 spoons of sugar is needed for every 4 quarts of tea used. This means that

  \[
  6 : 4
  \]

  or

  \[
  \frac{6 \text{ spoons of sugar}}{4 \text{ quarts of tea}}
  \]

- We also know that \( c \) spoons of sugar is needed for every 15 quarts of tea used. This means that

  \[
  c : 15
  \]

  or

  \[
  \frac{c \text{ spoons of sugar}}{15 \text{ quarts of tea}}
  \]

- Notice labels on the two equations from the previous two hints are lined up on the top and bottom.
This means that the proportions are equal to each other. Therefore,

\[
\frac{6}{4} = \frac{c}{15}
\]

This is an equation that can be used to find \(c\), the number of spoons of sugar needed for 15 quarts of tea. So the answer is \(6/4 = c/15\).

24) **Problem #PRABWYC "PRABWYC - Setting Up Proportions"**

When doing the laundry, you use 18 cups of detergent for every 14 gallons of water. Which of the following equations can be used to calculate \(c\), the number of cups of detergent needed when using 17 gallons of water?

A. \[
\frac{18}{14} = \frac{17}{c}
\]

B. \[
\frac{18}{17} = \frac{14}{c}
\]

C. \[
\frac{18}{14} = \frac{c}{17}
\]

D. \[
\frac{17}{18} = \frac{c}{14}
\]

**Multiple Choice:**

- [x] A
- [x] B
- ✔ C
- [x] D

**Hints:**

- The problem is about the following ratio
number of cups of detergent : number of gallons of water

- Line up the labels that are on the top and bottom of the fractions.

  \[
  \text{cups of detergent on the top} \quad \frac{\text{number of cups of detergent}}{\text{number of gallons of water}} \quad \text{gallons of water on the bottom}
  \]

- We know that 18 cups of detergent is needed for every 14 gallons of water used. This means that

  \[
  18 : 14
  \]

  or

  \[
  \frac{18 \text{ cups of detergent}}{14 \text{ gallons of water}}
  \]

- We also know that \( c \) cups of detergent is needed for every 17 gallons of water used. This means that

  \[
  c : 17
  \]

  or

  \[
  \frac{c \text{ cups of detergent}}{17 \text{ gallons of water}}
  \]

- The labels on the two equations from the previous two hints are lined up on the top and bottom.

  This means that the proportions are equal to each other. Therefore,

  \[
  \frac{18}{14} = \frac{c}{17}
  \]

  This is an equation that can be used to find \( c \), the number of cups of detergent needed for 17 gallons of water. So the answer is C. Select C.

25) Problem #PRABWY8 "PRABWY8 - Setting Up Proportions"
When making tea, you use 7 spoons of sugar for every 2 quarts of tea. Which of the following equations can be used to calculate \( c \), the number of spoons of sugar needed when using 8 quarts of tea?
Multiple Choice:

A. \[ \frac{8}{2} = \frac{7}{c} \]

B. \[ \frac{8}{7} = \frac{c}{2} \]

C. \[ \frac{2}{7} = \frac{c}{8} \]

D. \[ \frac{7}{2} = \frac{c}{8} \]

**Hints:**
- The problem is about the following ratio

  \[ \text{number of spoons of sugar} : \text{number of quarts of tea} \]

- Line up the labels that are on the top and bottom of the fractions.

  - spoons of sugar on the top
  
  \[ \frac{7 \text{ spoons of sugar}}{2 \text{ quarts of tea}} \]

- We know that 7 spoons of sugar is needed for every 2 quarts of tea used. This means that

  \[ 7 : 2 \]

  or

  \[ \frac{7 \text{ spoons of sugar}}{2 \text{ quarts of tea}} \]
We also know that \( c \) spoons of sugar is needed for every 8 quarts of tea used. This means that

\[
c : 8
\]

or

\[
\frac{c \text{ spoons of sugar}}{8 \text{ quarts of tea}}
\]

The labels on the two equations from the previous two hints are lined up on the top and bottom. This means that the proportions are equal to each other. Therefore,

\[
\frac{7}{2} = \frac{c}{8}
\]

This is an equation that can be used to find \( c \), the number of spoons of sugar needed for 8 quarts of tea. So the answer is D. Select D.

26) Problem #PRABWXP "PRABWXP - Setting Up Proportions"

When making tea, you use 15 spoons of sugar for every 13 quarts of tea. Which of the following equations can be used to calculate \( c \), the number of spoons of sugar needed when using 18 quarts of tea?

A. \[
\frac{13}{15} = \frac{c}{18}
\]

B. \[
\frac{15}{13} = \frac{c}{18}
\]

C. \[
\frac{13}{18} = \frac{c}{15}
\]

D. \[
\frac{18}{c} = \frac{1}{1}
\]
Multiple Choice:

- A
- [ ] B
- [ ] C
- [x] D

Hints:
- The problem is about the following ratio

\[ \text{number of spoons of sugar} : \text{number of quarts of tea} \]
- Line up the labels that are on the top and bottom of the fractions.

\[
\frac{\text{spoons of sugar}}{\text{quarts of tea}}
\]

- We know that 15 spoons of sugar is needed for every 15 quarts of tea used. This means that

\[ 15 : 15 \]

or

\[
\frac{15 \text{ spoons of sugar}}{15 \text{ quarts of tea}}
\]

- We also know that \( c \) spoons of sugar is needed for every 18 quarts of tea used. This means that

\[ c : 18 \]

or

\[
\frac{c \text{ spoons of sugar}}{18 \text{ quarts of tea}}
\]

- Notice the labels on the two equations from the previous two hints are lined up on the top and bottom.

This means that the proportions are equal to each other. Therefore,

\[ \frac{15}{c} \]
This is an equation that can be used to find \( c \), the number of spoons of sugar needed for 18 quarts of tea. So the answer is B. Select B.

27) Problem #PRABWYD "PRABWYD - Setting Up Proportions"

When making tea, you use 14 spoons of sugar for every 20 quarts of tea. Which of the following equations can be used to calculate \( c \), the number of spoons of sugar needed when using 38 quarts of tea?

A. \[
\frac{14}{20} = \frac{38}{c}
\]

B. \[
\frac{14}{38} = \frac{20}{c}
\]

C. \[
\frac{14}{20} = \frac{c}{38}
\]

D. \[
\frac{38}{14} = \frac{c}{20}
\]

Multiple Choice:

- A
- B
- C
- D

Hints:
- The problem is about the following ratio

  number of spoons of sugar : number of quarts of tea

- Line up the labels that are on the top and bottom of the fractions.

  spoons of sugar on the top
quarts of tea on the bottom

- We know that 14 spoons of sugar is needed for every 20 quarts of tea used. This means that

  \[
  14 : 20
  \]

  or

  \[
  \frac{14 \text{ spoons of sugar}}{20 \text{ quarts of tea}}
  \]

- We also know that \(c\) spoons of sugar is needed for every 38 quarts of tea used. This means that

  \[
  c : 38
  \]

  or

  \[
  \frac{c \text{ spoons of sugar}}{38 \text{ quarts of tea}}
  \]

- The labels on the two equations from the previous two hints are lined up on the top and bottom.

  This means that the proportions are equal to each other. Therefore,

  \[
  \frac{14}{20} = \frac{c}{38}
  \]

This is an equation that can be used to find \(c\), the number of spoons of sugar needed for 38 quarts of tea. So the answer is C. Select C.

28) Problem #PRABWW9 "PRABWW9 - Setting Up Proportions"
When making tea, you use 9 spoons of sugar for every 19 quarts of tea. Which of the following equations can be used to calculate \(c\), the number of spoons of sugar needed when using 26 quarts of tea?

A. \[
\frac{19}{9} = \frac{c}{26}
\]
B. \[
\begin{array}{c}
9 = c \\
\frac{19}{26}
\end{array}
\]

C. \[
\begin{array}{c}
19 = c \\
\frac{26}{9}
\end{array}
\]

D. \[
\begin{array}{c}
26 = c \\
\frac{9}{19}
\end{array}
\]

Multiple Choice:
× A
✓ B
× C
× D

Hints:
- The problem is about the following ratio:
  number of spoons of sugar : number of quarts of tea
- Line up the labels that are on the top and bottom of the fractions.
  spoons of sugar on the top
  \[\frac{9}{19}\]
  quarts of tea on the bottom

- We know that 9 spoons of sugar is needed for every 19 quarts of tea used. This means that
  \[9 : 19\]
  or
  \[
  \frac{9 \text{ spoons of sugar}}{19 \text{ quarts of tea}}
  \]

- We also know that \(c\) spoons of sugar is needed for every 26 quarts of tea used. This means that
  \[c : 26\]
or

\[ \frac{c}{26} = \frac{2}{19} \]

- Notice the labels on the two equations from the previous two hints are lined up on the top and bottom.

This means that the proportions are equal to each other. Therefore,

\[ \frac{9}{19} = \frac{c}{26} \]

This is an equation that can be used to find \( c \), the number of spoons of sugar needed for 26 quarts of tea. So the answer is B. Select B.

---

29) Problem #PRABWXZ "PRABWXZ - Setting Up Proportions"

When making tea, you use 18 spoons of sugar for every 2 quarts of tea. Which of the following equations can be used to calculate \( c \), the number of spoons of sugar needed when using 3 quarts of tea?

A. \[ \frac{2}{18} = \frac{c}{3} \]

B. \[ \frac{18}{2} = \frac{c}{3} \]

C. \[ \frac{2}{3} = \frac{c}{18} \]

D. \[ \frac{3}{18} = \frac{c}{2} \]

Multiple Choice:

A
Hints:

- The problem is about the following ratio

\[ \text{number of spoons of sugar} : \text{number of quarts of tea} \]

- Line up the labels that are on the top and bottom of the fractions.

\[ \text{spoons of sugar} \text{ on the top} \]
\[ \text{quarts of tea} \text{ on the bottom} \]

- We know that 18 spoons of sugar is needed for every 2 quarts of tea used. This means that

\[ 18 : 2 \]

or

\[ \frac{18 \text{ spoons of sugar}}{2 \text{ quarts of tea}} \]

- We also know that \( c \) spoons of sugar is needed for every 3 quarts of tea used. This means that

\[ c : 3 \]

or

\[ \frac{c \text{ spoons of sugar}}{3 \text{ quarts of tea}} \]

- Notice the labels on the two equations from the previous two hints are lined up on the top and bottom.

This means that the proportions are equal to each other. Therefore,

\[ \frac{18}{2} = \frac{c}{3} \]
This is an equation that can be used to find \( c \), the number of spoons of sugar needed for 3 quarts of tea. So the answer is B. Select B.

30) Problem #PRABWZA "PRABWZA - Setting Up Proportions"
When making tea, you use 16 spoons of sugar for every 17 quarts of tea. Which of the following equations can be used to calculate \( c \), the number of spoons of sugar needed when using 36 quarts of tea?

A. \[
\frac{36}{17} = \frac{16}{c}
\]

B. \[
\frac{36}{16} = \frac{c}{17}
\]

C. \[
\frac{17}{16} = \frac{c}{36}
\]

D. \[
\frac{16}{17} = \frac{c}{36}
\]

Multiple Choice:
- [x] A
- [x] B
- [x] C
- [✓] D

Hints:
- The problem is about the following ratio

\( \text{number of spoons of sugar} : \text{number of quarts of tea} \)
- Line up the labels that are on the top and bottom of the fractions.

spoons of sugar on the top

quarts of tea on the bottom

- We know that 16 spoons of sugar is needed for every 17 quarts of tea used. This means that
or

16 spoons of sugar

____

17 quarts of tea

- We also know that $c$ spoons of sugar is needed for every 36 quarts of tea used. This means that

$c : 36$

or

$c$ spoons of sugar

____

36 quarts of tea

- The labels on the two equations from the previous two hints are lined up on the top and bottom. This means that the proportions are equal to each other. Therefore,

$$\frac{16}{17} = \frac{c}{36}$$

This is an equation that can be used to find $c$, the number of spoons of sugar needed for 36 quarts of tea. So the answer is D. Select D.

---

31) Problem #PRABYW2 "PRABWY2 - Setting Up Proportions"
When making tea, you use 7 spoons of sugar for every 17 quarts of tea. Which of the following equations can be used to calculate $c$, the number of spoons of sugar needed when using 19 quarts of tea?

A.  \[
\frac{19}{17} = \frac{7}{c}
\]

B.  \[
\frac{19}{7} = \frac{c}{17}
\]

C.  \[
17 = c
\]
Multiple Choice:

A
B
C
D

Hints:

- The problem is about the following ratio:

\[
\frac{\text{number of spoons of sugar}}{\text{number of quarts of tea}}
\]

- Line up the labels that are on the top and bottom of the fractions.

\[
\text{spoons of sugar} \quad \text{on the top} \quad \frac{}{} \quad \text{quarts of tea} \quad \text{on the bottom}
\]

- We know that 7 spoons of sugar is needed for every 17 quarts of tea used. This means that

\[
7 : 17
\]

or

\[
\frac{7 \text{ spoons of sugar}}{17 \text{ quarts of tea}}
\]

- We also know that \(c\) spoons of sugar is needed for every 19 quarts of tea used. This means that

\[
c : 19
\]

or

\[
\frac{c \text{ spoons of sugar}}{19 \text{ quarts of tea}}
\]
The labels on the two equations from the previous two hints are lined up on the top and bottom.

This means that the proportions are equal to each other. Therefore,

\[
\frac{7}{17} = \frac{c}{19}
\]

This is an equation that can be used to find \(c\), the number of spoons of sugar needed for 19 quarts of tea. So the answer is D. Select D.

---

32) Problem #PRABWZD "PRABWZD - Setting Up Proportions"

When doing the laundry, you use 13 cups of detergent for every 7 gallons of water. Which of the following equations can be used to calculate \(c\), the number of cups of detergent needed when using 16 gallons of water?

A. \[
\frac{16}{7} = \frac{13}{c}
\]

B. \[
\frac{16}{13} = \frac{c}{7}
\]

C. \[
\frac{7}{13} = \frac{c}{16}
\]

D. \[
\frac{13}{7} = \frac{c}{16}
\]

Multiple Choice:

- A
- B
- C
- D

Hints:

- The problem is about the following ratio
number of cups of detergent : number of gallons of water

- Line up the labels that are on the top and bottom of the fractions.

  cups of detergent on the top
  
  gallons of water on the bottom

- We know that 13 cups of detergent is needed for every 7 gallons of water used. This means that

  13 : 7

  or

  13 cups of detergent
  
  7 gallons of water

- We also know that c cups of detergent is needed for every 16 gallons of water used. This means that

  c : 16

  or

  c cups of detergent
  
  16 gallons of water

- The labels on the two equations from the previous two hints are lined up on the top and bottom.

  This means that the proportions are equal to each other. Therefore,

  \[
  \frac{13}{7} = \frac{c}{16}
  \]

  This is an equation that can be used to find c, the number of cups of detergent needed for 16 gallons of water. So the answer is D. Select D.

33) Problem #PRABWWU "PRABWWU - Setting Up Proportions"

When doing the laundry, you use 14 cups of detergent for every 20 gallons of water. Which of the following equations can be used to calculate c, the number of cups of detergent needed for 26 gallons of water?
Multiple Choice:

✓ 14/20 = c/26
✗ 14/20 = 26/c
✗ 14/26 = 20/c
✗ 26/20 = 14/c

Hints:

- The problem is about the following ratio
  
  number of cups of detergent : number of gallons of water

- This ratio means that
  
  cups of detergent on the top
  
  __________________________
  
  gallons of water on the bottom

- We know that 14 cups of detergent is needed for every 20 gallons of water used. This means that
  
  14 : 20

  or

  14 cups of detergent
  
  __________________________
  
  20 gallons of water

- We also know that c cups of detergent is needed for every 26 gallons of water used. This means that
  
  c : 26

  or

  c cups of detergent
  
  __________________________
  
  26 gallons of water

- Notice labels on the two equations from the previous two hints are lined up on the top and bottom.

This means that the proportions are equal to each other. Therefore,

\[
\frac{14}{20} = \frac{c}{26}
\]
This is an equation that can be used to find $c$, the number of cups of detergent needed for 26 gallons of water.
So the answer is $\frac{14}{20} = \frac{c}{26}$.

### 34) Problem #PRABWWH "PRABWWH - Setting Up Proportions"

When doing the laundry, you use 11 cups of detergent for every 15 gallons of water. Which of the following equations can be used to calculate $c$, the number of cups of detergent needed for 21 gallons of water?

**Multiple Choice:**

- $\frac{11}{15} = \frac{c}{21}$  
- $\frac{11}{15} = \frac{21}{c}$  
- $\frac{11}{21} = \frac{15}{c}$  
- $\frac{21}{15} = \frac{11}{c}$

**Hints:**

- The problem is about the following ratio:
  
  number of cups of detergent : number of gallons of water

- This ratio means that

  cups of detergent on the top
  
  gallons of water on the bottom

- We know that 11 cups of detergent is needed for every 15 gallons of water used. This means that

  $11 : 15$

  or

  $\frac{11 \text{ cups of detergent}}{15 \text{ gallons of water}}$

- We also know that $c$ cups of detergent is needed for every 21 gallons of water used. This means that

  $c : 21$

  or
\[ \frac{c}{21} = \frac{11}{15} \]

This equation can be used to find \( c \), the number of cups of detergent needed for 21 gallons of water.

So the answer is \( \frac{11}{15} = \frac{c}{21} \).

---

35) Problem #PRABWYW "PRABWYW - Setting Up Proportions"

When making tea, you use 2 spoons of sugar for every 11 quarts of tea. Which of the following equations can be used to calculate \( c \), the number of spoons of sugar needed when using 27 quarts of tea?

A. \[ \frac{27}{11} = \frac{2}{c} \]

B. \[ \frac{27}{2} = \frac{c}{11} \]

C. \[ \frac{11}{2} = \frac{c}{27} \]

D. \[ \frac{2}{11} = \frac{c}{27} \]

Multiple Choice:

- A
- B
- C
Hints:

- The problem is about the following ratio
  
  number of spoons of sugar : number of quarts of tea

- Line up the labels that are on the top and bottom of the fractions.
  
  spoons of sugar on the top
  
  quarts of tea on the bottom

- We know that 2 spoons of sugar is needed for every 11 quarts of tea used. This means that
  
  $2 : 11$
  
  or
  
  \[
  \frac{2 \text{ spoons of sugar}}{11 \text{ quarts of tea}}
  \]

- We also know that $c$ spoons of sugar is needed for every 27 quarts of tea used. This means that
  
  $c : 27$
  
  or
  
  \[
  \frac{c \text{ spoons of sugar}}{27 \text{ quarts of tea}}
  \]

- The labels on the two equations from the previous two hints are lined up on the top and bottom.
  
  This means that the proportions are equal to each other. Therefore,
  
  \[
  \frac{2}{11} = \frac{c}{27}
  \]

  This is an equation that can be used to find $c$, the number of spoons of sugar needed for 27 quarts of tea.
  
  So the answer is D. Select D.
When doing the laundry, you use 14 cups of detergent for every 4 gallons of water. Which of the following equations can be used to calculate \( c \), the number of cups of detergent needed for 21 gallons of water?

**Multiple Choice:**

- ✔️ \( \frac{14}{4} = \frac{c}{21} \)
- ✗ \( \frac{14}{4} = \frac{21}{c} \)
- ✗ \( \frac{14}{21} = \frac{4}{c} \)
- ✗ \( \frac{21}{4} = \frac{14}{c} \)

**Hints:**

- The problem is about the following ratio: \( \text{number of cups of detergent} : \text{number of gallons of water} \)
- This ratio means that:
  
  \[
  \frac{\text{cups of detergent}}{\text{gallons of water}}
  \]

- We know that 14 cups of detergent is needed for every 4 gallons of water used. This means that:
  
  \[
  \frac{14}{4}
  \]
  
  or

  \[
  \frac{14 \text{ cups of detergent}}{4 \text{ gallons of water}}
  \]

- We also know that \( c \) cups of detergent is needed for every 21 gallons of water used. This means that:
  
  \[
  \frac{c}{21}
  \]
  
  or

  \[
  \frac{c \text{ cups of detergent}}{21 \text{ gallons of water}}
  \]

- Notice labels on the two equations from the previous two hints are lined up on the top and bottom. This means that the proportions are equal to each other. Therefore,
This is an equation that can be used to find \( c \), the number of cups of detergent needed for 21 gallons of water.

So the answer is \( \frac{14}{4} = \frac{c}{21} \).

37) Problem #PRABWXV "PRABWXV - Setting Up Proportions"

When making tea, you use 3 spoons of sugar for every 19 quarts of tea. Which of the following equations can be used to calculate \( c \), the number of spoons of sugar needed when using 30 quarts of tea?

A. \[ \frac{19}{3} = \frac{c}{30} \]

B. \[ \frac{3}{19} = \frac{c}{30} \]

C. \[ \frac{19}{30} = \frac{c}{3} \]

D. \[ \frac{30}{3} = \frac{c}{19} \]

Multiple Choice:

- A
- B
- C
- D

Hints:
- The problem is about the following ratio

  \[ \text{number of spoons of sugar : number of quarts of tea} \]
- Line up the labels that are on the top and bottom of the fractions.
spoons of sugar on the top

quarts of tea on the bottom

- We know that 3 spoons of sugar is needed for every 19 quarts of tea used. This means that
  \[
  3 : 19
  \]
  or
  \[
  \frac{3 \text{ spoons of sugar}}{19 \text{ quarts of tea}}
  \]
- We also know that \(c\) spoons of sugar is needed for every 30 quarts of tea used. This means that
  \[
  c : 30
  \]
  or
  \[
  \frac{c \text{ spoons of sugar}}{30 \text{ quarts of tea}}
  \]
- Notice the labels on the two equations from the previous two hints are lined up on the top and bottom.

This means that the proportions are equal to each other. Therefore,

\[
\frac{3}{19} = \frac{c}{30}
\]

This is an equation that can be used to find \(c\), the number of spoons of sugar needed for 30 quarts of tea. So the answer is B. Select B.

38) Problem #PRABWYH "PRABWYH - Setting Up Proportions"

When making tea, you use 5 spoons of sugar for every 13 quarts of tea. Which of the following equations can be used to calculate \(c\), the number of spoons of sugar needed when using 19 quarts of tea?

A. \[
\frac{5}{13} = \frac{19}{c}
\]
Multiple Choice:

A
B
C
D

Hints:

- The problem is about the following ratio
  
  \[
  \text{number of spoons of sugar} : \text{number of quarts of tea}
  \]
- Line up the labels that are on the top and bottom of the fractions.

  spoons of sugar on the top

  ----------------

  quarts of tea on the bottom

- We know that 5 spoons of sugar is needed for every 13 quarts of tea used. This means that

  \[ 5 : 13 \]

  or

  \[
  \frac{5 \text{ spoons of sugar}}{13 \text{ quarts of tea}}
  \]

- We also know that \( c \) spoons of sugar is needed for every 19 quarts of tea used. This means that

  \[
  \frac{c \text{ spoons of sugar}}{19 \text{ quarts of tea}}
  \]
or

\[ \text{c spoons of sugar} \]
\[ \frac{\text{19 quarts of tea}}{} \]

- The labels on the two equations from the previous two hints are lined up on the top and bottom.

This means that the proportions are equal to each other. Therefore,

\[ \frac{5}{13} = \frac{c}{19} \]

This is an equation that can be used to find \(c\), the number of spoons of sugar needed for 19 quarts of tea. So the answer is C. Select C.

39) Problem #PRABWZB "PRABWZB - Setting Up Proportions"

When doing the laundry, you use 20 cups of detergent for every 10 gallons of water. Which of the following equations can be used to calculate \(c\), the number of cups of detergent needed when using 28 gallons of water?

A. \[ \frac{28}{10} = \frac{20}{c} \]

B. \[ \frac{28}{20} = \frac{c}{10} \]

C. \[ \frac{10}{20} = \frac{c}{28} \]

D. \[ \frac{20}{10} = \frac{c}{28} \]
Multiple Choice:
- A
- B
- C
- D

Hints:
- The problem is about the following ratio

\[
\text{number of cups of detergent} : \text{number of gallons of water}
\]
- Line up the labels that are on the top and bottom of the fractions.

\[
\begin{align*}
\text{cups of detergent} & \quad \text{on the top} \\
\text{gallons of water} & \quad \text{on the bottom}
\end{align*}
\]
- We know that 20 cups of detergent is needed for every 10 gallons of water used. This means that

\[
20 : 10
\]

or

\[
\frac{20 \text{ cups of detergent}}{10 \text{ gallons of water}}
\]
- We also know that \(c\) cups of detergent is needed for every 28 gallons of water used. This means that

\[
c : 28
\]

or

\[
\frac{c \text{ cups of detergent}}{28 \text{ gallons of water}}
\]
- The labels on the two equations from the previous two hints are lined up on the top and bottom.

This means that the proportions are equal to each other. Therefore,

\[
\frac{20}{10} = \frac{c}{28}
\]
This is an equation that can be used to find \(c\), the number of cups of detergent needed for 28 gallons of water. So the answer is D. Select D.

### 40) Problem #PRABWZC "PRABWZC - Setting Up Proportions"

When making tea, you use 15 spoons of sugar for every 6 quarts of tea. Which of the following equations can be used to calculate \(c\), the number of spoons of sugar needed when using 23 quarts of tea?

A. 
\[
\frac{23}{6} = \frac{15}{c}
\]

B. 
\[
\frac{23}{15} = \frac{c}{6}
\]

C. 
\[
\frac{6}{15} = \frac{c}{23}
\]

D. 
\[
\frac{15}{6} = \frac{c}{23}
\]

**Multiple Choice:**

- X A
- X B
- X C
- ✓ D

**Hints:**

- The problem is about the following ratio:

  \text{number of spoons of sugar} : \text{number of quarts of tea}

- Line up the labels that are on the top and bottom of the fractions.

  \begin{align*}
  \text{spoons of sugar} & \text{ on the top} \\
  \text{quarts of tea} & \text{ on the bottom}
  \end{align*}
We know that 15 spoons of sugar is needed for every 6 quarts of tea used. This means that

\[
15 : 6
\]

or

\[
\frac{15 \text{ spoons of sugar}}{6 \text{ quarts of tea}}
\]

We also know that \( c \) spoons of sugar is needed for every 23 quarts of tea used. This means that

\[
c : 23
\]

or

\[
\frac{c \text{ spoons of sugar}}{23 \text{ quarts of tea}}
\]

The labels on the two equations from the previous two hints are lined up on the top and bottom.

This means that the proportions are equal to each other. Therefore,

\[
\frac{15}{6} = \frac{c}{23}
\]

This is an equation that can be used to find \( c \), the number of spoons of sugar needed for 23 quarts of tea. So the answer is D. Select D.

41) Problem #PRABWYP "PRABWYP - Setting Up Proportions"

When doing the laundry, you use 9 cups of detergent for every 17 gallons of water. Which of the following equations can be used to calculate \( c \), the number of cups of detergent needed when using 24 gallons of water?

A. \[
\frac{9}{17} = \frac{24}{c}
\]

B. \[
\frac{9}{24} = \frac{17}{c}
\]
Multiple Choice:

- A
- B
- C
- D

Hints:

- The problem is about the following ratio:
  \[ \frac{\text{number of cups of detergent}}{\text{number of gallons of water}} \]
- Line up the labels that are on the top and bottom of the fractions.

- cups of detergent on the top
- \[ \frac{\text{cups of detergent}}{\text{gallons of water}} \] on the bottom

- We know that \(9\) cups of detergent is needed for every \(17\) gallons of water used. This means that
  \[ 9 : 17 \]
  or
  \[ \frac{9\text{ cups of detergent}}{17\text{ gallons of water}} \]

- We also know that \(c\) cups of detergent is needed for every \(24\) gallons of water used. This means that
  \[ c : 24 \]
  or
  \[ \frac{c\text{ cups of detergent}}{24\text{ gallons of water}} \]
c cups of detergent

\[
\frac{c}{24 \text{ gallons of water}}
\]

- The labels on the two equations from the previous two hints are lined up on the top and bottom. This means that the proportions are equal to each other. Therefore,

\[
\frac{9}{17} = \frac{c}{24}
\]

This is an equation that can be used to find \(c\), the number of cups of detergent needed for 24 gallons of water. So the answer is C. Select C.

---

42) Problem #PRABWWW "PRABWWW - Setting Up Proportions"
When doing the laundry, you use 2 cups of detergent for every 12 gallons of water. Which of the following equations can be used to calculate \(c\), the number of cups of detergent needed for 15 gallons of water?

**Multiple Choice:**
- \(\checkmark\) \(\frac{2}{12} = \frac{c}{15}\)
- \(\times\) \(\frac{2}{12} = \frac{15}{c}\)
- \(\times\) \(\frac{2}{15} = \frac{12}{c}\)
- \(\times\) \(\frac{15}{12} = \frac{2}{c}\)

**Hints:**
- The problem is about the following ratio

\[
\text{number of cups of detergent} : \text{number of gallons of water}
\]
- This ratio means that

\[
\frac{\text{cups of detergent}}{\text{gallons of water}}
\]

- We know that 2 cups of detergent is needed for every 12 gallons of water used. This means that

\[
2 : 12
\]
or

\[
\frac{2 \text{ cups of detergent}}{12 \text{ gallons of water}}
\]

- We also know that \( c \) cups of detergent is needed for every 15 gallons of water used. This means that \( c : 15 \)

or

\[
\frac{c \text{ cups of detergent}}{15 \text{ gallons of water}}
\]

- Notice labels on the two equations from the previous two hints are lined up on the top and bottom. This means that the proportions are equal to each other. Therefore,

\[
\frac{2}{12} = \frac{c}{15}
\]

This is an equation that can be used to find \( c \), the number of cups of detergent needed for 15 gallons of water.
So the answer is \( 2/12 = c/15 \).

43) Problem #PRABWWV "PRABWWV - Setting Up Proportions"
When making tea, you use 7 spoons of sugar for every 2 quarts of tea. Which of the following equations can be used to calculate \( c \), the number of spoons of sugar needed for 18 quarts of tea?

Multiple Choice:

- ✔️ \( 7/2 = c/18 \)
- ✗ \( 7/2 = 18/c \)
- ✗ \( 7/18 = 2/c \)
- ✗ \( 18/2 = 7/c \)

Hints:
- The problem is about the following ratio

number of spoons of sugar : number of quarts of tea
• This ratio means that

\[
\frac{\text{spoons of sugar on the top}}{\text{quarts of tea on the bottom}}
\]

• We know that 7 spoons of sugar is needed for every 2 quarts of tea used. This means that

\[
7 : 2
\]

or

\[
\frac{7 \text{ spoons of sugar}}{2 \text{ quarts of tea}}
\]

• We also know that \(c\) spoons of sugar is needed for every 18 quarts of tea used. This means that

\[
c : 18
\]

or

\[
\frac{c \text{ spoons of sugar}}{18 \text{ quarts of tea}}
\]

• Notice labels on the two equations from the previous two hints are lined up on the top and bottom. This means that the proportions are equal to each other. Therefore,

\[
\frac{7}{2} = \frac{c}{18}
\]

This is an equation that can be used to find \(c\), the number of spoons of sugar needed for 18 quarts of tea. So the answer is \(7/2 = c/18\).

#### 44) Problem #PRABWXE "PRABWXE - Setting Up Proportions"

When doing the laundry, you use 6 cups of detergent for every 16 gallons of water. Which of the following equations can be used to calculate \(c\), the number of cups of detergent needed when using 18 gallons of water?

A. \(16 = c\)
Multiple Choice:

A

B

C

D

Hints:

• The problem is about the following ratio
  number of cups of detergent : number of gallons of water
• Line up the labels that are on the top and bottom of the fractions.
  cups of detergent on the top
  ---------------------------------
  gallons of water on the bottom

• We know that 6 cups of detergent is needed for every 16 gallons of water used. This means that
  6 : 16
  or
  
  6 cups of detergent
  ---------------------------------
  16 gallons of water

• We also know that c cups of detergent is needed for every 18 gallons of water used. This means that
or

c cups of detergent

\[
\frac{c}{18 \text{ gallons of water}}
\]

- Notice the labels on the two equations from the previous two hints are lined up on the top and bottom.

This means that the proportions are equal to each other. Therefore,

\[
\frac{6}{16} = \frac{c}{18}
\]

This is an equation that can be used to find \( c \), the number of cups of detergent needed for 18 gallons of water. So the answer is B. Select B.
Multiple Choice:

- A
- B
- C
- D

Hints:

- The problem is about the following ratio:
  
  number of cups of detergent : number of gallons of water

- Line up the labels that are on the top and bottom of the fractions.

  cups of detergent on the top
  ____________________________
  gallons of water on the bottom

- We know that \(19\) cups of detergent is needed for every \(3\) gallons of water used. This means that
  
  \[19 : 3\]

  or

  \[
  \frac{19 \text{ cups of detergent}}{3 \text{ gallons of water}}
  \]

- We also know that \(c\) cups of detergent is needed for every \(12\) gallons of water used. This means that
  
  \[c : 12\]

  or

  \[
  \frac{c \text{ cups of detergent}}{12 \text{ gallons of water}}
  \]

- The labels on the two equations from the previous two hints are lined up on the top and bottom.

  This means that the proportions are equal to each other. Therefore,

  \[
  \frac{19}{c}
  \]
3 = 12

This is an equation that can be used to find $c$, the number of cups of detergent needed for 12 gallons of water. So the answer is C. Select C.

46) Problem #PRABWWD "PRABWWD - Setting Up Proportions"
When doing the laundry, you use 15 cups of detergent for every 16 gallons of water. Which of the following equations can be used to calculate $c$, the number of cups of detergent needed for 27 gallons of water?

Multiple Choice:

- ✓ $\frac{15}{16} = \frac{c}{27}$
- ✗ $\frac{15}{16} = \frac{27}{c}$
- ✗ $\frac{15}{27} = \frac{16}{c}$
- ✗ $\frac{27}{16} = \frac{15}{c}$

Hints:

- The problem is about the following ratio
  
  number of cups of detergent : number of gallons of water

- This ratio means that
  
  cups of detergent on the top
  
  ________________

  gallons of water on the bottom

- We know that 15 cups of detergent is needed for every 16 gallons of water used. This means that
  
  $15 : 16$

  or

  $\frac{15 \text{ cups of detergent}}{16 \text{ gallons of water}}$

- We also know that $c$ cups of detergent is needed for every 27 gallons of water used. This means that
  
  $c : 27$
c cups of detergent

\[
\frac{c}{27} \text{ gallons of water}
\]

- Notice labels on the two equations from the previous two hints are lined up on the top and bottom. This means that the proportions are equal to each other. Therefore,

\[
\frac{15}{16} = \frac{c}{27}
\]

This is an equation that can be used to find \( c \), the number of cups of detergent needed for 27 gallons of water. So the answer is \( \frac{15}{16} = \frac{c}{27} \).

47) Problem #PRABWYJ "PRABWYJ - Setting Up Proportions"
When doing the laundry, you use 6 cups of detergent for every 13 gallons of water. Which of the following equations can be used to calculate \( c \), the number of cups of detergent needed when using 14 gallons of water?

A. \( \frac{6}{13} = \frac{14}{c} \)

B. \( \frac{6}{14} = \frac{13}{c} \)

C. \( \frac{6}{13} = \frac{c}{14} \)

D. \( \frac{14}{6} = \frac{c}{13} \)

Multiple Choice:
Hints:

- The problem is about the following ratio:

  \[ \frac{\text{number of cups of detergent}}{\text{number of gallons of water}} \]

- Line up the labels that are on the top and bottom of the fractions.

  \[
  \frac{\text{cups of detergent}}{\text{gallons of water}}
  \]

- We know that 6 cups of detergent is needed for every 13 gallons of water used. This means that

  \[ 6 : 13 \]

  or

  \[
  \frac{6 \text{ cups of detergent}}{13 \text{ gallons of water}}
  \]

- We also know that \( c \) cups of detergent is needed for every 14 gallons of water used. This means that

  \[ c : 14 \]

  or

  \[
  \frac{c \text{ cups of detergent}}{14 \text{ gallons of water}}
  \]

- The labels on the two equations from the previous two hints are lined up on the top and bottom. This means that the proportions are equal to each other. Therefore,

  \[
  \frac{6}{13} = \frac{c}{14}
  \]
This is an equation that can be used to find \( c \), the number of cups of detergent needed for 14 gallons of water. So the answer is C. Select C.

48) Problem #PRABWWE "PRABWWE - Setting Up Proportions"
When making tea, you use 19 spoons of sugar for every 21 quarts of tea. Which of the following equations can be used to calculate \( c \), the number of spoons of sugar needed for 23 quarts of tea?

**Multiple Choice:**
- ✔️ \( \frac{19}{21} = \frac{c}{23} \)
- ✗ \( \frac{19}{21} = \frac{23}{c} \)
- ✗ \( \frac{19}{23} = \frac{21}{c} \)
- ✗ \( \frac{23}{21} = \frac{19}{c} \)

**Hints:**
- The problem is about the following ratio

  \[ \text{number of spoons of sugar} : \text{number of quarts of tea} \]

- This ratio means that

  \[ \frac{\text{spoons of sugar}}{\text{quarts of tea}} \]

- We know that 19 spoons of sugar is needed for every 21 quarts of tea used. This means that

  \[ 19 : 21 \]

  or

  \[ \frac{19 \text{ spoons of sugar}}{21 \text{ quarts of tea}} \]

- We also know that \( c \) spoons of sugar is needed for every 23 quarts of tea used. This means that

  \[ c : 23 \]

  or

  \[ \frac{c \text{ spoons of sugar}}{23 \text{ quarts of tea}} \]
23 quarts of tea

- Notice labels on the two equations from the previous two hints are lined up on the top and bottom.

This means that the proportions are equal to each other. Therefore,

$$\frac{19}{21} = \frac{c}{23}$$

This is an equation that can be used to find $c$, the number of spoons of sugar needed for 23 quarts of tea. So the answer is $19/21 = c/23$.

---

49) Problem #PRABWX4 "PRABWX4 - Setting Up Proportions"

When doing the laundry, you use 6 cups of detergent for every 7 gallons of water. Which of the following equations can be used to calculate $c$, the number of cups of detergent needed when using 21 gallons of water?

A. $$\frac{7}{6} = \frac{c}{21}$$

B. $$\frac{6}{7} = \frac{c}{21}$$

C. $$\frac{7}{21} = \frac{c}{6}$$

D. $$\frac{21}{6} = \frac{c}{7}$$

Multiple Choice:

✗ A
✓ B
✗ C
✗ D
Hints:
- The problem is about the following ratio

number of cups of detergent : number of gallons of water
- Line up the labels that are on the top and bottom of the fractions.

cups of detergent on the top

-------------
gallons of water on the bottom

- We know that 6 cups of detergent is needed for every 7 gallons of water used. This means that

6 : 7

or

6 cups of detergent

-------------
7 gallons of water

- We also know that c cups of detergent is needed for every 21 gallons of water used. This means that

c : 21

or

c cups of detergent

-------------
21 gallons of water

- Notice the labels on the two equations from the previous two hints are lined up on the top and bottom.

This means that the proportions are equal to each other. Therefore,

\[
\frac{6}{7} = \frac{c}{21}
\]

This is an equation that can be used to find c, the number of cups of detergent needed for 21 gallons of water. So the answer is B. Select B.
When doing the laundry, you use 3 cups of detergent for every 21 gallons of water. Which of the following equations can be used to calculate \( c \), the number of cups of detergent needed when using 35 gallons of water?

A. \[
\frac{35}{21} = \frac{3}{c}
\]

B. \[
\frac{35}{3} = \frac{c}{21}
\]

C. \[
\frac{21}{3} = \frac{c}{35}
\]

D. \[
\frac{3}{21} = \frac{c}{35}
\]

Multiple Choice:

A
B
C
D

Hints:
- The problem is about the following ratio

\[ \text{number of cups of detergent} : \text{number of gallons of water} \]
- Line up the labels that are on the top and bottom of the fractions.

\[
\frac{\text{cups of detergent}}{\text{gallons of water}}
\]

- We know that 3 cups of detergent is needed for every 21 gallons of water used. This means that

\[ 3 : 21 \]
or

3 cups of detergent  
21 gallons of water

- We also know that \( c \) cups of detergent is needed for every 35 gallons of water used. This means that

\[ c : 35 \]

or

\[
\frac{c \text{ cups of detergent}}{35 \text{ gallons of water}}
\]

- The labels on the two equations from the previous two hints are lined up on the top and bottom.

This means that the proportions are equal to each other. Therefore,

\[
\frac{3}{21} = \frac{c}{35}
\]

This is an equation that can be used to find \( c \), the number of cups of detergent needed for 35 gallons of water. So the answer is D. Select D.

51) Problem #PRABWX5 "PRABWX5 - Setting Up Proportions"

When making tea, you use 20 spoons of sugar for every 9 quarts of tea. Which of the following equations can be used to calculate \( c \), the number of spoons of sugar needed when using 26 quarts of tea?

A. \[
\frac{9}{20} = \frac{c}{26}
\]

B. \[
\frac{20}{9} = \frac{c}{26}
\]

C. \[
\frac{9}{c} = \frac{26}{c}
\]
Multiple Choice:

- [x] A
- [✓] B
- [x] C
- [x] D

Hints:
- The problem is about the following ratio:
  
  \[
  \frac{\text{number of spoons of sugar}}{\text{number of quarts of tea}}
  \]

- Line up the labels that are on the top and bottom of the fractions.

- We know that 20 spoons of sugar is needed for every 9 quarts of tea used. This means that

  \[
  \frac{20}{9}
  \]

  or

  \[
  \frac{20 \text{ spoons of sugar}}{9 \text{ quarts of tea}}
  \]

- We also know that \(c\) spoons of sugar is needed for every 26 quarts of tea used. This means that

  \[
  \frac{c}{26}
  \]

  or

  \[
  \frac{c \text{ spoons of sugar}}{26 \text{ quarts of tea}}
  \]

- Notice the labels on the two equations from the previous two hints are lined up on the top and
This means that the proportions are equal to each other. Therefore,

\[
\frac{20}{c} = \frac{9}{26}
\]

This is an equation that can be used to find \(c\), the number of spoons of sugar needed for 26 quarts of tea. So the answer is B. Select B.

52) Problem #PRABWWB "PRABWWB - Setting Up Proportions"

When doing the laundry, you use 5 cups of detergent for every 13 gallons of water. Which of the following equations can be used to calculate \(c\), the number of cups of detergent needed for 27 gallons of water?

Multiple Choice:

- ✔️ \(\frac{5}{13} = \frac{c}{27}\)
- ✗ \(\frac{5}{13} = \frac{27}{c}\)
- ✗ \(\frac{5}{27} = \frac{13}{c}\)
- ✗ \(\frac{27}{13} = \frac{5}{c}\)

Hints:

- The problem is about the following ratio
  
  number of cups of detergent : number of gallons of water

- This ratio means that

  cups of detergent on the top
  
  gallons of water on the bottom

- We know that 5 cups of detergent is needed for every 13 gallons of water used. This means that

  \(5 : 13\)

  or

  \(\frac{5 \text{ cups of detergent}}{13 \text{ gallons of water}}\)
We also know that \( c \) cups of detergent is needed for every 27 gallons of water used. This means that

\[ c : 27 \]

or

\[ \frac{c \text{ cups of detergent}}{27 \text{ gallons of water}} \]

Notice labels on the two equations from the previous two hints are lined up on the top and bottom. This means that the proportions are equal to each other. Therefore,

\[ \frac{5}{13} = \frac{c}{27} \]

This is an equation that can be used to find \( c \), the number of cups of detergent needed for 27 gallons of water.

So the answer is \( \frac{5}{13} = \frac{c}{27} \).

53) Problem #PRABWWA "PRABWWA - Setting Up Proportions"

When making tea, you use 7 spoons of sugar for every 17 quarts of tea. Which of the following equations can be used to calculate \( c \), the number of spoons of sugar needed for 36 quarts of tea?

**Multiple Choice:**

- 7/17 = c/36
- 7/17 = 36/c
- 7/36 = 17/c
- 36/17 = 7/c

**Hints:**

- The problem is about the following ratio

  number of spoons of sugar : number of quarts of tea

- This ratio means that

  spoons of sugar on the top

  quarts of tea on the bottom
We know that 7 spoons of sugar is needed for every 17 quarts of tea used. This means that

\[ \frac{7}{17} \]

or

\[ \frac{7 \text{ spoons of sugar}}{17 \text{ quarts of tea}} \]

We also know that \( c \) spoons of sugar is needed for every 36 quarts of tea used. This means that

\[ \frac{c}{36} \]

or

\[ \frac{c \text{ spoons of sugar}}{36 \text{ quarts of tea}} \]

Notice labels on the two equations from the previous two hints are lined up on the top and bottom. This means that the proportions are equal to each other. Therefore,

\[ \frac{7}{17} = \frac{c}{36} \]

This is an equation that can be used to find \( c \), the number of spoons of sugar needed for 36 quarts of tea. So the answer is \( \frac{7}{17} = \frac{c}{36} \).

54) Problem #PRABWYT "PRABWYT - Setting Up Proportions"

When doing the laundry, you use 13 cups of detergent for every 18 gallons of water. Which of the following equations can be used to calculate \( c \), the number of cups of detergent needed when using 21 gallons of water?

A. \[ \frac{13}{18} = \frac{21}{c} \]

B. \[ \frac{13}{21} = \frac{18}{c} \]
Multiple Choice:

A
B
C
D

Hints:

- The problem is about the following ratio

\[ \frac{\text{number of cups of detergent}}{\text{number of gallons of water}} \]

- Line up the labels that are on the top and bottom of the fractions.

  \[
  \frac{\text{cups of detergent}}{\text{gallons of water}}
  \]

- We know that 13 cups of detergent is needed for every 18 gallons of water used. This means that

  \[ 13 : 18 \]

  or

  \[
  \frac{13 \text{ cups of detergent}}{18 \text{ gallons of water}}
  \]

- We also know that \( c \) cups of detergent is needed for every 21 gallons of water used. This means that

  \[ c : 21 \]

  or

  \[
  \frac{c \text{ cups of detergent}}{21 \text{ gallons of water}}
  \]
c cups of detergent
____________________
21 gallons of water

- The labels on the two equations from the previous two hints are lined up on the top and bottom. This means that the proportions are equal to each other. Therefore,

\[
\frac{13}{18} = \frac{c}{21}
\]

This is an equation that can be used to find \( c \), the number of cups of detergent needed for 21 gallons of water. So the answer is C. Select C.

☐ 55) Problem #PRABWXM "PRABWXM - Setting Up Proportions"
When making tea, you use 11 spoons of sugar for every 2 quarts of tea. Which of the following equations can be used to calculate \( c \), the number of spoons of sugar needed when using 16 quarts of tea?

A. \[
\frac{2}{11} = \frac{c}{16}
\]

B. \[
\frac{11}{2} = \frac{c}{16}
\]

C. \[
\frac{2}{16} = \frac{c}{11}
\]

D. \[
\frac{16}{11} = \frac{c}{2}
\]

Multiple Choice:
- ✗ A
- ✔ B
- C
Hints:

- The problem is about the following ratio

  number of spoons of sugar : number of quarts of tea

- Line up the labels that are on the top and bottom of the fractions.

  spoons of sugar on the top
  ___________________________
  quarts of tea on the bottom

- We know that 11 spoons of sugar is needed for every 2 quarts of tea used. This means that

  11 : 2

  or

  11 spoons of sugar
  ___________________
  2 quarts of tea

- We also know that c spoons of sugar is needed for every 16 quarts of tea used. This means that

  c : 16

  or

  c spoons of sugar
  __________________
  16 quarts of tea

- Notice the labels on the two equations from the previous two hints are lined up on the top and bottom.

This means that the proportions are equal to each other. Therefore,

  \[
  \frac{11}{2} = \frac{c}{16}
  \]

This is an equation that can be used to find c, the number of spoons of sugar needed for 16 quarts of tea. So the answer is B. Select B.
When making tea, you use 8 spoons of sugar for every 6 quarts of tea. Which of the following equations can be used to calculate c, the number of spoons of sugar needed when using 13 quarts of tea?

A. \[
\frac{8}{6} = \frac{13}{c}
\]

B. \[
\frac{8}{13} = \frac{6}{c}
\]

C. \[
\frac{8}{6} = \frac{c}{13}
\]

D. \[
\frac{13}{8} = \frac{c}{6}
\]

Multiple Choice:

- A
- B
- C
- D

Hints:

- The problem is about the following ratio:

  number of spoons of sugar : number of quarts of tea

- Line up the labels that are on the top and bottom of the fractions.

  spoons of sugar on the top

  quarts of tea on the bottom

- We know that 8 spoons of sugar is needed for every 6 quarts of tea used. This means that 8 : 6
8 spoons of sugar

6 quarts of tea

We also know that \( c \) spoons of sugar is needed for every 13 quarts of tea used. This means that

\[
c : 13
\]

or

\[
c \text{ spoons of sugar}
\]

\[
13 \text{ quarts of tea}
\]

The labels on the two equations from the previous two hints are lined up on the top and bottom.

This means that the proportions are equal to each other. Therefore,

\[
\frac{8}{6} = \frac{c}{13}
\]

This is an equation that can be used to find \( c \), the number of spoons of sugar needed for 13 quarts of tea. So the answer is C. Select C.


57) Problem #PRABWXY "PRABWXY - Setting Up Proportions"
When doing the laundry, you use 19 cups of detergent for every 17 gallons of water. Which of the following equations can be used to calculate \( c \), the number of cups of detergent needed when using 37 gallons of water?

A. \[
\frac{17}{19} = \frac{c}{37}
\]

B. \[
\frac{19}{17} = \frac{c}{37}
\]
C. \[
\begin{array}{c}
17 \\
37
\end{array} = \begin{array}{c}
c \\
19
\end{array}
\]

D. \[
\begin{array}{c}
37 \\
19
\end{array} = \begin{array}{c}
c \\
17
\end{array}
\]

**Multiple Choice:**

- **A**
- **✓ B**
- **✗ C**
- **✗ D**

**Hints:**

- The problem is about the following ratio

\[\frac{\text{number of cups of detergent}}{\text{number of gallons of water}}\]

- Line up the labels that are on the top and bottom of the fractions.

- \[\frac{\text{cups of detergent}}{\text{gallons of water}}\]

- We know that 19 cups of detergent is needed for every 17 gallons of water used. This means that

\[19 : 17\]

- or

\[\frac{19 \text{ cups of detergent}}{17 \text{ gallons of water}}\]

- We also know that \(c\) cups of detergent is needed for every 37 gallons of water used. This means that

\[c : 37\]

- or

\[\frac{c \text{ cups of detergent}}{37 \text{ gallons of water}}\]
Notice the labels on the two equations from the previous two hints are lined up on the top and bottom.

This means that the proportions are equal to each other. Therefore,

\[
\frac{19}{17} = \frac{c}{37}
\]

This is an equation that can be used to find \( c \), the number of cups of detergent needed for 37 gallons of water. So the answer is B. Select B.

58) Problem #PRABWW6 "PRABWW6 - Setting Up Proportions"

When doing the laundry, you use 8 cups of detergent for every 21 gallons of water. Which of the following equations can be used to calculate \( c \), the number of cups of detergent needed for 35 gallons of water?

Multiple Choice:

- \( \frac{8}{21} = \frac{c}{35} \)
- \( \frac{8}{21} = \frac{35}{c} \)
- \( \frac{8}{35} = \frac{21}{c} \)
- \( \frac{35}{21} = \frac{8}{c} \)

Hints:

- The problem is about the following ratio
  
  number of cups of detergent : number of gallons of water

- This ratio means that
  
  cups of detergent on the top \\
  ________________
  
  gallons of water on the bottom

- We know that \( 8 \) cups of detergent is needed for every 21 gallons of water used. This means that
  
  \( 8 : 21 \)

  or

  8 cups of detergent
21 gallons of water

- We also know that \( c \) cups of detergent is needed for every 35 gallons of water used. This means that

\[
\frac{c}{35}
\]

or

\[\begin{array}{c}
c \text{ cups of detergent} \\
\hline
35 \text{ gallons of water}
\end{array}\]

- Notice labels on the two equations from the previous two hints are lined up on the top and bottom. This means that the proportions are equal to each other. Therefore,

\[
\frac{8}{21} = \frac{c}{35}
\]

This is an equation that can be used to find \( c \), the number of cups of detergent needed for 35 gallons of water.
So the answer is \( 8/21 = c/35 \).

---

59) Problem #PRABWYN "PRABWYN - Setting Up Proportions"

When making tea, you use 21 spoons of sugar for every 7 quarts of tea. Which of the following equations can be used to calculate \( c \), the number of spoons of sugar needed when using 21 quarts of tea?

A. \[
\begin{array}{c}
21 \\
\hline
7
\end{array} = \begin{array}{c}
21 \\
\hline
\_\_\_
\end{array}
\]

B. \[
\begin{array}{c}
21 \\
\hline
21
\end{array} = \begin{array}{c}
\_\_\_ \\
\hline
\_\_\_ 
\end{array}
\]

C. \[
\begin{array}{c}
21 \\
\hline
7
\end{array} = \begin{array}{c}
\_\_\_ \\
\hline
\_\_\_ 
\end{array}
\]
Multiple Choice:

A
B
C
D

Hints:

- The problem is about the following ratio

number of spoons of sugar : number of quarts of tea

- Line up the labels that are on the top and bottom of the fractions.

spoons of sugar on the top

____________________

quarts of tea on the bottom

- We know that 21 spoons of sugar is needed for every 7 quarts of tea used. This means that

21 : 7

or

21 spoons of sugar

____________________

7 quarts of tea

- We also know that c spoons of sugar is needed for every 21 quarts of tea used. This means that

c : 21

or

c spoons of sugar

____________________

21 quarts of tea

- The labels on the two equations from the previous two hints are lined up on the top and bottom. This means that the proportions are equal to each other. Therefore,
\[
\frac{21}{c} = \frac{7}{21}
\]

This is an equation that can be used to find \( c \), the number of spoons of sugar needed for 21 quarts of tea. So the answer is C. Select C.

60) Problem #PRABWWF "PRABWWF - Setting Up Proportions"
When doing the laundry, you use 21 cups of detergent for every 5 gallons of water. Which of the following equations can be used to calculate \( c \), the number of cups of detergent needed for 22 gallons of water?

Multiple Choice:

- \( \frac{21}{5} = \frac{c}{22} \) ✔
- \( \frac{21}{5} = \frac{22}{c} \) ✗
- \( \frac{21}{22} = \frac{5}{c} \) ✗
- \( \frac{22}{5} = \frac{21}{c} \) ✗

Hints:
- The problem is about the following ratio:
  
  \[ \text{number of cups of detergent} : \text{number of gallons of water} \]
- This ratio means that:
  
  \[ \frac{\text{cups of detergent}}{\text{gallons of water}} \]

  - We know that 21 cups of detergent is needed for every 5 gallons of water used. This means that
    
    \[ 21 : 5 \]

  or

  \[ \frac{21 \text{ cups of detergent}}{5 \text{ gallons of water}} \]

  - We also know that \( c \) cups of detergent is needed for every 22 gallons of water used. This means that
c : 22

or

c cups of detergent

\[ \frac{c}{22} \text{ gallons of water} \]

- Notice labels on the two equations from the previous two hints are lined up on the top and bottom.

This means that the proportions are equal to each other. Therefore,

\[ \frac{21}{5} = \frac{c}{22} \]

This is an equation that can be used to find c, the number of cups of detergent needed for 22 gallons of water.
So the answer is 21/5 = c/22.

61) Problem #PRABWWG "PRABWWG - Setting Up Proportions"
When making tea, you use 9 spoons of sugar for every 12 quarts of tea. Which of the following equations can be used to calculate c, the number of spoons of sugar needed for 21 quarts of tea?

Multiple Choice:
- ✔️ 9/12 = c/21
- ✗️ 9/12 = 21/c
- ✗️ 9/21 = 12/c
- ✗️ 21/12 = 9/c

Hints:
- The problem is about the following ratio

number of spoons of sugar : number of quarts of tea
- This ratio means that

spoons of sugar on the top

quarts of tea on the bottom

- We know that 9 spoons of sugar is needed for every 12 quarts of tea used. This means that
9 : 12

or

9 spoons of sugar

12 quarts of tea

- We also know that \( c \) spoons of sugar is needed for every 21 quarts of tea used. This means that

\( c : 21 \)

or

\( c \) spoons of sugar

21 quarts of tea

- Notice labels on the two equations from the previous two hints are lined up on the top and bottom.

This means that the proportions are equal to each other. Therefore,

\[
\frac{9}{12} = \frac{c}{21}
\]

This is an equation that can be used to find \( c \), the number of spoons of sugar needed for 21 quarts of tea.

So the answer is \( \frac{9}{12} = \frac{c}{21} \).

62) Problem #PRABWWZ "PRABWWZ - Setting Up Proportions"

When making tea, you use 7 spoons of sugar for every 2 quarts of tea. Which of the following equations can be used to calculate \( c \), the number of spoons of sugar needed for 11 quarts of tea?

Multiple Choice:

- \( \checkmark \) \( \frac{7}{2} = \frac{c}{11} \)
- \( \times \) \( \frac{7}{2} = \frac{11}{c} \)
- \( \times \) \( \frac{7}{11} = \frac{2}{c} \)
- \( \times \) \( \frac{11}{2} = \frac{7}{c} \)

Hints:
- The problem is about the following ratio
number of spoons of sugar : number of quarts of tea

- This ratio means that

spoons of sugar on the top


quarts of tea on the bottom

- We know that 7 spoons of sugar is needed for every 2 quarts of tea used. This means that

\[
7 : 2
\]

or

\[
\frac{7 \text{ spoons of sugar}}{2 \text{ quarts of tea}}
\]

- We also know that \( c \) spoons of sugar is needed for every 11 quarts of tea used. This means that

\[
c : 11
\]

or

\[
\frac{c \text{ spoons of sugar}}{11 \text{ quarts of tea}}
\]

- Notice labels on the two equations from the previous two hints are lined up on the top and bottom. This means that the proportions are equal to each other. Therefore,

\[
\frac{7}{2} = \frac{c}{11}
\]

This is an equation that can be used to find \( c \), the number of spoons of sugar needed for 11 quarts of tea. So the answer is \( 7/2 = c/11 \).

63) Problem #PRABWXW "PRABWXW - Setting Up Proportions"

When doing the laundry, you use 12 cups of detergent for every 12 gallons of water. Which of the following equations can be used to calculate \( c \), the number of cups of detergent needed when using 19
gallons of water?

A. \[ \frac{12}{19} = \frac{c}{19} \]

B. \[ \frac{12}{12} = \frac{c}{19} \]

C. \[ \frac{12}{19} = \frac{c}{12} \]

D. \[ \frac{19}{12} = \frac{c}{12} \]

Multiple Choice:

- A
- B
- C
- D

Hints:

- The problem is about the following ratio:
  number of cups of detergent : number of gallons of water

- Line up the labels that are on the top and bottom of the fractions.

- We know that 12 cups of detergent is needed for every 12 gallons of water used. This means that
  \[ 12 : 12 \]
  or
  12 cups of detergent
We also know that \(c\) cups of detergent is needed for every 19 gallons of water used. This means that
\[
c : 19
\]
or
\[
c \text{ cups of detergent} = \frac{1}{19} \text{ gallons of water}
\]

Notice the labels on the two equations from the previous two hints are lined up on the top and bottom. This means that the proportions are equal to each other. Therefore,
\[
\frac{12}{c} = \frac{19}{12}
\]

This is an equation that can be used to find \(c\), the number of cups of detergent needed for 19 gallons of water. So the answer is B. Select B.

---

64) Problem #PRABWWQ "PRABWWQ - Setting Up Proportions"
When doing the laundry, you use 5 cups of detergent for every 14 gallons of water. Which of the following equations can be used to calculate \(c\), the number of cups of detergent needed for 21 gallons of water?

**Multiple Choice:**
- ✔️ \(\frac{5}{14} = \frac{c}{21}\)
- ✗ \(\frac{5}{14} = \frac{21}{c}\)
- ✗ \(\frac{5}{14} = \frac{14}{c}\)
- ✗ \(\frac{21}{14} = \frac{5}{c}\)

**Hints:**
- The problem is about the following ratio

  number of cups of detergent : number of gallons of water
- This ratio means that
cups of detergent on the top
gallons of water on the bottom

- We know that 5 cups of detergent is needed for every 14 gallons of water used. This means that

\[
\frac{5}{14}
\]

or

\[
\frac{5 \text{ cups of detergent}}{14 \text{ gallons of water}}
\]

- We also know that \( c \) cups of detergent is needed for every 21 gallons of water used. This means that

\[
\frac{c}{21}
\]

or

\[
\frac{c \text{ cups of detergent}}{21 \text{ gallons of water}}
\]

- Notice labels on the two equations from the previous two hints are lined up on the top and bottom. This means that the proportions are equal to each other. Therefore,

\[
\frac{5}{14} = \frac{c}{21}
\]

This is an equation that can be used to find \( c \), the number of cups of detergent needed for 21 gallons of water.
So the answer is \( 5/14 = c/21 \).

65) Problem #PRABWY7 "PRABWY7 - Setting Up Proportions"
When doing the laundry, you use 10 cups of detergent for every 13 gallons of water. Which of the following equations can be used to calculate \( c \), the number of cups of detergent needed when using 18 gallons of water?

A. \[
\frac{18}{13} = \frac{10}{c}
\]
B. \[ \frac{18}{10} = \frac{c}{13} \]

C. \[ \frac{13}{10} = \frac{c}{18} \]

D. \[ \frac{10}{13} = \frac{c}{18} \]

Multiple Choice:

A
B
C
D

Hints:

- The problem is about the following ratio:
  
  \[ \text{number of cups of detergent} : \text{number of gallons of water} \]

- Line up the labels that are on the top and bottom of the fractions.

  \[ \frac{\text{cups of detergent}}{\text{gallons of water}} \]

- We know that 10 cups of detergent is needed for every 13 gallons of water used. This means that
  
  \[ 10 : 13 \]
  
  or

  \[ \frac{10 \text{ cups of detergent}}{13 \text{ gallons of water}} \]

- We also know that \( c \) cups of detergent is needed for every 18 gallons of water used. This means that
c : 18

or

c cups of detergent

-------------

18 gallons of water

- The labels on the two equations from the previous two hints are lined up on the top and bottom.

This means that the proportions are equal to each other. Therefore,

\[
\frac{10}{13} = \frac{c}{18}
\]

This is an equation that can be used to find \( c \), the number of cups of detergent needed for 18 gallons of water. So the answer is D. Select D.

---

66) Problem #PRABWW2 "PRABWW2 - Setting Up Proportions"

When doing the laundry, you use 18 cups of detergent for every 12 gallons of water. Which of the following equations can be used to calculate \( c \), the number of cups of detergent needed for 17 gallons of water?

Multiple Choice:

✅ 18/12 = c/17
❌ 18/12 = 17/c
❌ 18/17 = 12/c
❌ 17/12 = 18/c

Hints:

- The problem is about the following ratio

  number of cups of detergent : number of gallons of water

- This ratio means that

  cups of detergent on the top

  ---------------------------

  gallons of water on the bottom

- We know that 18 cups of detergent is needed for every 12 gallons of water used. This means that
or

18 cups of detergent
____________________
12 gallons of water

- We also know that \( c \) cups of detergent is needed for every 17 gallons of water used. This means that

- Notice labels on the two equations from the previous two hints are lined up on the top and bottom. This means that the proportions are equal to each other. Therefore,

\[
\frac{18}{12} = \frac{c}{17}
\]

This is an equation that can be used to find \( c \), the number of cups of detergent needed for 17 gallons of water.
So the answer is \( \frac{18}{12} = \frac{c}{17} \).

---

67) Problem #PRABWXK "PRABWXK - Setting Up Proportions"

When doing the laundry, you use 2 cups of detergent for every 5 gallons of water. Which of the following equations can be used to calculate \( c \), the number of cups of detergent needed when using 14 gallons of water?

A. \[
\frac{5}{2} = \frac{c}{14}
\]

B. \[
\frac{2}{5} = \frac{c}{14}
\]
Multiple Choice:

A

B

C

D

Hints:
- The problem is about the following ratio
  
  number of cups of detergent : number of gallons of water

- Line up the labels that are on the top and bottom of the fractions.

  cups of detergent on the top

  ------------------------

  gallons of water on the bottom

- We know that 2 cups of detergent is needed for every 5 gallons of water used. This means that

  2 : 5

  or

  2 cups of detergent

  ------------------------

  5 gallons of water

- We also know that c cups of detergent is needed for every 14 gallons of water used. This means that

  c : 14

  or

  c cups of detergent

  ------------------------

  14 gallons of water
14 gallons of water

- Notice the labels on the two equations from the previous two hints are lined up on the top and bottom.

This means that the proportions are equal to each other. Therefore,

\[
\frac{2}{5} = \frac{c}{14}
\]

This is an equation that can be used to find \(c\), the number of cups of detergent needed for 14 gallons of water. So the answer is B. Select B.

---

### 68) Problem #PRABWYZ "PRABWYZ - Setting Up Proportions"

When doing the laundry, you use 12 cups of detergent for every 11 gallons of water. Which of the following equations can be used to calculate \(c\), the number of cups of detergent needed when using 17 gallons of water?

A. \[
\frac{17}{11} = \frac{12}{c}
\]

B. \[
\frac{17}{12} = \frac{c}{11}
\]

C. \[
\frac{11}{12} = \frac{c}{17}
\]

D. \[
\frac{12}{11} = \frac{c}{17}
\]

Multiple Choice:
- ❌ A
- ❌ B
- ❌ C
- D
Hints:

- The problem is about the following ratio:
  
  number of cups of detergent : number of gallons of water

- Line up the labels that are on the top and bottom of the fractions.

  cups of detergent on the top
  
  __________________________
  
  gallons of water on the bottom

- We know that 12 cups of detergent is needed for every 11 gallons of water used. This means that:

  12 : 11
  
  or
  
  12 cups of detergent
  
  __________________________
  
  11 gallons of water

- We also know that c cups of detergent is needed for every 17 gallons of water used. This means that:

  c : 17
  
  or
  
  c cups of detergent
  
  __________________________
  
  17 gallons of water

- The labels on the two equations from the previous two hints are lined up on the top and bottom. This means that the proportions are equal to each other. Therefore,

  \[
  \frac{12}{11} = \frac{c}{17}
  \]

  This is an equation that can be used to find c, the number of cups of detergent needed for 17 gallons of water. So the answer is D. Select D.
When doing the laundry, you use 16 cups of detergent for every 3 gallons of water. Which of the following equations can be used to calculate c, the number of cups of detergent needed when using 14 gallons of water?

A. \[
\frac{3}{16} = \frac{c}{14}
\]

B. \[
\frac{16}{3} = \frac{c}{14}
\]

C. \[
\frac{3}{14} = \frac{c}{16}
\]

D. \[
\frac{14}{16} = \frac{c}{3}
\]

Multiple Choice:

- A
- B
- C
- D

Hints:
- The problem is about the following ratio
  \[
  \text{number of cups of detergent} : \text{number of gallons of water}
  \]
- Line up the labels that are on the top and bottom of the fractions.

  \[
  \text{cups of detergent} \quad \text{on the top}
  \]

  \[
  \text{gallons of water} \quad \text{on the bottom}
  \]

- We know that 16 cups of detergent is needed for every 3 gallons of water used. This means that

  \[
  16 : 3
  \]
or

\[
\frac{16 \text{ cups of detergent}}{3 \text{ gallons of water}}
\]

- We also know that \( c \text{ cups of detergent} \) is needed for every \( 14 \text{ gallons of water} \) used. This means that

\[
c : 14
\]

or

\[
\frac{c \text{ cups of detergent}}{14 \text{ gallons of water}}
\]

- Notice the labels on the two equations from the previous two hints are lined up on the top and bottom.

This means that the proportions are equal to each other. Therefore,

\[
\frac{16}{3} = \frac{c}{14}
\]

This is an equation that can be used to find \( c \), the number of cups of detergent needed for \( 14 \text{ gallons of water} \). So the answer is B. Select B.

70) Problem #PRABWWP "PRABWWP - Setting Up Proportions"

When making tea, you use 11 spoons of sugar for every 18 quarts of tea. Which of the following equations can be used to calculate \( c \), the number of spoons of sugar needed for 20 quarts of tea?

**Multiple Choice:**

- 11/18 = c/20
- 11/18 = 20/c
- 11/20 = 18/c
- 20/18 = 11/c

**Hints:**

- The problem is about the following ratio
number of spoons of sugar : number of quarts of tea

- This ratio means that

  spoons of sugar on the top

  quarts of tea on the bottom

- We know that 11 spoons of sugar is needed for every 18 quarts of tea used. This means that

  \[11 : 18\]

  or

  \[
  \frac{11 \text{ spoons of sugar}}{18 \text{ quarts of tea}}
  \]

- We also know that \(c\) spoons of sugar is needed for every 20 quarts of tea used. This means that

  \[c : 20\]

  or

  \[
  \frac{c \text{ spoons of sugar}}{20 \text{ quarts of tea}}
  \]

- Notice labels on the two equations from the previous two hints are lined up on the top and bottom.

  This means that the proportions are equal to each other. Therefore,

  \[
  \frac{11}{18} = \frac{c}{20}
  \]

  This is an equation that can be used to find \(c\), the number of spoons of sugar needed for 20 quarts of tea. So the answer is \(11/18 = c/20\).

---

71) Problem #PRABWX2 "PRABWX2 - Setting Up Proportions"

When doing the laundry, you use 17 cups of detergent for every 2 gallons of water. Which of the following equations can be used to calculate \(c\), the number of cups of detergent needed when using 10 gallons of water?
A. \[
\frac{2}{17} = \frac{c}{10}
\]

B. \[
\frac{17}{2} = \frac{c}{10}
\]

C. \[
\frac{2}{10} = \frac{c}{17}
\]

D. \[
\frac{10}{17} = \frac{c}{2}
\]

Multiple Choice:
- A
- B
- C
- D

Hints:
- The problem is about the following ratio

number of cups of detergent : number of gallons of water

- Line up the labels that are on the top and bottom of the fractions.

  cups of detergent on the top

  gallons of water on the bottom

- We know that 17 cups of detergent is needed for every 2 gallons of water used. This means that

  17 : 2

  or

  \[
  \frac{17 \text{ cups of detergent}}{2 \text{ gallons of water}}
  \]
• We also know that \( c \) cups of detergent is needed for every 10 gallons of water used. This means that

\[
c : 10
\]

or

\[
\frac{c \text{ cups of detergent}}{10 \text{ gallons of water}}
\]

• Notice the labels on the two equations from the previous two hints are lined up on the top and bottom.

This means that the proportions are equal to each other. Therefore,

\[
\frac{17}{2} = \frac{c}{10}
\]

This is an equation that can be used to find \( c \), the number of cups of detergent needed for 10 gallons of water. So the answer is B. Select B.

72) Problem #PRABWXS "PRABWXS - Setting Up Proportions"

When doing the laundry, you use 11 cups of detergent for every 6 gallons of water. Which of the following equations can be used to calculate \( c \), the number of cups of detergent needed when using 22 gallons of water?

A. \[
\frac{6}{11} = \frac{c}{22}
\]

B. \[
\frac{11}{6} = \frac{c}{22}
\]

C. \[
\frac{6}{22} = \frac{c}{11}
\]

D. \[
22 = c
\]
Multiple Choice:

- A
- B
- C
- D

Hints:

- The problem is about the following ratio
  
  \[
  \text{number of cups of detergent} : \text{number of gallons of water}
  \]
- Line up the labels that are on the top and bottom of the fractions.

  \[
  \text{cups of detergent} \quad \text{on the top}
  \]

  \[
  \text{gallons of water} \quad \text{on the bottom}
  \]

- We know that 11 cups of detergent is needed for every 6 gallons of water used. This means that

  \[
  11 : 6
  \]

  or

  \[
  \frac{11 \text{ cups of detergent}}{6 \text{ gallons of water}}
  \]

- We also know that \( c \) cups of detergent is needed for every 22 gallons of water used. This means that

  \[
  c : 22
  \]

  or

  \[
  \frac{c \text{ cups of detergent}}{22 \text{ gallons of water}}
  \]

- Notice the labels on the two equations from the previous two hints are lined up on the top and bottom.

This means that the proportions are equal to each other. Therefore,
11 \[\frac{c}{6}\] = \[\frac{22}{22}\]

This is an equation that can be used to find \(c\), the number of cups of detergent needed for 22 gallons of water. So the answer is B. Select B.

73) Problem #PRABWXC "PRABWXC - Setting Up Proportions"
When doing the laundry, you use 9 cups of detergent for every 10 gallons of water. Which of the following equations can be used to calculate \(c\), the number of cups of detergent needed when using 19 gallons of water?

A. \[\frac{10}{9}\] = \[\frac{c}{19}\]

B. \[\frac{9}{10}\] = \[\frac{c}{19}\]

C. \[\frac{10}{19}\] = \[\frac{c}{9}\]

D. \[\frac{19}{9}\] = \[\frac{c}{10}\]

Multiple Choice:
- [x] A
- [✓] B
- [x] C
- [x] D

Hints:
- The problem is about the following ratio
  \[\text{number of cups of detergent : number of gallons of water}\]
- Line up the labels that are on the top and bottom of the fractions.
cups of detergent on the top
-------------
gallons of water on the bottom

- We know that 9 cups of detergent is needed for every 10 gallons of water used. This means that

  9 : 10

  or

  9 cups of detergent
  ---------------
  10 gallons of water

- We also know that c cups of detergent is needed for every 19 gallons of water used. This means that

  c : 19

  or

  c cups of detergent
  ---------------
  19 gallons of water

- Notice the labels on the two equations from the previous two hints are lined up on the top and bottom.

  This means that the proportions are equal to each other. Therefore,

  9       c
  ---- = ----
  10      19

  This is an equation that can be used to find c, the number of cups of detergent needed for 19 gallons of water. So the answer is B. Select B.

74) Problem #PRABWYF "PRABWYF - Setting Up Proportions"

When making tea, you use 6 spoons of sugar for every 20 quarts of tea. Which of the following equations can be used to calculate c, the number of spoons of sugar needed when using 36 quarts of tea?

A. 6      36
    ---- = ----
    20      c
B. \[ \frac{6}{36} = \frac{20}{c} \]

C. \[ \frac{6}{20} = \frac{c}{36} \]

D. \[ \frac{36}{6} = \frac{c}{20} \]

**Multiple Choice:**

- A
- B
- C
- D

**Hints:**

- The problem is about the following ratio
  
  \[ \text{number of spoons of sugar} : \text{number of quarts of tea} \]

- Line up the labels that are on the top and bottom of the fractions.
  
  \[ \text{spoons of sugar on the top} \]
  
  \[ \text{quarts of tea on the bottom} \]

- We know that 6 spoons of sugar is needed for every 20 quarts of tea used. This means that
  
  6 : 20

  or

  \[ \frac{6 \text{ spoons of sugar}}{20 \text{ quarts of tea}} \]

- We also know that \( c \) spoons of sugar is needed for every 36 quarts of tea used. This means that
c : 36

or

c spoons of sugar

\[
\frac{c}{36 \text{ quarts of tea}}
\]

- The labels on the two equations from the previous two hints are lined up on the top and bottom.

This means that the proportions are equal to each other. Therefore,

\[
\frac{6}{20} = \frac{c}{36}
\]

This is an equation that can be used to find \( c \), the number of spoons of sugar needed for 36 quarts of tea.

So the answer is C. Select C.

□ 75) Problem #PRABWXB "PRABWXB - Setting Up Proportions"

When making tea, you use 16 spoons of sugar for every 18 quarts of tea. Which of the following equations can be used to calculate \( c \), the number of spoons of sugar needed when using 30 quarts of tea?

A. \[
\frac{18}{16} = \frac{c}{30}
\]

B. \[
\frac{16}{18} = \frac{c}{30}
\]

C. \[
\frac{18}{30} = \frac{c}{16}
\]

D. \[
\frac{30}{16} = \frac{c}{18}
\]
Hints:

- The problem is about the following ratio:
  \( \text{number of spoons of sugar : number of quarts of tea} \)
- Line up the labels that are on the top and bottom of the fractions.

- We know that 16 spoons of sugar is needed for every 18 quarts of tea used. This means that
  \[ 16 : 18 \]
  or
  \[ \frac{16 \text{ spoons of sugar}}{18 \text{ quarts of tea}} \]
- We also know that \( c \) spoons of sugar is needed for every 30 quarts of tea used. This means that
  \[ c : 30 \]
  or
  \[ \frac{c \text{ spoons of sugar}}{30 \text{ quarts of tea}} \]
- Notice the labels on the two equations from the previous two hints are lined up on the top and bottom.

This means that the proportions are equal to each other. Therefore,

\[ \frac{16}{18} = \frac{c}{30} \]
This is an equation that can be used to find \( c \), the number of spoons of sugar needed for 30 quarts of tea. So the answer is B. Select B.

76) Problem #PRABWW3 "PRABWW3 - Setting Up Proportions"
When making tea, you use 7 spoons of sugar for every 9 quarts of tea. Which of the following equations can be used to calculate \( c \), the number of spoons of sugar needed for 19 quarts of tea?

Multiple Choice:
- ✔️ \( \frac{7}{9} = \frac{c}{19} \)
- ✗ \( \frac{7}{9} = \frac{19}{c} \)
- ✗ \( \frac{7}{19} = \frac{9}{c} \)
- ✗ \( \frac{19}{9} = \frac{7}{c} \)

Hints:
- The problem is about the following ratio

\[
\text{number of spoons of sugar} : \text{number of quarts of tea}
\]
- This ratio means that

\[
\text{spoons of sugar} \quad \text{on the top} \quad \frac{7 \text{ spoons of sugar}}{9 \text{ quarts of tea}} = \frac{c \text{ spoons of sugar}}{19 \text{ quarts of tea}}
\]

- We know that 7 spoons of sugar is needed for every 9 quarts of tea used. This means that

\[
7 : 9
\]

- or

\[
\frac{7 \text{ spoons of sugar}}{9 \text{ quarts of tea}}
\]

- We also know that \( c \) spoons of sugar is needed for every 19 quarts of tea used. This means that

\[
\frac{c \text{ spoons of sugar}}{19 \text{ quarts of tea}}
\]

- or

\[
\frac{c \text{ spoons of sugar}}{19 \text{ quarts of tea}}
\]
19 quarts of tea

- Notice labels on the two equations from the previous two hints are lined up on the top and bottom.

This means that the proportions are equal to each other. Therefore,

\[
\frac{7}{9} = \frac{c}{19}
\]

This is an equation that can be used to find \(c\), the number of spoons of sugar needed for 19 quarts of tea. So the answer is \(7/9 = c/19\).

77) Problem #PRABWXA "PRABWXA - Setting Up Proportions"
When doing the laundry, you use 4 cups of detergent for every 15 gallons of water. Which of the following equations can be used to calculate \(c\), the number of cups of detergent needed when using 35 gallons of water?

A. \[
\frac{15}{4} = \frac{c}{35}
\]

B. \[
\frac{4}{15} = \frac{c}{35}
\]

C. \[
\frac{15}{35} = \frac{c}{4}
\]

D. \[
\frac{35}{4} = \frac{c}{15}
\]

Multiple Choice:
- A
- ✔️ B
- ✗ C
- ✗ D
Hints:
- The problem is about the following ratio
  
  number of cups of detergent : number of gallons of water

- Line up the labels that are on the top and bottom of the fractions.

  cups of detergent on the top

  ________________________________

  gallons of water on the bottom

- We know that 4 cups of detergent is needed for every 15 gallons of water used. This means that

  \[ 4 : 15 \]

  or

  \[
  \frac{4 \text{ cups of detergent}}{15 \text{ gallons of water}}
  \]

- We also know that \( c \) cups of detergent is needed for every 35 gallons of water used. This means that

  \[ c : 35 \]

  or

  \[
  \frac{c \text{ cups of detergent}}{35 \text{ gallons of water}}
  \]

- Notice the labels on the two equations from the previous two hints are lined up on the top and bottom.

  This means that the proportions are equal to each other. Therefore,

  \[
  \frac{4}{15} = \frac{c}{35}
  \]

  This is an equation that can be used to find \( c \), the number of cups of detergent needed for 35 gallons of water. So the answer is B. Select B.
When doing the laundry, you use 10 cups of detergent for every 13 gallons of water. Which of the following equations can be used to calculate $c$, the number of cups of detergent needed when using 23 gallons of water?

A. \[
\frac{23}{13} = \frac{10}{c}
\]

B. \[
\frac{23}{10} = \frac{c}{13}
\]

C. \[
\frac{13}{10} = \frac{c}{23}
\]

D. \[
\frac{10}{13} = \frac{c}{23}
\]

Multiple Choice:
- A
- B
- C
- D

Hints:
- The problem is about the following ratio
  
  \text{number of cups of detergent} : \text{number of gallons of water}

- Line up the labels that are on the top and bottom of the fractions.

- We know that 10 cups of detergent is needed for every 13 gallons of water used. This means that $10 : 13$
We also know that \( c \) cups of detergent is needed for every 23 gallons of water used. This means that

\[
c : 23
\]

or

\[
c \text{ cups of detergent} \quad \frac{\text{cups of detergent}}{23 \text{ gallons of water}}
\]

The labels on the two equations from the previous two hints are lined up on the top and bottom. This means that the proportions are equal to each other. Therefore,

\[
\frac{10}{13} = \frac{c}{23}
\]

This is an equation that can be used to find \( c \), the number of cups of detergent needed for 23 gallons of water. So the answer is D. Select D.

**Problem #PRABWY3 "PRABWY3 - Setting Up Proportions"**

When doing the laundry, you use 16 cups of detergent for every 21 gallons of water. Which of the following equations can be used to calculate \( c \), the number of cups of detergent needed when using 29 gallons of water?

A. \[
\frac{29}{21} = \frac{16}{c}
\]

B. \[
\frac{29}{16} = \frac{c}{21}
\]

C. \[
\frac{21}{c} = \frac{c}{c}
\]
Multiple Choice:

- A
- B
- C
- D

Hints:

- The problem is about the following ratio
  \[ \text{number of cups of detergent} : \text{number of gallons of water} \]
- Line up the labels that are on the top and bottom of the fractions.
  \[ \frac{\text{cups of detergent}}{\text{gallons of water}} \]

- We know that 16 cups of detergent is needed for every 21 gallons of water used. This means that
  \[ 16 : 21 \]
  or
  \[ \frac{16 \text{ cups of detergent}}{21 \text{ gallons of water}} \]

- We also know that \( c \) cups of detergent is needed for every 29 gallons of water used. This means that
  \[ c : 29 \]
  or
  \[ \frac{c \text{ cups of detergent}}{29 \text{ gallons of water}} \]

- The labels on the two equations from the previous two hints are lined up on the top and bottom.
This means that the proportions are equal to each other. Therefore,

\[
\frac{16}{21} = \frac{c}{29}
\]

This is an equation that can be used to find \( c \), the number of cups of detergent needed for 29 gallons of water. So the answer is D. Select D.

80) Problem #PRABWX7 "PRABWX7 - Setting Up Proportions"
When making tea, you use 9 spoons of sugar for every 4 quarts of tea. Which of the following equations can be used to calculate \( c \), the number of spoons of sugar needed when using 10 quarts of tea?

A. \[
\frac{9}{4} = \frac{10}{c}
\]

B. \[
\frac{9}{10} = \frac{4}{c}
\]

C. \[
\frac{9}{4} = \frac{c}{10}
\]

D. \[
\frac{10}{9} = \frac{c}{4}
\]

Multiple Choice:
- **✗** A
- **✗** B
- **✓** C
- **✗** D

Hints:
- The problem is about the following ratio

  number of spoons of sugar : number of quarts of tea
Line up the labels that are on the top and bottom of the fractions.

spoons of sugar on the top

quarts of tea on the bottom

We know that 9 spoons of sugar is needed for every 4 quarts of tea used. This means that

9 : 4

or

9 spoons of sugar

4 quarts of tea

We also know that c spoons of sugar is needed for every 10 quarts of tea used. This means that

c : 10

or

c spoons of sugar

10 quarts of tea

The labels on the two equations from the previous two hints are lined up on the top and bottom.

This means that the proportions are equal to each other. Therefore,

\[
\frac{9}{4} = \frac{c}{10}
\]

This is an equation that can be used to find c, the number of spoons of sugar needed for 10 quarts of tea. So the answer is C. Select C.

81) Problem #PRABWWS "PRABWWS - Setting Up Proportions"
When doing the laundry, you use 19 cups of detergent for every 16 gallons of water. Which of the following equations can be used to calculate c, the number of cups of detergent needed for 32 gallons of water?
Multiple Choice:
✓ 19/16 = c/32
✗ 19/16 = 32/c
✗ 19/32 = 16/c
✗ 32/16 = 19/c

Hints:
- The problem is about the following ratio

  number of cups of detergent : number of gallons of water

- This ratio means that

  cups of detergent on the top
  _____________________________
  gallons of water on the bottom

- We know that 19 cups of detergent is needed for every 16 gallons of water used. This means that

  19 : 16

  or

  19 cups of detergent
  _____________________________
  16 gallons of water

- We also know that c cups of detergent is needed for every 32 gallons of water used. This means that

  c : 32

  or

  c cups of detergent
  _____________________________
  32 gallons of water

- Notice labels on the two equations from the previous two hints are lined up on the top and bottom.

This means that the proportions are equal to each other. Therefore,

  19     c
  _____ = _____
This is an equation that can be used to find $c$, the number of cups of detergent needed for 32 gallons of water.
So the answer is $19/16 = c/32$.

---

82) Problem #PRABWXX "PRABWXX - Setting Up Proportions"
When making tea, you use 18 spoons of sugar for every 4 quarts of tea. Which of the following equations can be used to calculate $c$, the number of spoons of sugar needed when using 8 quarts of tea?

A. $\frac{4}{18} = \frac{c}{8}$
B. $\frac{18}{4} = \frac{c}{8}$
C. $\frac{4}{8} = \frac{c}{18}$
D. $\frac{8}{18} = \frac{c}{4}$

Multiple Choice:

- A
- B
- C
- D

Hints:
- The problem is about the following ratio
  
  number of spoons of sugar : number of quarts of tea
- Line up the labels that are on the top and bottom of the fractions.
  
  spoons of sugar on the top
quarts of tea on the bottom

- We know that 18 spoons of sugar is needed for every 4 quarts of tea used. This means that
  
  \[
  18 : 4
  \]
  
or
  
  \[
  \frac{18 \text{ spoons of sugar}}{4 \text{ quarts of tea}}
  \]

- We also know that \( c \) spoons of sugar is needed for every 8 quarts of tea used. This means that
  
  \[
  c : 8
  \]
  
or
  
  \[
  \frac{c \text{ spoons of sugar}}{8 \text{ quarts of tea}}
  \]

- Notice the labels on the two equations from the previous two hints are lined up on the top and bottom.

  This means that the proportions are equal to each other. Therefore,

  \[
  \frac{18}{4} = \frac{c}{8}
  \]

  This is an equation that can be used to find \( c \), the number of spoons of sugar needed for 8 quarts of tea. So the answer is B. Select B.

83) Problem #PRABWW8 "PRABWW8 - Setting Up Proportions"

When doing the laundry, you use 2 cups of detergent for every 12 gallons of water. Which of the following equations can be used to calculate \( c \), the number of cups of detergent needed when using 26 gallons of water?

\[
\begin{array}{llll}
\text{A.} & 12 & = & c \\
& \frac{12}{2} & = & \frac{c}{26}
\end{array}
\]
Multiple Choice:

A.  

B.  

C.  

D.  

Hints:

- The problem is about the following ratio
  
  \[
  \text{number of cups of detergent : number of gallons of water}
  \]

- Line up the labels that are on the top and bottom of the fractions.

  \[
  \frac{\text{cups of detergent}}{\text{gallons of water}}
  \]

- We know that 2 cups of detergent is needed for every 12 gallons of water used. This means that

  \[
  2 : 12
  \]

  or

  \[
  \frac{2 \text{ cups of detergent}}{12 \text{ gallons of water}}
  \]

- We also know that \(c\) cups of detergent is needed for every 26 gallons of water used. This means that

  \[
  c : 26
  \]
or

\[ \frac{c \text{ cups of detergent}}{26 \text{ gallons of water}} \]

- Notice the labels on the two equations from the previous two hints are lined up on the top and bottom.

This means that the proportions are equal to each other. Therefore,

\[ \frac{2}{12} = \frac{c}{26} \]

This is an equation that can be used to find \( c \), the number of cups of detergent needed for 26 gallons of water. So the answer is B. Select B.

84) Problem #PRABWYV "PRABWYV - Setting Up Proportions"
When doing the laundry, you use 18 cups of detergent for every 7 gallons of water. Which of the following equations can be used to calculate \( c \), the number of cups of detergent needed when using 21 gallons of water?

A. \[ \frac{21}{7} = \frac{18}{c} \]

B. \[ \frac{21}{18} = \frac{c}{7} \]

C. \[ \frac{7}{18} = \frac{c}{21} \]

D. \[ \frac{18}{7} = \frac{c}{21} \]

Multiple Choice:
Hints:

- The problem is about the following ratio

\[
\text{number of cups of detergent} : \text{number of gallons of water}
\]

- Line up the labels that are on the top and bottom of the fractions.

\[
\frac{\text{cups of detergent}}{\text{gallons of water}}
\]

- We know that 18 cups of detergent is needed for every 7 gallons of water used. This means that

\[
18 : 7
\]

or

\[
\frac{18 \text{ cups of detergent}}{7 \text{ gallons of water}}
\]

- We also know that \(c\) cups of detergent is needed for every 21 gallons of water used. This means that

\[
c : 21
\]

or

\[
\frac{c \text{ cups of detergent}}{21 \text{ gallons of water}}
\]

- The labels on the two equations from the previous two hints are lined up on the top and bottom.

This means that the proportions are equal to each other. Therefore,

\[
\frac{18}{7} = \frac{c}{21}
\]
This is an equation that can be used to find $c$, the number of cups of detergent needed for 21 gallons of water. So the answer is D. Select D.

85) Problem #PRABWYR "PRABWYR - Setting Up Proportions"
When doing the laundry, you use 6 cups of detergent for every 9 gallons of water. Which of the following equations can be used to calculate $c$, the number of cups of detergent needed when using 21 gallons of water?

A. \[
\frac{6}{9} = \frac{21}{c}
\]

B. \[
\frac{6}{21} = \frac{9}{c}
\]

C. \[
\frac{6}{9} = \frac{c}{21}
\]

D. \[
\frac{21}{6} = \frac{c}{9}
\]

Multiple Choice:

\[\times A\]
\[\times B\]
\[\checkmark C\]
\[\times D\]

Hints:
- The problem is about the following ratio
  \[
  \text{number of cups of detergent} : \text{number of gallons of water}
  \]
- Line up the labels that are on the top and bottom of the fractions.

  \[
  \text{cups of detergent} \text{ on the top}
  \]

  \[
  \text{gallons of water} \text{ on the bottom}
  \]
We know that 6 cups of detergent is needed for every 9 gallons of water used. This means that

\[ 6 : 9 \]

or

\[ \frac{6 \text{ cups of detergent}}{9 \text{ gallons of water}} \]

We also know that \( c \) cups of detergent is needed for every 21 gallons of water used. This means that

\[ c : 21 \]

or

\[ \frac{c \text{ cups of detergent}}{21 \text{ gallons of water}} \]

The labels on the two equations from the previous two hints are lined up on the top and bottom.

This means that the proportions are equal to each other. Therefore,

\[ \frac{6}{9} = \frac{c}{21} \]

This is an equation that can be used to find \( c \), the number of cups of detergent needed for 21 gallons of water. So the answer is C. Select C.

86) Problem #PRABWXD "PRABWXD - Setting Up Proportions"
When making tea, you use 8 spoons of sugar for every 7 quarts of tea. Which of the following equations can be used to calculate \( c \), the number of spoons of sugar needed when using 22 quarts of tea?

A. \[ \frac{7}{8} = \frac{c}{22} \]

B. \[ \frac{8}{7} = \frac{c}{22} \]
Multiple Choice:

A

B

C

D

Hints:

- The problem is about the following ratio

\[
\text{number of spoons of sugar : number of quarts of tea}
\]

- Line up the labels that are on the top and bottom of the fractions.

\[
\text{spoons of sugar on the top}
\]

\[
\text{quarts of tea on the bottom}
\]

- We know that 8 spoons of sugar is needed for every 7 quarts of tea used. This means that

\[
8 : 7
\]

or

\[
\frac{8 \text{ spoons of sugar}}{7 \text{ quarts of tea}}
\]

- We also know that \(c\) spoons of sugar is needed for every 22 quarts of tea used. This means that

\[
c : 22
\]

or

\[
\frac{c \text{ spoons of sugar}}{22 \text{ quarts of tea}}
\]
22 quarts of tea

- Notice the labels on the two equations from the previous two hints are lined up on the top and bottom.

This means that the proportions are equal to each other. Therefore,

\[
\frac{8}{7} = \frac{c}{22}
\]

This is an equation that can be used to find \(c\), the number of spoons of sugar needed for 22 quarts of tea. So the answer is B. Select B.

87) Problem #PRABWX8 "PRABWX8 - Setting Up Proportions"

When doing the laundry, you use 11 cups of detergent for every 2 gallons of water. Which of the following equations can be used to calculate \(c\), the number of cups of detergent needed when using 10 gallons of water?

A. \[
\frac{11}{2} = \frac{10}{c}
\]

B. \[
\frac{11}{10} = \frac{2}{c}
\]

C. \[
\frac{11}{2} = \frac{c}{10}
\]

D. \[
\frac{10}{11} = \frac{c}{2}
\]

Multiple Choice:

- A
- B
- C
- D
Hints:

- The problem is about the following ratio
  number of cups of detergent : number of gallons of water
- Line up the labels that are on the top and bottom of the fractions.
  
cups of detergent on the top
  __________________________
gallons of water on the bottom

- We know that 11 cups of detergent is needed for every 2 gallons of water used. This means that
  
  11 : 2
  
or
  
  11 cups of detergent
  __________________________
  2 gallons of water

- We also know that c cups of detergent is needed for every 10 gallons of water used. This means that
  
  c : 10
  
or
  
  c cups of detergent
  __________________________
  10 gallons of water

- The labels on the two equations from the previous two hints are lined up on the top and bottom. This means that the proportions are equal to each other. Therefore,

\[
\frac{11}{2} = \frac{c}{10}
\]

This is an equation that can be used to find c, the number of cups of detergent needed for 10 gallons of water. So the answer is C. Select C.
When making tea, you use 21 spoons of sugar for every 15 quarts of tea. Which of the following equations can be used to calculate $c$, the number of spoons of sugar needed when using 34 quarts of tea?

A. \[
\frac{21}{15} = \frac{34}{c}
\]

B. \[
\frac{21}{34} = \frac{15}{c}
\]

C. \[
\frac{21}{c} = \frac{15}{34}
\]

D. \[
\frac{34}{21} = \frac{c}{15}
\]

Multiple Choice:

- [x] A
- [x] B
- [✓] C
- [x] D

Hints:
- The problem is about the following ratio

\[
\text{number of spoons of sugar} : \text{number of quarts of tea}
\]

- Line up the labels that are on the top and bottom of the fractions.

- We know that 21 spoons of sugar is needed for every 15 quarts of tea used. This means that $21 : 15$
21 spoons of sugar
-------------
15 quarts of tea

We also know that \( \text{c spoons of sugar} \) is needed for every 34 quarts of tea used. This means that

\[
\text{c : 34}
\]

or

\[
\frac{\text{c spoons of sugar}}{\text{34 quarts of tea}}
\]

The labels on the two equations from the previous two hints are lined up on the top and bottom.

This means that the proportions are equal to each other. Therefore,

\[
\frac{21}{15} = \frac{c}{34}
\]

This is an equation that can be used to find \( c \), the number of spoons of sugar needed for 34 quarts of tea. So the answer is C. Select C.
13 is 44% of what number?

Round to the nearest hundredth.

Algebraic Expression:

\[ \frac{13}{x} = \frac{44}{100} \]

where \( x \) is the whole, so it's across from 100, and 13 is the part, so it's across from 44.
Multiply both sides by 100x so that you get

1300 = 44x

and then solve for x.

Don't forget to round!

1300 = 44x

1300/44 = x
x = 29.545454545454545

Rounded, the answer is 29.55.

13 is 44% of 29.55.

2) Problem #PRAHMBX "PRAHMBX - Percent of - Finding the whole: Percent > 100%"

122 is 479% of what number?

Round your answer to the nearest hundredth.

Algebraic Expression:

25.47

Hints:

This is a Part = Percent \times Whole problem.

You're given the part (122) and the percent (479%, or 4.79).

Substitute these into the equation to find the whole.
122 = 4.79 × Whole

Whole = 122/4.79

What is 122/4.79?

Don't forget to round your answer!

122/4.79 = 25.47

122 is 479% of 25.47.
3) Problem #PRAHK7E "PRAHK7E - Percent of - Finding the whole"

16 is 41% of what number?

Round to the nearest hundredth.

Algebraic Expression:

\[ \frac{16}{x} = \frac{41}{100} \]

Hints:

41% is the same as 41/100.

You can rewrite the problem as a proportion problem:

\[ \frac{16}{x} = \frac{41}{100} \]

where \( x \) is the whole, so it's across from 100, and 16 is the part, so it's across from 41.
Multiply both sides by 100x so that you get

\[ 1600 = 41x \]

and then solve for x.

Don't forget to round!

\[ 1600 = 41x \]

\[ 1600/41 = x \]
x = 39.0243902439024

Rounded, the answer is 39.02.

16 is 41% of 39.02.

---

4) Problem #PRAHMBY "PRAHMBY - Percent of - Finding the whole: Percent > 100%"

86 is 233% of what number?

Round your answer to the nearest hundredth.

Algebraic Expression:

\[
\text{36.91}
\]

Hints:

- This is a Part = Percent × Whole problem.

You're given the part (86) and the percent (233%, or 2.33).

Substitute these into the equation to find the whole.

\[
86 = 2.33 \times \text{Whole}
\]

\[
\text{Whole} = 86/2.33
\]

What is 86/2.33?

Don't forget to round your answer!

\[
86/2.33 = 36.91
\]

86 is 233% of 36.91.

---

5) Problem #PRAH4KC "PRAH4KC - Percent"

52 is 460% of what number?

Round your answer to the nearest hundredth.

Algebraic Expression:

\[
\text{11.3}
\]

Hints:

- This is a Part = Percent × Whole problem.

You're given the part (52) and the percent (460%, or 4.6).

Substitute these into the equation to find the whole.

\[
52 = 4.6 \times \text{Whole}
\]

\[
\text{Whole} = 52/4.6
\]
What is $52/4.6$?

Don't forget to round your answer!
- $52/4.6 = 11.3$

52 is 460% of 11.3.

---

6) Problem #PRAHK7A "PRAHK7A - Percent of - Finding the whole"

5 is 63% of what number?

Round to the nearest hundredth.

**Algebraic Expression:**

$7.94$

**Hints:**

- 63% is the same as $63/100$.

You can rewrite the problem as a proportion problem:

$$\frac{5}{x} = \frac{63}{100}$$

where $x$ is the whole, so it's across from 100, and 5 is the part, so it's across from 63.

- Multiply both sides by $100x$ so that you get

$$500 = 63x$$

and then solve for $x$.

Don't forget to round!
- $500 = 63x$

$$500/63 = x$$

$x = 7.93650793650794$

Rounded, the answer is $7.94$.

5 is 63% of 7.94.

---

7) Problem #PRAH4KB "PRAH4KB - Percent"

68 is 218% of what number?

Round your answer to the nearest hundredth.
Algebraic Expression:

✓ 31.19

Hints:

- This is a Part = Percent × Whole problem.

You're given the part (68) and the percent (218%, or 2.18).

Substitute these into the equation to find the whole.

- $68 = 2.18 \times \text{Whole}$

Whole = $68/2.18$

What is $68/2.18$?

Don't forget to round your answer!

- $68/2.18 = 31.19$

68 is 218% of 31.19.

---

8) Problem #PRAH4E5 "PRAH4E5 - 232712 - Percent "
38 is 35% of what number?

Round to the nearest hundredth.

Algebraic Expression:

✓ 108.57

Hints:

- 35% is the same as 35/100.

You can rewrite the problem as a proportion problem:

\[
\frac{38}{x} = \frac{35}{100}
\]

where x is the whole, so it's across from 100, and 38 is the part, so it's across from 35.

- Multiply both sides by 100x so that you get

$3800 = 35x$

and then solve for x.

Don't forget to round!

- $3800 = 35x$
3800/35 = x

x = 108.571428571429

Rounded, the answer is 108.57.

38 is 35% of 108.57.

---

9) Problem #PRAHMBZ "PRAHMBZ - Percent of - Finding the whole: Percent > 100%"

107 is 221% of what number?

Round your answer to the nearest hundredth.

**Algebraic Expression:**

✓ 48.42

**Hints:**

- This is a Part = Percent \( \times \) Whole problem.

You're given the part (107) and the percent (221%, or 2.21).

Substitute these into the equation to find the whole.

- \( 107 = 2.21 \times \text{Whole} \)

Whole = \( \frac{107}{2.21} \)

What is \( \frac{107}{2.21} \)?

Don't forget to round your answer!

- \( \frac{107}{2.21} = 48.42 \)

107 is 221% of 48.42.

---

10) Problem #PRAH4KK "PRAH4KK - Percent"

78 is 192% of what number?

Round your answer to the nearest hundredth.

**Algebraic Expression:**

✓ 40.63

**Hints:**

- This is a Part = Percent \( \times \) Whole problem.

You're given the part (78) and the percent (192%, or 1.92).

Substitute these into the equation to find the whole.

- \( 78 = 1.92 \times \text{Whole} \)
What is $78/1.92$?

Don't forget to round your answer!

- $78/1.92 = 40.63$

$78$ is $192\%$ of $40.63$.

11) Problem #PRAHK7Y "PRAHK7Y - Percent of - Finding the whole"

6 is 74% of what number?

**Round to the nearest hundredth.**

**Algebraic Expression:**

- $74\%$ is the same as $74/100$.

You can rewrite the problem as a proportion problem:

\[
\frac{6}{x} = \frac{74}{100}
\]

where $x$ is the whole, so it's across from 100, and 6 is the part, so it's across from 74.

- Multiply both sides by $100x$ so that you get

\[
600 = 74x
\]

and then solve for $x$.

Don't forget to round!

- $600 = 74x$

\[
600/74 = x
\]

$x = 8.10810810810811$

Rounded, the answer is **8.11**.

6 is 74% of 8.11.

12) Problem #PRAHK7S "PRAHK7S - Percent of - Finding the whole"

21 is 60% of what number?
Round to the nearest hundredth.
Algebraic Expression:

✓ 35

Hints:
- 60% is the same as 60/100.

You can rewrite the problem as a proportion problem:

\[
\frac{21}{x} = \frac{60}{100}
\]

where \( x \) is the whole, so it's across from 100, and 21 is the part, so it's across from 60.

- Multiply both sides by 100x so that you get

\[
2100 = 60x
\]

and then solve for \( x \).

Don't forget to round!
- \( 2100 = 60x \)

\[
\frac{2100}{60} = x
\]

\( x = 35 \)

Rounded, the answer is 35.

21 is 60% of 35.

13) Problem #PRAHMB3 "PRAHMB3 - Percent of - Finding the whole: Percent > 100%"
87 is 469% of what number?

Round your answer to the nearest hundredth.
Algebraic Expression:

✓ 18.55

Hints:
- This is a Part = Percent \( \times \) Whole problem.

You're given the part (87) and the percent (469%, or 4.69).

Substitute these into the equation to find the whole.
- \( 87 = 4.69 \times \text{Whole} \)
Whole = $\frac{87}{4.69}$

What is $\frac{87}{4.69}$?

Don't forget to round your answer!

- $\frac{87}{4.69} = 18.55$

87 is 469% of 18.55.

14) Problem #PRAHK74 "PRAHK74 - Percent of - Finding the whole"  
30 is 53% of what number? 

Round to the nearest hundredth.  
Algebraic Expression:

✓ 56.6

Hints:

- 53% is the same as $\frac{53}{100}$.

You can rewrite the problem as a proportion problem:

\[
\frac{30}{x} = \frac{53}{100}
\]

where $x$ is the whole, so it's across from 100, and 30 is the part, so it's across from 53.

- Multiply both sides by 100x so that you get

$3000 = 53x$

and then solve for $x$.

Don't forget to round!

- $3000 = 53x$

$3000/53 = x$

$x = 56.6037735849057$

Rounded, the answer is 56.6.

30 is 53% of 56.6.

15) Problem #PRAHMB8 "PRAHMB8 - Percent of - Finding the whole: Percent > 100%"  
90 is 244% of what number?
Round your answer to the nearest hundredth.

**Algebraic Expression:**

✓ 36.89

**Hints:**

- This is a Part = Percent × Whole problem.

You're given the part (90) and the percent (244%, or 2.44).

Substitute these into the equation to find the whole.

- $90 = 2.44 \times \text{Whole}$

Whole = $\frac{90}{2.44}$

What is $\frac{90}{2.44}$?

Don't forget to round your answer!

- $\frac{90}{2.44} = 36.89$

90 is 244% of 36.89.

---

16) Problem #PRAHMCF "PRAHMCF - Percent of - Finding the whole: Percent > 100%"

65 is 279% of what number?

Round your answer to the nearest hundredth.

**Algebraic Expression:**

✓ 23.3

**Hints:**

- This is a Part = Percent × Whole problem.

You're given the part (65) and the percent (279%, or 2.79).

Substitute these into the equation to find the whole.

- $65 = 2.79 \times \text{Whole}$

Whole = $\frac{65}{2.79}$

What is $\frac{65}{2.79}$?

Don't forget to round your answer!

- $\frac{65}{2.79} = 23.3$

65 is 279% of 23.3.
17) Problem #PRAHMB9 "PRAHMB9 - Percent of - Finding the whole: Percent > 100%"

52 is 292% of what number?

Round your answer to the nearest hundredth.

Algebraic Expression:
✓ 17.81

Hints:
- This is a Part = Percent \times Whole problem.

You're given the part (52) and the percent (292%, or 2.92).

Substitute these into the equation to find the whole.
- \[ 52 = 2.92 \times \text{Whole} \]

Whole = 52/2.92

What is 52/2.92?

Don't forget to round your answer!
- \[ 52/2.92 = 17.81 \]

52 is 292% of 17.81.

18) Problem #PRAH4KF "PRAH4KF - Percent"

88 is 161% of what number?

Round your answer to the nearest hundredth.

Algebraic Expression:
✓ 54.66

Hints:
- This is a Part = Percent \times Whole problem.

You're given the part (88) and the percent (161%, or 1.61).

Substitute these into the equation to find the whole.
- \[ 88 = 1.61 \times \text{Whole} \]

Whole = 88/1.61

What is 88/1.61?

Don't forget to round your answer!
- \[ 88/1.61 = 54.66 \]
88 is 161% of 54.66.

19) Problem #PRAHMB6 "PRAHMB6 - Percent of - Finding the whole: Percent > 100%"
87 is 192% of what number?

Round your answer to the nearest hundredth.
Algebraic Expression:

\[ \text{45.31} \]

Hints:
- This is a Part = Percent \times Whole problem.

You're given the part (87) and the percent (192%, or 1.92).

Substitute these into the equation to find the whole.
- \[ 87 = 1.92 \times \text{Whole} \]

\[ \text{Whole} = \frac{87}{1.92} \]

What is \( \frac{87}{1.92} \)?

Don't forget to round your answer!
- \[ \frac{87}{1.92} = 45.31 \]

87 is 192% of 45.31.

20) Problem #PRAHK7R "PRAHK7R - Percent of - Finding the whole"
15 is 62% of what number?

Round to the nearest hundredth.
Algebraic Expression:

\[ \text{24.19} \]

Hints:
- 62% is the same as \( \frac{62}{100} \).

You can rewrite the problem as a proportion problem:

\[ \frac{15}{x} = \frac{62}{100} \]

where \( x \) is the whole, so it's across from 100, and 15 is the part, so it's across from 62.

- Multiply both sides by 100x so that you get
1500 = 62x

and then solve for x.

Don't forget to round!

- 1500 = 62x

\[
\frac{1500}{62} = x
\]

\[
x = 24.1935483870968
\]

Rounded, the answer is 24.19.

15 is 62\% of 24.19.

---

25 is 50\% of what number?

**Round to the nearest hundredth.**

**Algebraic Expression:**

\[50\]

**Hints:**

- 50\% is the same as \(\frac{50}{100}\).

You can rewrite the problem as a proportion problem:

\[
\frac{25}{x} = \frac{50}{100}
\]

where \(x\) is the whole, so it's across from 100, and 25 is the part, so it's across from 50.

- Multiply both sides by 100\(x\) so that you get

\[
2500 = 50x
\]

and then solve for \(x\).

Don't forget to round!

- \(2500 = 50x\)

\[
\frac{2500}{50} = x
\]

\[
x = 50
\]

Rounded, the answer is 50.
25 is 50% of 50.

22) Problem #PRAHK7N "PRAHK7N - Percent of - Finding the whole"
29 is 54% of what number?

Round to the nearest hundredth.
Algebraic Expression:
\[ 29 = \frac{54}{100} \times x \]

Hints:
- 54% is the same as 54/100.

You can rewrite the problem as a proportion problem:
\[ \frac{29}{x} = \frac{54}{100} \]

where x is the whole, so it's across from 100, and 29 is the part, so it's across from 54.

- Multiply both sides by 100x so that you get
\[ 2900 = 54x \]

and then solve for x.

Don't forget to round!
- \[ 2900 = 54x \]

\[ 2900/54 = x \]

\[ x = 53.7037037037037 \]

Rounded, the answer is 53.7.

29 is 54% of 53.7.

23) Problem #PRAHK7V "PRAHK7V - Percent of - Finding the whole"
45 is 39% of what number?

Round to the nearest hundredth.
Algebraic Expression:
\[ 45 = \frac{39}{100} \times x \]

Hints:
- 39% is the same as 39/100.
You can rewrite the problem as a proportion problem:

\[
\frac{45}{x} = \frac{39}{100}
\]

where \(x\) is the whole, so it's across from 100, and 45 is the part, so it's across from 39.

- Multiply both sides by 100x so that you get

\[4500 = 39x\]

and then solve for \(x\).

Don't forget to round!

\[-\quad 4500 = 39x\]

\[
\frac{4500}{39} = x
\]

\[x = 115.384615384615\]

Rounded, the answer is 115.38.

45 is 39\% of 115.38.

---

24) Problem #PRAH4FB "PRAH4FB - 232718 - Percent"
7 is 53\% of what number?

**Round to the nearest hundredth.**

**Algebraic Expression:**

\[\checkmark \quad 13.21\]

**Hints:**

- 53\% is the same as \(\frac{53}{100}\).

You can rewrite the problem as a proportion problem:

\[
\frac{7}{x} = \frac{53}{100}
\]

where \(x\) is the whole, so it's across from 100, and 7 is the part, so it's across from 53.

- Multiply both sides by 100x so that you get

\[700 = 53x\]
and then solve for $x$.

Don't forget to round!

- $700 = 53x$

$\frac{700}{53} = x$

$x = 13.2075471698113$

Rounded, the answer is $13.21$.

7 is 53% of 13.21.

25) Problem #PRAH4FE "PRAH4FE - 232721 - Percent"

6 is 51% of what number?

Round to the nearest hundredth.

**Algebraic Expression:**

$\checkmark$ 11.76

**Hints:**

- 51% is the same as $\frac{51}{100}$.

You can rewrite the problem as a proportion problem:

\[
\frac{6}{x} = \frac{51}{100}
\]

where $x$ is the whole, so it's across from 100, and 6 is the part, so it's across from 51.

- Multiply both sides by 100$x$ so that you get

$600 = 51x$

and then solve for $x$.

Don't forget to round!

- $600 = 51x$

$\frac{600}{51} = x$

$x = 11.7647058823529$

Rounded, the answer is $11.76$.

6 is 51% of 11.76.
26) Problem #PRAHMCG "PRAHMCG - Percent of - Finding the whole: Percent > 100%"

107 is 218% of what number?

Round your answer to the nearest hundredth.

Algebraic Expression:

\[ \frac{107}{2.18} = 49.08 \]

Hints:
- This is a Part = Percent × Whole problem.

You're given the part (107) and the percent (218%, or 2.18).

Substitute these into the equation to find the whole.
- \[ 107 = 2.18 \times \text{Whole} \]

\[ \text{Whole} = \frac{107}{2.18} \]

What is \( \frac{107}{2.18} \)?

Don't forget to round your answer!
- \[ \frac{107}{2.18} = 49.08 \]

107 is 218% of 49.08.

27) Problem #PRAHMCC "PRAHMCC - Percent of - Finding the whole: Percent > 100%"

54 is 386% of what number?

Round your answer to the nearest hundredth.

Algebraic Expression:

\[ \frac{54}{3.86} = 13.99 \]

Hints:
- This is a Part = Percent × Whole problem.

You're given the part (54) and the percent (386%, or 3.86).

Substitute these into the equation to find the whole.
- \[ 54 = 3.86 \times \text{Whole} \]

\[ \text{Whole} = \frac{54}{3.86} \]

What is \( \frac{54}{3.86} \)?

Don't forget to round your answer!
- \[ \frac{54}{3.86} = 13.99 \]
54 is 386% of 13.99.

28) Problem #PRAHK7H "PRAHK7H - Percent of - Finding the whole"
39 is 66% of what number?

Round to the nearest hundredth.
Algebraic Expression:

\[
\begin{align*}
\text{Hints:} \\
& \quad \text{66\% is the same as } 66/100. \\
& \quad \text{You can rewrite the problem as a proportion problem:} \\
& \quad \frac{39}{x} = \frac{66}{100} \\
& \quad \text{where } x \text{ is the whole, so it's across from 100, and 39 is the part, so it's across from 66.} \\
& \quad \text{Multiply both sides by } 100x \text{ so that you get} \\
& \quad 3900 = 66x \\
& \quad \text{and then solve for } x. \\
& \quad \text{Don't forget to round!} \\
& \quad \quad 3900 = 66x \\
& \quad \quad 3900/66 = x \\
& \quad \quad x = 59.0909090909091 \\
& \quad \text{Rounded, the answer is } 59.09. \\
& \quad 39 \text{ is 66\% of } 59.09.
\end{align*}
\]

29) Problem #PRAH85T "PRAH85T - 232712 - Percent "
38 is 35% of what number?

Round to the nearest hundredth.
Algebraic Expression:

\[
\begin{align*}
\text{Hints:} \\
& \quad \text{Rounded, the answer is } 108.57.
\end{align*}
\]
38 is 35% of 108.57.

30) Problem #PRAH4KG "PRAH4KG - Percent"
51 is 175% of what number?

Round your answer to the nearest hundredth.
Algebraic Expression:

\[ 51 = 1.75 \times \text{Whole} \]

Hints:
- This is a Part = Percent \times Whole problem.

You're given the part (51) and the percent (175%, or 1.75).

Substitute these into the equation to find the whole.
- \[ 51 = 1.75 \times \text{Whole} \]

Whole = 51/1.75

What is 51/1.75?

Don't forget to round your answer!
- \[ 51/1.75 = 29.14 \]

51 is 175% of 29.14.

31) Problem #PRAHMB2 "PRAHMB2 - Percent of - Finding the whole: Percent > 100%"
62 is 491% of what number?

Round your answer to the nearest hundredth.
Algebraic Expression:

\[ 62 = 4.91 \times \text{Whole} \]

Hints:
- This is a Part = Percent \times Whole problem.

You're given the part (62) and the percent (491%, or 4.91).

Substitute these into the equation to find the whole.
- \[ 62 = 4.91 \times \text{Whole} \]

Whole = 62/4.91

What is 62/4.91?
Don't forget to round your answer!

- \( \frac{62}{4.91} = 12.63 \)

62 is 491% of 12.63.

32) Problem #PRAHK7U "PRAHK7U - Percent of - Finding the whole"

39 is 27% of what number?

Round to the nearest hundredth.

**Algebraic Expression:**

\[
\frac{39}{x} = \frac{27}{100}
\]

**Hints:**

- 27% is the same as \( \frac{27}{100} \).

You can rewrite the problem as a proportion problem:

\[
\frac{39}{x} = \frac{27}{100}
\]

where \( x \) is the whole, so it's across from 100, and 39 is the part, so it's across from 27.

- Multiply both sides by 100x so that you get

\[
3900 = 27x
\]

and then solve for \( x \).

Don't forget to round!

- \( 3900 = 27x \)

\[
\frac{3900}{27} = x
\]

\[
x = 144.444444444444
\]

Rounded, the answer is **144.44**.

39 is 27% of 144.44.

33) Problem #PRAH4KD "PRAH4KD - Percent"

71 is 176% of what number?

Round your answer to the nearest hundredth.

**Algebraic Expression:**

40.34
Hints:
- This is a Part = Percent × Whole problem.

You're given the part (71) and the percent (176%, or 1.76).

Substitute these into the equation to find the whole.
- \(71 = 1.76 \times \text{Whole}\)

Whole = \(\frac{71}{1.76}\)

What is \(\frac{71}{1.76}\)?

Don't forget to round your answer!
- \(\frac{71}{1.76} = 40.34\)

71 is 176% of 40.34.

34) Problem #PRAH4KM "PRAH4KM - Percent"
53 is 245% of what number?

Round your answer to the nearest hundredth.

Algebraic Expression:

21.63

Hints:
- This is a Part = Percent × Whole problem.

You're given the part (53) and the percent (245%, or 2.45).

Substitute these into the equation to find the whole.
- \(53 = 2.45 \times \text{Whole}\)

Whole = \(\frac{53}{2.45}\)

What is \(\frac{53}{2.45}\)?

Don't forget to round your answer!
- \(\frac{53}{2.45} = 21.63\)

53 is 245% of 21.63.

35) Problem #PRAHK7W "PRAHK7W - Percent of - Finding the whole"
24 is 63% of what number?
Round to the nearest hundredth.

**Algebraic Expression:**

![Checkmark] 38.1

**Hints:**

- 63% is the same as 63/100.

You can rewrite the problem as a proportion problem:

\[
\frac{24}{x} = \frac{63}{100}
\]

where x is the whole, so it's across from 100, and 24 is the part, so it's across from 63.

- Multiply both sides by 100x so that you get

\[2400 = 63x\]

and then solve for x.

Don't forget to round!

- \[2400 = 63x\]

\[
\frac{2400}{63} = x
\]

\[x = 38.0952380952381\]

Rounded, the answer is 38.1.

24 is 63% of 38.1.

---

36) Problem #PRAHMCD "PRAHMCD - Percent of - Finding the whole: Percent > 100%"

**120 is 180% of what number?**

**Round your answer to the nearest hundredth.**

**Algebraic Expression:**

![Checkmark] 66.67

**Hints:**

- This is a Part = Percent \(\times\) Whole problem.

You're given the part (120) and the percent (180%, or 1.8).

Substitute these into the equation to find the whole.

- \[120 = 1.8 \times \text{Whole}\]
Whole = 120/1.8

What is 120/1.8?

Don't forget to round your answer!

- 120/1.8 = 66.67

120 is 180% of 66.67.

37) Problem #PRAH4KH "PRAH4KH - Percent"

58 is 452% of what number?

Round your answer to the nearest hundredth.

**Algebraic Expression:**

✓ 12.83

**Hints:**

- This is a Part = Percent × Whole problem.

You're given the part (58) and the percent (452%, or 4.52).

Substitute these into the equation to find the whole.

- 58 = 4.52 × Whole

Whole = 58/4.52

What is 58/4.52?

Don't forget to round your answer!

- 58/4.52 = 12.83

58 is 452% of 12.83.

38) Problem #PRAHMCK "PRAHMCK - Percent of - Finding the whole: Percent > 100%"

71 is 492% of what number?

Round your answer to the nearest hundredth.

**Algebraic Expression:**

✓ 14.43

**Hints:**

- This is a Part = Percent × Whole problem.

You're given the part (71) and the percent (492%, or 4.92).

Substitute these into the equation to find the whole.
71 = 4.92 \times \text{Whole}

\text{Whole} = \frac{71}{4.92}

What is \frac{71}{4.92}?

Don't forget to round your answer!

\frac{71}{4.92} = 14.43

71 is 492\% of 14.43.

39) Problem #PRAHK73 "PRAHK73 - Percent of - Finding the whole"
5 is 26\% of what number?

Round to the nearest hundredth.
Algebraic Expression:

✓ 19.23

Hints:

• 26\% is the same as \frac{26}{100}.

You can rewrite the problem as a proportion problem:

\frac{5}{x} = \frac{26}{100}

where x is the whole, so it's across from 100, and 5 is the part, so it's across from 26.

• Multiply both sides by 100x so that you get

500 = 26x

and then solve for x.

Don't forget to round!

• 500 = 26x

500/26 = x

x = \textbf{19.2307692307692}

Rounded, the answer is \textbf{19.23}.

5 is 26\% of 19.23.

40) Problem #PRAH4KE "PRAH4KE - Percent"
51 is 403% of what number?

Round your answer to the nearest hundredth.

Algebraic Expression:
✓ 12.66

Hints:
• This is a Part = Percent × Whole problem.

You're given the part (51) and the percent (403%, or 4.03).

Substitute these into the equation to find the whole.
• \( 51 = 4.03 \times \text{Whole} \)

\[ \text{Whole} = \frac{51}{4.03} \]

What is \( \frac{51}{4.03} \)?

Don't forget to round your answer!
• \( \frac{51}{4.03} = 12.66 \)

51 is 403% of 12.66.

41) Problem #PRAHM7 "PRAHM7 - Percent of - Finding the whole: Percent > 100%"

123 is 363% of what number?

Round your answer to the nearest hundredth.

Algebraic Expression:
✓ 33.88

Hints:
• This is a Part = Percent × Whole problem.

You're given the part (123) and the percent (363%, or 3.63).

Substitute these into the equation to find the whole.
• \( 123 = 3.63 \times \text{Whole} \)

\[ \text{Whole} = \frac{123}{3.63} \]

What is \( \frac{123}{3.63} \)?

Don't forget to round your answer!
• \( \frac{123}{3.63} = 33.88 \)

123 is 363% of 33.88.
42) Problem #PRAHMB4 "PRAHMB4 - Percent of - Finding the whole: Percent > 100%"
59 is 191% of what number?

Round your answer to the nearest hundredth.

**Algebraic Expression:**

30.89

**Hints:**
- This is a Part = Percent \(\times\) Whole problem.

You're given the part (59) and the percent (191%, or 1.91).

Substitute these into the equation to find the whole.
- \(59 = 1.91 \times \text{Whole}\)

\[\text{Whole} = \frac{59}{1.91}\]

What is \(59/1.91\)?

Don't forget to round your answer!
- \(\frac{59}{1.91} = 30.89\)

59 is 191% of 30.89.

43) Problem #PRAHMB5 "PRAHMB5 - Percent of - Finding the whole: Percent > 100%"
89 is 259% of what number?

Round your answer to the nearest hundredth.

**Algebraic Expression:**

34.36

**Hints:**
- This is a Part = Percent \(\times\) Whole problem.

You're given the part (89) and the percent (259%, or 2.59).

Substitute these into the equation to find the whole.
- \(89 = 2.59 \times \text{Whole}\)

\[\text{Whole} = \frac{89}{2.59}\]

What is \(89/2.59\)?

Don't forget to round your answer!
- \(\frac{89}{2.59} = 34.36\)
89 is 259% of 34.36.

44) Problem #PRAH4KJ "PRAH4KJ - Percent"
103 is 128% of what number?

Round your answer to the nearest hundredth.

Algebraic Expression:

\[ 80.47 \]

Hints:
- This is a Part = Percent \times Whole problem.

You're given the part (103) and the percent (128%, or 1.28).

Substitute these into the equation to find the whole.
- \[ 103 = 1.28 \times \text{Whole} \]

Whole = \frac{103}{1.28}

What is \frac{103}{1.28}?

Don't forget to round your answer!
- \[ \frac{103}{1.28} = 80.47 \]

103 is 128% of 80.47.

45) Problem #PRAHK7X "PRAHK7X - Percent of - Finding the whole"
9 is 66% of what number?

Round to the nearest hundredth.

Algebraic Expression:

\[ 13.64 \]

Hints:
- 66% is the same as \frac{66}{100}.

You can rewrite the problem as a proportion problem:

\[ \frac{9}{x} = \frac{66}{100} \]

where x is the whole, so it's across from 100, and 9 is the part, so it's across from 66.

- Multiply both sides by 100x so that you get
900 = 66x

and then solve for x.

Don't forget to round!

- 900 = 66x

\[
x = \frac{900}{66}
\]

\[
x = 13.6363636363636
\]

Rounded, the answer is 13.64.

9 is 66% of 13.64.

46) Problem #PRAHMCA "PRAHMCA - Percent of - Finding the whole: Percent > 100"

50 is 126% of what number?

Round your answer to the nearest hundredth.

Algebraic Expression:

\[
39.68
\]

Hints:

- This is a Part = Percent × Whole problem.

You're given the part (50) and the percent (126%, or 1.26).

Substitute these into the equation to find the whole.

- \(50 = 1.26 \times \text{Whole}\)

Whole = \(\frac{50}{1.26}\)

What is \(\frac{50}{1.26}\)?

Don't forget to round your answer!

- \(\frac{50}{1.26} = 39.68\)

50 is 126% of 39.68.

47) Problem #PRAHK7T "PRAHK7T - Percent of - Finding the whole"

26 is 30% of what number?

Round to the nearest hundredth.

Algebraic Expression:

\[
86.67
\]
Hints:
- 30% is the same as 30/100.

You can rewrite the problem as a proportion problem:
\[
\frac{26}{x} = \frac{30}{100}
\]

where \( x \) is the whole, so it's across from 100, and 26 is the part, so it's across from 30.

- Multiply both sides by 100\(x \) so that you get

\[
2600 = 30x
\]

and then solve for \( x \).

Don't forget to round!
- \( 2600/30 = x \)

\[
x = \frac{2600}{30} = 86.6666666666667
\]

Rounded, the answer is 86.67.

26 is 30% of 86.67.

48) Problem #PRAH4FC "PRAH4FC - 232719 - Percent"

42 is 49% of what number?

Round to the nearest hundredth.

Algebraic Expression:

\[
\sqrt{85.71}
\]

Hints:
- 49% is the same as 49/100.

You can rewrite the problem as a proportion problem:
\[
\frac{42}{x} = \frac{49}{100}
\]

where \( x \) is the whole, so it's across from 100, and 42 is the part, so it's across from 49.

- Multiply both sides by 100\(x \) so that you get
4200 = 49x

and then solve for x.

Don't forget to round!

- 4200 = 49x

\[
\frac{4200}{49} = x
\]

x = 85.7142857142857

Rounded, the answer is 85.71.

42 is 49% of 85.71.

49) Problem #PRAHMCJ "PRAHMCJ - Percent of - Finding the whole: Percent > 100%"

69 is 372% of what number?

Round your answer to the nearest hundredth.

Algebraic Expression:

✓ 18.55

Hints:

- This is a Part = Percent \times Whole problem.

You're given the part (69) and the percent (372%, or 3.72).

Substitute these into the equation to find the whole.

- 69 = 3.72 \times Whole

Whole = \frac{69}{3.72}

What is 69/3.72?

Don't forget to round your answer!

- 69/3.72 = 18.55

69 is 372% of 18.55.

50) Problem #PRAHMCB "PRAHMCB - Percent of - Finding the whole: Percent > 100%"

57 is 405% of what number?

Round your answer to the nearest hundredth.

Algebraic Expression:

✓ 14.07
Hints:
- This is a Part = Percent × Whole problem.

You're given the part (57) and the percent (405%, or 4.05).

Substitute these into the equation to find the whole.
- \( 57 = 4.05 \times \text{Whole} \)

\[ \text{Whole} = \frac{57}{4.05} \]

What is \( 57/4.05 \)?

Don't forget to round your answer!
- \( \frac{57}{4.05} = 14.07 \)

57 is 405% of 14.07.

51) Problem #PRAHK7Q "PRAHK7Q - Percent of - Finding the whole"

42 is 40% of what number?

Round to the nearest hundredth.

Algebraic Expression:

\[ 105 \]

Hints:
- 40% is the same as 40/100.

You can rewrite the problem as a proportion problem:

\[ \frac{42}{x} = \frac{40}{100} \]

where \( x \) is the whole, so it's across from 100, and 42 is the part, so it's across from 40.

- Multiply both sides by 100x so that you get

\[ 4200 = 40x \]

and then solve for \( x \).

Don't forget to round!
- \( 4200 = 40x \)

\[ 4200/40 = x \]

\[ x = 105 \]
Rounded, the answer is 105.

42 is 40% of 105.

52) Problem #PRAHK7Z "PRAHK7Z - Percent of - Finding the whole"

47 is 45% of what number?

Round to the nearest hundredth.

Algebraic Expression:

\[
\text{Algebraic Expression: } 104.44
\]

Hints:

- 45% is the same as 45/100.

You can rewrite the problem as a proportion problem:

\[
\frac{47}{x} = \frac{45}{100}
\]

where \(x\) is the whole, so it's across from 100, and 47 is the part, so it's across from 45.

- Multiply both sides by 100x so that you get

\[
4700 = 45x
\]

and then solve for \(x\).

Don't forget to round!

- \(4700 = 45x\)

\[
4700/45 = x
\]

\[
x = 104.444444444444
\]

Rounded, the answer is 104.44.

47 is 45% of 104.44.

53) Problem #PRAH4E9 "PRAH4E9 - 232716 - Percent"

30 is 33% of what number?

Round to the nearest hundredth.

Algebraic Expression:

\[
\text{Algebraic Expression: } 90.91
\]
Hints:

- 33% is the same as 33/100.

You can rewrite the problem as a proportion problem:

\[
\frac{30}{x} = \frac{33}{100}
\]

where \(x\) is the whole, so it's across from 100, and 30 is the part, so it's across from 33.

- Multiply both sides by 100x so that you get

\[
3000 = 33x
\]

and then solve for \(x\).

Don't forget to round!

- \(3000 = 33x\)

\[
\frac{3000}{33} = x
\]

\(x = 90.9090909090909\)

Rounded, the answer is 90.91.

30 is 33% of 90.91.

---

54) Problem #PRAHMCH "PRAHMCH - Percent of - Finding the whole: Percent > 100%"

52 is 342% of what number?

Round your answer to the nearest hundredth.

Algebraic Expression:

\[
\checkmark 15.2
\]

Hints:

- This is a Part = Percent \(\times\) Whole problem.

You're given the part (52) and the percent (342%, or 3.42).

Substitute these into the equation to find the whole.

- \(52 = 3.42 \times \text{Whole}\)

\[
\text{Whole} = \frac{52}{3.42}
\]

What is 52/3.42?
Don't forget to round your answer!

- \( \frac{52}{3.42} = 15.2 \)

52 is 342% of 15.2.

---

55) Problem #PRAHK72 "PRAHK72 - Percent of - Finding the whole"

32 is 65% of what number?

**Round to the nearest hundredth.**

**Algebraic Expression:**

\[ \frac{32}{x} = \frac{65}{100} \]

where \( x \) is the whole, so it's across from 100, and 32 is the part, so it's across from 65.

- Multiply both sides by 100x so that you get

\[ 3200 = 65x \]

and then solve for \( x \).

Don't forget to round!

- \( 3200 = 65x \)

\[ \frac{3200}{65} = x \]

\[ x = 49.2307692307692 \]

Rounded, the answer is **49.23**.

32 is 65% of 49.23.

---

56) Problem #PRAH4E7 "PRAH4E7 - 232714 - Percent"

17 is 46% of what number?

**Round to the nearest hundredth.**

**Algebraic Expression:**

\[ \frac{17}{x} = \frac{46}{100} \]

where \( x \) is the whole, so it's across from 100, and 17 is the part, so it's across from 46.

- Multiply both sides by 100x so that you get

\[ 1700 = 46x \]

and then solve for \( x \).

Don't forget to round!

- \( 1700 = 46x \)

\[ \frac{1700}{46} = x \]

\[ x = 36.962307692307694 \]

Rounded, the answer is **36.96**.
Hints:

- 46% is the same as 46/100.

You can rewrite the problem as a proportion problem:

\[
\frac{17}{x} = \frac{46}{100}
\]

where \( x \) is the whole, so it's across from 100, and 17 is the part, so it's across from 46.

- Multiply both sides by 100\(x \) so that you get

\[1700 = 46x\]

and then solve for \( x \).

Don't forget to round!

- \( 1700 = 46x \)

\[\frac{1700}{46} = x\]

\[x = 36.9565217391304\]

Rounded, the answer is 36.96.

17 is 46% of 36.96.

---

57) Problem #PRAH4FD "PRAH4FD - 232720 - Percent"

38 is 34% of what number?

Round to the nearest hundredth.

Algebraic Expression:

\[111.76\]

Hints:

- 34% is the same as 34/100.

You can rewrite the problem as a proportion problem:

\[
\frac{38}{x} = \frac{34}{100}
\]

where \( x \) is the whole, so it's across from 100, and 38 is the part, so it's across from 34.
Multiply both sides by 100x so that you get

\[ 3800 = 34x \]

and then solve for x.

Don't forget to round!

\[ \frac{3800}{34} = x \]

\[ x = 111.764705882353 \]

Rounded, the answer is 111.76.

38 is 34% of 111.76.

58) Problem #PRAHK7P "PRAHK7P - Percent of - Finding the whole"
18 is 27% of what number?

Round to the nearest hundredth.

Algebraic Expression:

\[ \checkmark 66.67 \]

Hints:

- 27% is the same as 27/100.

You can rewrite the problem as a proportion problem:

\[ \frac{18}{x} = \frac{27}{100} \]

where \( x \) is the whole, so it's across from 100, and 18 is the part, so it's across from 27.

- Multiply both sides by 100x so that you get

\[ 1800 = 27x \]

and then solve for x.

Don't forget to round!

\[ \frac{1800}{27} = x \]

\[ x = 66.666666666667 \]
Rounded, the answer is **66.67**.

18 is 27% of 66.67.

59) **Problem #PRAH4E8 "PRAH4E8 - 232715 - Percent"**

2 is 28% of what number?

**Round to the nearest hundredth.**

**Algebraic Expression:**

✓ 7.14

**Hints:**

- 28% is the same as 28/100.

You can rewrite the problem as a proportion problem:

\[
\frac{2}{x} = \frac{28}{100}
\]

where \(x\) is the whole, so it's across from 100, and 2 is the part, so it's across from 28.

- Multiply both sides by 100x so that you get

\[200 = 28x\]

and then solve for \(x\).

Don't forget to round!

- \[200 = 28x\]

\[200/28 = x\]

\[x = 7.14285714285714\]

Rounded, the answer is **7.14**.

2 is 28% of 7.14.
Daisy went shopping with $65 in her pocket, but she didn't want to spend it all. She decided to spend 11% of her money at most, and save the rest for later. How much was Daisy willing to spend?

**Algebraic Expression:**

7.15

**Hints:**

11% is the same as 11/100.

Rewrite the problem as:

\[
\frac{11}{100} = \frac{x}{65}
\]

where x is the part, so it's across from 11, and 65 is the whole, so it's across from 100.
Multiply both sides of the above equation by $65 \times 100$, so you get:

$11 \times 65 = 100x$

Now solve for $x$.

$11 \times 65 = 100x$

$715 = 100x$

$715/100 = x$
Daisy was willing to spend $7.15.

Rebecca went shopping with $87 in her pocket, but she didn't want to spend it all. She decided to spend 40% of her money at most, and save the rest for later. How much was Rebecca willing to spend?

**Algebraic Expression:**

\[ \frac{40}{100} = \frac{x}{87} \]

where \( x \) is the part, so it's across from 40, and 87 is the whole, so it's across from 100.
Multiply both sides of the above equation by $87 \times 100$, so you get:

$$40 \times 87 = 100x$$

Now solve for $x$. 

$$40 \times 87 = 100x$$

$$3480 = 100x$$

$$3480/100 = x$$
Rebecca was willing to spend $34.8.

Emily is running a lemonade stand. She expects to make $96 for the day, but ends up making 243% of that amount. How much money did Emily make that day?

Exact Match (case sensitive):

✓ 233.28
✓ 233.280
✓ 233.28.00

Hints:

This is a Part = Percent × Whole problem.

You're given the percent (243%, or 2.43) and the whole (96).

Substitute these into the equation to find the part.
Part = 2.43 × 96

Part = 233.28

Emily made $233.28.

Type in 233.28.

4) Problem #PRAHXBX "PRAHXBX - Percent of - Word problem 2"

Rebecca went shopping with $142 in her pocket, but she didn't want to spend it all. She decided to spend 37% of her money at most, and save the rest for later. How much was Rebecca willing to spend?

Algebraic Expression:

52.54

Hints:

- 37% is the same as 37/100.

Rewrite the problem as:

\[
\frac{37}{100} = \frac{x}{142}
\]

where x is the part, so it's across from 37, and 142 is the whole, so it's across from 100.

- Multiply both sides of the above equation by 142 × 100, so you get:

37 × 142 = 100x

Now solve for x.
Rebecca was willing to spend $52.54.

5) Problem #PRAHXCV "PRAHXCV - Percent of - Word problem 3"
Emily is running a lemonade stand. She expects to make $82 for the day, but ends up making 442% of that amount. How much money did Emily make that day?

Exact Match (case sensitive):

- 362.44
- 362.440
- 362.44.00
- $362.44
- $362.44

Hints:
- This is a Part = Percent × Whole problem.

You're given the percent (442%, or 4.42) and the whole (82).

Substitute these into the equation to find the part.
- Part = 4.42 × 82

Part = 362.44

Emily made $362.44.

Type in 362.44.

6) Problem #PRAHXAX "PRAHXAX - Percent of - Word problem 1"
David has 768 gumballs. He decides to give 95% of them to a friend as a birthday present. How many gumballs does David give away?

Round your answer to the nearest whole number.

Algebraic Expression:

- 730

Hints:
- When dealing with percents, use this equation:
Part = Percent × Whole

In this case, you're given the whole (768) and the percent (95%, or 0.95).

Use these to find the part.
• Substitute the given values into the equation:

Part = 0.95 × 768

Now solve for part.

Remember to round afterwards!
• Part = 0.95 × 768

Part = 729.6

Rounded, the answer is 730.

David gives away 730 gumballs.

7) Problem #PRAHXAW "PRAHXAW - Percent of - Word problem 1"
Chris has 317 cookies. He decides to give 55% of them to a friend as a birthday present. How many cookies does Chris give away?

Round your answer to the nearest whole number.
Algebraic Expression:
✓ 174

Hints:
• When dealing with percents, use this equation:

Part = Percent × Whole

In this case, you're given the whole (317) and the percent (55%, or 0.55).

Use these to find the part.
• Substitute the given values into the equation:

Part = 0.55 × 317

Now solve for part.

Remember to round afterwards!
• Part = 0.55 × 317
8) Problem #PRAHXAY "PRAHXAY - Percent of - Word problem 1"

Tom has 403 cookies. He decides to give 86% of them to a friend as a birthday present. How many cookies does Tom give away?

Round your answer to the nearest whole number.

Algebraic Expression:

\[ \text{Part} = \text{Percent} \times \text{Whole} \]

\[ \text{Part} = 0.86 \times 403 \]

Now solve for part.

Remember to round afterwards!

\[ \text{Part} = 346.58 \]

Rounded, the answer is 347.

Tom gives away 347 cookies.

9) Problem #PRAHXCX "PRAHXCX - Percent of - Word problem 3"

Anthony is running a lemonade stand. He expects to make $60 for the day, but ends up making 349% of that amount. How much money did Anthony make that day?

Exact Match (case sensitive):

\[ \checkmark 209.4 \]
\[ \checkmark 209.40 \]
\[ \checkmark 209.400 \]
Hints:
• This is a Part = Percent × Whole problem.

You're given the percent (349%, or 3.49) and the whole (60).

Substitute these into the equation to find the part.
• Part = 3.49 × 60

Part = 209.4

Anthony made $209.4.

Type in 209.4.

10) Problem #PRAHXDH "PRAHXDH - Percent of - Word problem 3"
Emily is running a lemonade stand. She expects to make $94 for the day, but ends up making 438% of that amount. How much money did Emily make that day?

Exact Match (case sensitive):
- 411.72
- 411.720
- 411.72.00

Hints:
• This is a Part = Percent × Whole problem.

You're given the percent (438%, or 4.38) and the whole (94).

Substitute these into the equation to find the part.
• Part = 4.38 × 94

Part = 411.72

Emily made $411.72.

Type in 411.72.

11) Problem #PRAHXCG "PRAHXCG - Percent of - Word problem 2"
Natasha went shopping with $93 in her pocket, but she didn't want to spend it all. She decided to spend 9% of her money at most, and save the rest for later. How much was Natasha willing to spend?

Algebraic Expression:
- 8.37

Hints:
• 9% is the same as $\frac{9}{100}$.
Rewrite the problem as:

\[
\frac{9}{100} = \frac{x}{93}
\]

where \( x \) is the part, so it's across from 9, and 93 is the whole, so it's across from 100.

- Multiply both sides of the above equation by \( 93 \times 100 \), so you get:
  \[
  9 \times 93 = 100x
  \]

Now solve for \( x \).
- \( 9 \times 93 = 100x \)

\[
837 = 100x
\]

\[
837/100 = x
\]

\[
x = 8.37
\]

Natasha was willing to spend $8.37.

12) Problem #PRAHX2 "PRAHX2 - Percent of - Word problem 1"

David has 359 gumballs. He decides to give 29% of them to a friend as a birthday present. How many gumballs does David give away?

Round your answer to the nearest whole number.

**Algebraic Expression:**

\[
\checkmark \quad 104
\]

**Hints:**
- When dealing with percents, use this equation:

  \[
  \text{Part} = \text{Percent} \times \text{Whole}
  \]

  In this case, you're given the whole (359) and the percent (29%, or 0.29).

  Use these to find the part.
- Substitute the given values into the equation:

  \[
  \text{Part} = 0.29 \times 359
  \]

  Now solve for part.

  Remember to round afterwards!
13) Problem #PRAHXC3 "PRAHXC3 - Percent of - Word problem 3"
Emily is running a lemonade stand. She expects to make $110 for the day, but ends up making 162% of that amount. How much money did Emily make that day?

**Exact Match (case sensitive):**
- 178.2
- 178.20
- 178.2.00

**Hints:**
- This is a Part = Percent × Whole problem.

You're given the percent (162%, or 1.62) and the whole (110).

Substitute these into the equation to find the part.
- Part = 1.62 × 110

Part = 178.2

Emily made $178.2.

Type in 178.2.

14) Problem #PRAHXCZ "PRAHXCZ - Percent of - Word problem 3"
Tracy is running a lemonade stand. She expects to make $117 for the day, but ends up making 319% of that amount. How much money did Tracy make that day?

**Exact Match (case sensitive):**
- 373.23
- 373.230
- 373.23.00

**Hints:**
- This is a Part = Percent × Whole problem.

You're given the percent (319%, or 3.19) and the whole (117).

Substitute these into the equation to find the part.
Tracy made $373.23.

Type in 373.23.

15) Problem #PRAHXDM "PRAHXDM - Percent of - Word problem 3"
Tracy is running a lemonade stand. She expects to make $68 for the day, but ends up making 363% of that amount. How much money did Tracy make that day?

Exact Match (case sensitive):

✔️ 246.84
✔️ 246.840
✔️ 246.84.00

Hints:
- This is a Part = Percent \times Whole problem.
You're given the percent (363%, or 3.63) and the whole (68).
Substitute these into the equation to find the part.
- Part = 3.63 \times 68

Part = 246.84

Tracy made $246.84.

Type in 246.84.

16) Problem #PRAHXBD "PRAHXBD - Percent of - Word problem 1"
Chris has 274 gumballs. He decides to give 48% of them to a friend as a birthday present. How many gumballs does Chris give away?

Round your answer to the nearest whole number.

Algebraic Expression:

✔️ 132

Hints:
- When dealing with percents, use this equation:

Part = Percent \times Whole

In this case, you're given the whole (274) and the percent (48%, or 0.48).
Use these to find the part.
- Substitute the given values into the equation:

\[
\text{Part} = 0.48 \times 274
\]

Now solve for part.

Remember to round afterwards!
- \[\text{Part} = 0.48 \times 274\]

\[\text{Part} = 131.52\]

Rounded, the answer is 132.

Chris gives away 132 gumballs.

17) **Problem #PRAHXDN "PRAHXDN - Percent of - Word problem 3"**

Emily is running a lemonade stand. She expects to make $90 for the day, but ends up making 162% of that amount. How much money did Emily make that day?

**Exact Match (case sensitive):**
- 145.8
- 145.80
- 145.8.00

**Hints:**
- This is a Part = Percent × Whole problem.

You're given the percent (162%, or 1.62) and the whole (90).

Substitute these into the equation to find the part.
- \[\text{Part} = 1.62 \times 90\]

\[\text{Part} = 145.8\]

Emily made $145.8.

Type in 145.8.

18) **Problem #PRAHXB3 "PRAHXB3 - Percent of - Word problem 2"**

Daisy went shopping with $105 in her pocket, but she didn't want to spend it all. She decided to spend 58% of her money at most, and save the rest for later. How much was Daisy willing to spend?

**Algebraic Expression:**
- 60.9
Hints:
- 58% is the same as 58/100.

Rewrite the problem as:

\[
\frac{58}{100} = \frac{x}{105}
\]

where x is the part, so it's across from 58, and 105 is the whole, so it's across from 100.

- Multiply both sides of the above equation by 105 \times 100, so you get:

\[
58 \times 105 = 100x
\]

Now solve for x.

- \( 58 \times 105 = 100x \)

\[
6090 = 100x
\]

\[
6090/100 = x
\]

\[ x = 60.9 \]

Daisy was willing to spend $60.9.

---

19) Problem #PRAHXDR "PRAHXDR - Percent of - Word problem 3"

Tracy is running a lemonade stand. She expects to make $51 for the day, but ends up making 474% of that amount. How much money did Tracy make that day?

Exact Match (case sensitive):

- 241.74
- 241.740
- 241.74.00

Hints:
- This is a Part = Percent \times Whole problem.

You're given the percent (474%, or 4.74) and the whole (51).

Substitute these into the equation to find the part.

- Part = 4.74 \times 51

Part = 241.74

Tracy made $241.74.
20) Problem #PRAHXCH "PRAHXCH - Percent of - Word problem 2"
Rebecca went shopping with $106 in her pocket, but she didn't want to spend it all. She decided to spend 84% of her money at most, and save the rest for later. How much was Rebecca willing to spend?

**Algebraic Expression:**

\[ \frac{84}{100} = \frac{x}{106} \]

where \( x \) is the part, so it's across from 84, and 106 is the whole, so it's across from 100.

- Multiply both sides of the above equation by 106 × 100, so you get:

\[ 84 \times 106 = 100x \]

Now solve for \( x \).

- \( 84 \times 106 = 100x \)

\[ 8904 = 100x \]

\[ \frac{8904}{100} = x \]

\[ x = 89.04 \]

Rebecca was willing to spend $89.04.

21) Problem #PRAHXDQ "PRAHXDQ - Percent of - Word problem 3"
Sam is running a lemonade stand. He expects to make $103 for the day, but ends up making 133% of that amount. How much money did Sam make that day?

**Exact Match (case sensitive):**

- 136.99
- 136.990
- 136.99.00

**Hints:**

- This is a Part = Percent × Whole problem.
You're given the percent (133%, or 1.33) and the whole (103).

Substitute these into the equation to find the part.
- Part = 1.33 × 103

Part = 136.99

Sam made $136.99.

Type in 136.99.

22) Problem #PRAHXA7 "PRAHXA7 - Percent of - Word problem 1"
Andrew has 719 gumballs. He decides to give 86% of them to a friend as a birthday present. How many gumballs does Andrew give away?

Round your answer to the nearest whole number.

Algebraic Expression:
✓ 618

Hints:
- When dealing with percents, use this equation:

Part = Percent × Whole

In this case, you're given the whole (719) and the percent (86%, or 0.86).

Use these to find the part.
- Substitute the given values into the equation:

Part = 0.86 × 719

Now solve for part.

Remember to round afterwards!
- Part = 0.86 × 719

Part = 618.34

Rounded, the answer is 618.

Andrew gives away 618 gumballs.

23) Problem #PRAHXBF "PRAHXBF - Percent of - Word problem 1"
Andrew has 978 comics. He decides to give 36% of them to a friend as a birthday present. How many comics does Andrew give away?
Round your answer to the nearest whole number.

Algebraic Expression:

\[ 352 \]

Hints:

- When dealing with percents, use this equation:

\[ \text{Part} = \text{Percent} \times \text{Whole} \]

In this case, you're given the whole (978) and the percent (36%, or 0.36).

Use these to find the part.

- Substitute the given values into the equation:

\[ \text{Part} = 0.36 \times 978 \]

Now solve for part.

Remember to round afterwards!

- Part = 0.36 \times 978

Part = 352.08

Rounded, the answer is 352.

Andrew gives away 352 comics.

---

24) Problem #PRAHXBJ "PRAHXBJ - Percent of - Word problem 1"

Ryan has 257 cookies. He decides to give 3% of them to a friend as a birthday present. How many cookies does Ryan give away?

Round your answer to the nearest whole number.

Algebraic Expression:

\[ 8 \]

Hints:

- When dealing with percents, use this equation:

\[ \text{Part} = \text{Percent} \times \text{Whole} \]

In this case, you're given the whole (257) and the percent (3%, or 0.3).

Use these to find the part.

- Substitute the given values into the equation:
Part = 0.3 \times 257

Now solve for part.

Remember to round afterwards!
- Part = 0.3 \times 257

Part = 7.71

Rounded, the answer is 8.

Ryan gives away 8 cookies.

25) Problem #PRAHXDE "PRAHXDE - Percent of - Word problem 3"
Emily is running a lemonade stand. She expects to make $66 for the day, but ends up making 219% of that amount. How much money did Emily make that day?

Exact Match (case sensitive):
- ✓ 144.54
- ✓ 144.540
- ✓ 144.54.00

Hints:
- This is a Part = Percent \times Whole problem.

You're given the percent (219%, or 2.19) and the whole (66).

Substitute these into the equation to find the part.
- Part = 2.19 \times 66

Part = 144.54

Emily made $144.54.

Type in 144.54.

26) Problem #PRAHXC6 "PRAHXC6 - Percent of - Word problem 3"
Sam is running a lemonade stand. He expects to make $105 for the day, but ends up making 366% of that amount. How much money did Sam make that day?

Exact Match (case sensitive):
- ✓ 384.3
- ✓ 384.30
- ✓ 384.3.00
Hints:
- This is a Part = Percent × Whole problem.

You're given the percent (366%, or 3.66) and the whole (105).

Substitute these into the equation to find the part.
- Part = 3.66 × 105

Part = 384.3

Sam made $384.3.

Type in 384.3.

27) Problem #PRAHXCQ "PRAHXCQ - Percent of - Word problem 2"
Rebecca went shopping with $68 in her pocket, but she didn't want to spend it all. She decided to spend 48% of her money at most, and save the rest for later. How much was Rebecca willing to spend?

Algebraic Expression:
✓ 32.64
✓ $32.64
✓ 32.64 dollars

Hints:
- 48% is the same as 48/100.

Rewrite the problem as:

\[
\frac{48}{100} = \frac{x}{68}
\]

where x is the part, so it's across from 48, and 68 is the whole, so it's across from 100.

- Multiply both sides of the above equation by 68 × 100, so you get:

\[48 \times 68 = 100x\]

Now solve for x.
- \[48 \times 68 = 100x\]

\[3264 = 100x\]

\[3264/100 = x\]

\[x = 32.64\]
Rebecca was willing to spend $32.64.

28) Problem #PRAHXCA "PRAHXCA - Percent of - Word problem 2"
Meredith went shopping with $142 in her pocket, but she didn't want to spend it all. She decided to spend 12% of her money at most, and save the rest for later. How much was Meredith willing to spend?

**Algebraic Expression:**

\[ 12 \times 142 = 100x \]

**Hints:**
- 12% is the same as 12/100.

Rewrite the problem as:

\[
\frac{12}{100} = \frac{x}{142}
\]

where \( x \) is the part, so it's across from 12, and 142 is the whole, so it's across from 100.

- Multiply both sides of the above equation by 142 × 100, so you get:

\[ 12 \times 142 = 100x \]

Now solve for \( x \).

- \( 12 \times 142 = 100x \)

\[ 1704 = 100x \]

\[ 1704/100 = x \]

\[ x = 17.04 \]

Meredith was willing to spend $17.04.

29) Problem #PRAHXCK "PRAHXCK - Percent of - Word problem 2"
Daisy went shopping with $71 in her pocket, but she didn't want to spend it all. She decided to spend 49% of her money at most, and save the rest for later. How much was Daisy willing to spend?

**Algebraic Expression:**

\[ 49 \times 71 = 100x \]

**Hints:**
- 49% is the same as 49/100.

Rewrite the problem as:

\[
\frac{49}{100} = \frac{x}{71}
\]
where x is the part, so it's across from 49, and 71 is the whole, so it's across from 100.

- Multiply both sides of the above equation by $71 \times 100$, so you get:

$$49 \times 71 = 100x$$

Now solve for x.
- $49 \times 71 = 100x$

$$3479 = 100x$$

$$3479/100 = x$$

$$x = 34.79$$

Daisy was willing to spend $34.79.

30) Problem #PRAHXC2 "PRAHXC2 - Percent of - Word problem 3"
Sam is running a lemonade stand. He expects to make $111 for the day, but ends up making 191% of that amount. How much money did Sam make that day?

**Exact Match (case sensitive):**

- 212.01
- 212.010
- 212.01.00

**Hints:**
- This is a Part = Percent $\times$ Whole problem.

You're given the percent (191%, or 1.91) and the whole (111).

Substitute these into the equation to find the part.
- Part = $1.91 \times 111$

Part = 212.01

Sam made $212.01.

Type in 212.01.

31) Problem #PRAHXDF "PRAHXDF - Percent of - Word problem 3"
Tracy is running a lemonade stand. She expects to make $97 for the day, but ends up making 462% of that amount. How much money did Tracy make that day?

**Exact Match (case sensitive):**
Hints:
- This is a Part = Percent × Whole problem.

You're given the percent (462%, or 4.62) and the whole (97).

Substitute these into the equation to find the part.
- Part = 4.62 × 97

Part = 448.14

Tracy made $448.14.

Type in 448.14.

---

32) Problem #PRAHXCR "PRAHXCR - Percent of - Word problem 2"

Natasha went shopping with $133 in her pocket, but she didn't want to spend it all. She decided to spend 66% of her money at most, and save the rest for later. How much was Natasha willing to spend?

Algebraic Expression:

\[
\frac{66}{100} = \frac{x}{133}
\]

where \(x\) is the part, so it's across from 66, and 133 is the whole, so it's across from 100.

- Multiply both sides of the above equation by 133 × 100, so you get:

\[
66 \times 133 = 100x
\]

Now solve for \(x\).
- \(66 \times 133 = 100x\)

\[
8778 = 100x
\]
8778/100 = x
x = 87.78

Natasha was willing to spend $87.78.

33) Problem #PRAHXA6 "PRAHXA6 - Percent of - Word problem 1"
Tom has 883 gumballs. He decides to give 98% of them to a friend as a birthday present. How many gumballs does Tom give away?

Round your answer to the nearest whole number.

Algebraic Expression:

\[ 865 \]

Hints:
- When dealing with percents, use this equation:
  \[ \text{Part} = \text{Percent} \times \text{Whole} \]
  In this case, you're given the whole (883) and the percent (98%, or 0.98).

Use these to find the part.
- Substitute the given values into the equation:

\[ \text{Part} = 0.98 \times 883 \]

Now solve for part.

Remember to round afterwards!
- Part = 0.98 \times 883

Part = 865.34

Rounded, the answer is 865.

Tom gives away 865 gumballs.

34) Problem #PRAHXA5 "PRAHXA5 - Percent of - Word problem 1"
Chris has 546 cookies. He decides to give 46% of them to a friend as a birthday present. How many cookies does Chris give away?

Round your answer to the nearest whole number.

Algebraic Expression:

\[ 251 \]
Hints:
- When dealing with percents, use this equation:

\[
\text{Part} = \text{Percent} \times \text{Whole}
\]

In this case, you're given the whole (546) and the percent (46%, or 0.46).

Use these to find the part.
- Substitute the given values into the equation:

\[
\text{Part} = 0.46 \times 546
\]

Now solve for part.

Remember to round afterwards!
- Part = 0.46 \times 546

Part = 251.16

Rounded, the answer is 251.

Chris gives away 251 cookies.

---

35) Problem #PRAHXBZ "PRAHXBZ - Percent of - Word problem 2"

Daisy went shopping with $82 in her pocket, but she didn't want to spend it all. She decided to spend 9% of her money at most, and save the rest for later. How much was Daisy willing to spend?

**Algebraic Expression:**

\[
7.38
\]

**Hints:**
- 9% is the same as 9/100.

Rewrite the problem as:

\[
\frac{9}{100} = \frac{x}{82}
\]

where x is the part, so it's across from 9, and 82 is the whole, so it's across from 100.

- Multiply both sides of the above equation by 82 \times 100, so you get:

\[
9 \times 82 = 100x
\]

Now solve for x.
• 9 × 82 = 100x

738 = 100x

738/100 = x

x = 7.38

Daisy was willing to spend $7.38.

36) Problem #PRAHXBB "PRAHXBB - Percent of - Word problem 1"

Chris has 153 comics. He decides to give 16% of them to a friend as a birthday present. How many comics does Chris give away?

Round your answer to the nearest whole number.

Algebraic Expression:

✓ 24

Hints:

• When dealing with percents, use this equation:

  Part = Percent × Whole

In this case, you're given the whole (153) and the percent (16%, or 0.16).

Use these to find the part.

• Substitute the given values into the equation:

  Part = 0.16 × 153

Now solve for part.

Remember to round afterwards!

• Part = 0.16 × 153

Part = 24.48

Rounded, the answer is 24.

Chris gives away 24 comics.

37) Problem #PRAHB9 "PRAHB9 - Percent of - Word problem 2"

Daisy went shopping with $84 in her pocket, but she didn't want to spend it all. She decided to spend 56% of her money at most, and save the rest for later. How much was Daisy willing to spend?

Algebraic Expression:

47.04
Hints:
- 56% is the same as 56/100.

Rewrite the problem as:

\[
\frac{56}{100} = \frac{x}{84}
\]

where \(x\) is the part, so it's across from 56, and 84 is the whole, so it's across from 100.

- Multiply both sides of the above equation by 84 \(\times\) 100, so you get:

\[
56 \times 84 = 100x
\]

Now solve for \(x\).
- \(56 \times 84 = 100x\)

\[
4704 = 100x
\]

\[
4704/100 = x
\]

\[x = 47.04\]

Daisy was willing to spend $47.04.

---

38) Problem #PRAHXB4 "PRAHXB4 - Percent of - Word problem 2"

Rebecca went shopping with $146 in her pocket, but she didn't want to spend it all. She decided to spend 3% of her money at most, and save the rest for later. How much was Rebecca willing to spend?

**Algebraic Expression:**

\[
4.38
\]

**Hints:**
- 3% is the same as 3/100.

Rewrite the problem as:

\[
\frac{3}{100} = \frac{x}{146}
\]

where \(x\) is the part, so it's across from 3, and 146 is the whole, so it's across from 100.

- Multiply both sides of the above equation by 146 \(\times\) 100, so you get:

\[
3 \times 146 = 100x
\]
Now solve for x.
- \(3 \times 146 = 100x\)

\[438 = 100x\]
\[438/100 = x\]

\[x = 4.38\]

Rebecca was willing to spend $4.38.

#### 39) Problem #PRAHXDB "PRAHXDB - Percent of - Word problem 3"
Anthony is running a lemonade stand. He expects to make $70 for the day, but ends up making 228% of that amount. How much money did Anthony make that day?

**Exact Match (case sensitive):**

- 159.6
- 159.60
- 159.6.00

**Hints:**
- This is a Part = Percent \times Whole problem.

You're given the percent (228%, or 2.28) and the whole (70).

Substitute these into the equation to find the part.
- Part = 2.28 \times 70

Part = 159.6

Anthony made $159.6.

Type in 159.6.

#### 40) Problem #PRAHXA8 "PRAHXA8 - Percent of - Word problem 1"
Andrew has 555 cookies. He decides to give 71% of them to a friend as a birthday present. How many cookies does Andrew give away?

**Round your answer to the nearest whole number.**

**Algebraic Expression:**

- 394

**Hints:**
- When dealing with percents, use this equation:
Part = Percent × Whole

In this case, you're given the whole (555) and the percent (71%, or 0.71).

Use these to find the part.
- Substitute the given values into the equation:

Part = 0.71 × 555

Now solve for part.

Remember to round afterwards!
- Part = 0.71 × 555

Part = 394.05

Rounded, the answer is 394.

Andrew gives away 394 cookies.

---

41) Problem #PRAHXBS "PRAHXBS - Percent of - Word problem 1"

Ryan has 381 cookies. He decides to give 28% of them to a friend as a birthday present. How many cookies does Ryan give away?

Round your answer to the nearest whole number.

Algebraic Expression:

107

Hints:
- When dealing with percents, use this equation:

Part = Percent × Whole

In this case, you're given the whole (381) and the percent (28%, or 0.28).

Use these to find the part.
- Substitute the given values into the equation:

Part = 0.28 × 381

Now solve for part.

Remember to round afterwards!
- Part = 0.28 × 381
Part = 106.68

Rounded, the answer is 107.

Ryan gives away 107 cookies.

42) Problem #PRAHXDS "PRAHXDS - Percent of - Word problem 3"

Tracy is running a lemonade stand. She expects to make $95 for the day, but ends up making 364% of that amount. How much money did Tracy make that day?

**Exact Match (case sensitive):**

- 345.8
- 345.80
- 345.8.00

**Hints:**

- This is a Part = Percent × Whole problem.

You're given the percent (364%, or 3.64) and the whole (95).

Substitute these into the equation to find the part.

- Part = 3.64 × 95

Part = 345.8

Tracy made $345.8.

Type in 345.8.

43) Problem #PRAHXCN "PRAHXCN - Percent of - Word problem 2"

Natasha went shopping with $135 in her pocket, but she didn't want to spend it all. She decided to spend 14% of her money at most, and save the rest for later. How much was Natasha willing to spend?

**Algebraic Expression:**

- 18.9
- $18.9
- 18.9 dollars

**Hints:**

- 14% is the same as 14/100.

Rewrite the problem as:

\[
\frac{14}{100} = \frac{x}{135}
\]
where \( x \) is the part, so it's across from 14, and 135 is the whole, so it's across from 100.

- Multiply both sides of the above equation by \( 135 \times 100 \), so you get:

\[
14 \times 135 = 100x
\]

Now solve for \( x \).
- \( 14 \times 135 = 100x \)

\[
1890 = 100x
\]

\[
1890/100 = x
\]

\[
x = 18.9
\]

Natasha was willing to spend $18.9.

44) Problem #PRAHXBQ "PRAHXBQ - Percent of - Word problem 1"

David has 361 gumballs. He decides to give 18% of them to a friend as a birthday present. How many gumballs does David give away?

Round your answer to the nearest whole number.

Algebraic Expression:

\[
\checkmark \, 65
\]

Hints:
- When dealing with percents, use this equation:

\[
\text{Part} = \text{Percent} \times \text{Whole}
\]

In this case, you're given the whole (361) and the percent (18%, or 0.18).

Use these to find the part.
- Substitute the given values into the equation:

\[
\text{Part} = 0.18 \times 361
\]

Now solve for part.

Remember to round afterwards!
- \( \text{Part} = 0.18 \times 361 \)

\[
\text{Part} = 64.98
\]

Rounded, the answer is 65.
Tom has 413 cookies. He decides to give 14% of them to a friend as a birthday present. How many cookies does Tom give away?

**Round your answer to the nearest whole number.**

**Algebraic Expression:**

\[ \text{Part} = 0.14 \times 413 \]

In this case, you're given the whole (413) and the percent (14%, or 0.14).

Use these to find the part.

- Substitute the given values into the equation:

\[ \text{Part} = 0.14 \times 413 \]

Now solve for part.

Remember to round afterwards!

- Part = 0.14 × 413

Part = 57.82

Rounded, the answer is 58.

Tom gives away 58 cookies.

Daisy went shopping with $88 in her pocket, but she didn't want to spend it all. She decided to spend 29% of her money at most, and save the rest for later. How much was Daisy willing to spend?

**Algebraic Expression:**

\[ \text{Part} = \frac{29}{100} \times 88 \]

\[ \text{Part} = 25.52 \]

\[ \$25.52 \]

\[ 25.52 \text{ dollars} \]

**Hints:**

- 29% is the same as 29/100.
Rewrite the problem as:

\[
\frac{29}{100} = \frac{x}{88}
\]

where \(x\) is the part, so it's across from 29, and 88 is the whole, so it's across from 100.

- Multiply both sides of the above equation by \(88 \times 100\), so you get:

\[
29 \times 88 = 100x
\]

Now solve for \(x\).

- \(29 \times 88 = 100x\)

\[
2552 = 100x
\]

\[
2552/100 = x
\]

\[
x = 25.52
\]

Daisy was willing to spend $25.52.

---

47) Problem #PRAHXBA "PRAHXBA - Percent of - Word problem 1"
Andrew has 896 cookies. He decides to give 23% of them to a friend as a birthday present. How many cookies does Andrew give away?

Round your answer to the nearest whole number.

**Algebraic Expression:**

\[\checkmark 206\]

**Hints:**

- When dealing with percents, use this equation:

\[
\text{Part} = \text{Percent} \times \text{Whole}
\]

In this case, you're given the whole (896) and the percent (23%, or 0.23).

Use these to find the part.

- Substitute the given values into the equation:

\[
\text{Part} = 0.23 \times 896
\]

Now solve for part.

Remember to round afterwards!
• Part = 0.23 \times 896

Part = 206.08

Rounded, the answer is 206.

Andrew gives away 206 cookies.

48) Problem #PRAHXA3 "PRAHXA3 - Percent of - Word problem 1"
Ryan has 472 cookies. He decides to give 60\% of them to a friend as a birthday present. How many cookies does Ryan give away?

Round your answer to the nearest whole number.
Algebraic Expression:

\checkmark \text{283}

Hints:
• When dealing with percents, use this equation:

Part = \text{Percent} \times \text{Whole}

In this case, you're given the whole (472) and the percent (60\%, or 0.60).

Use these to find the part.
• Substitute the given values into the equation:

Part = 0.60 \times 472

Now solve for part.

Remember to round afterwards!
• Part = 0.60 \times 472

Part = 283.2

Rounded, the answer is 283.

Ryan gives away 283 cookies.

49) Problem #PRAHXA9 "PRAHXA9 - Percent of - Word problem 1"
Andrew has 296 cookies. He decides to give 95\% of them to a friend as a birthday present. How many cookies does Andrew give away?

Round your answer to the nearest whole number.
Algebraic Expression:

\[ \text{Part} = \text{Percent} \times \text{Whole} \]

Hints:
- When dealing with percents, use this equation:

In this case, you're given the whole (296) and the percent (95%, or 0.95).

Use these to find the part.
- Substitute the given values into the equation:

\[ \text{Part} = 0.95 \times 296 \]

Now solve for part.
- Remember to round afterwards!
- \[ \text{Part} = 0.95 \times 296 \]

Part = 281.2

Rounded, the answer is 281.

Andrew gives away 281 cookies.

50) Problem #PRAHXBH "PRAHXBH - Percent of - Word problem 1"

David has 474 cookies. He decides to give 13% of them to a friend as a birthday present. How many cookies does David give away?

Round your answer to the nearest whole number.

Algebraic Expression:

\[ \text{Part} = \text{Percent} \times \text{Whole} \]

Hints:
- When dealing with percents, use this equation:

In this case, you're given the whole (474) and the percent (13%, or 0.13).

Use these to find the part.
- Substitute the given values into the equation:

\[ \text{Part} = 0.13 \times 474 \]
Now solve for part.

Remember to round afterwards!
- Part = 0.13 × 474

Part = 61.62

Rounded, the answer is 62.

David gives away 62 cookies.

51) Problem #PRAHXC5 "PRAHXC5 - Percent of - Word problem 3"
Tracy is running a lemonade stand. She expects to make $136 for the day, but ends up making 420% of that amount. How much money did Tracy make that day?

**Exact Match (case sensitive):**

- 571.2
- 571.20
- 571.2.00

**Hints:**
- This is a Part = Percent × Whole problem.

You're given the percent (420%, or 4.2) and the whole (136).

Substitute these into the equation to find the part.
- Part = 4.2 × 136

Part = 571.2

Tracy made $571.2.

Type in 571.2.

52) Problem #PRAHXC8 "PRAHXC8 - Percent of - Word problem 3"
Sam is running a lemonade stand. He expects to make $82 for the day, but ends up making 401% of that amount. How much money did Sam make that day?

**Exact Match (case sensitive):**

- 328.82
- 328.820
- 328.82.00

**Hints:**
- This is a Part = Percent × Whole problem.
You're given the percent (401%, or 4.01) and the whole (82).

Substitute these into the equation to find the part.
- Part = 4.01 × 82

Part = 328.82

Sam made $328.82.

Type in 328.82.

---

53) Problem #PRAHXDC "PRAHXDC - Percent of - Word problem 3"
Anthony is running a lemonade stand. He expects to make $53 for the day, but ends up making 437% of that amount. How much money did Anthony make that day?

**Exact Match (case sensitive):**
- 231.61
- 231.610
- 231.61.00

**Hints:**
- This is a Part = Percent × Whole problem.

You're given the percent (437%, or 4.37) and the whole (53).

Substitute these into the equation to find the part.
- Part = 4.37 × 53

Part = 231.61

Anthony made $231.61.

Type in 231.61.

---

54) Problem #PRAHXDA "PRAHXDA - Percent of - Word problem 3"
Tracy is running a lemonade stand. She expects to make $77 for the day, but ends up making 307% of that amount. How much money did Tracy make that day?

**Exact Match (case sensitive):**
- 236.39
- 236.390
- 236.39.00

**Hints:**
- This is a Part = Percent × Whole problem.
You're given the percent (307%, or 3.07) and the whole (77).

Substitute these into the equation to find the part.
- Part = 3.07 × 77

Part = 236.39

Tracy made $236.39.

Type in 236.39.

---

**55) Problem #PRAHXCD "PRAHXCD - Percent of - Word problem 2"**

Daisy went shopping with $60 in her pocket, but she didn't want to spend it all. She decided to spend 81% of her money at most, and save the rest for later. How much was Daisy willing to spend?

**Algebraic Expression:**

\[ \frac{81}{100} = \frac{x}{60} \]

where \(x\) is the part, so it's across from 81, and 60 is the whole, so it's across from 100.

- Multiply both sides of the above equation by \(60 \times 100\), so you get:
  \[ 81 \times 60 = 100x \]

Now solve for \(x\).
- \( 81 \times 60 = 100x \)
  
  \[ 4860 = 100x \]
  
  \[ 4860/100 = x \]
  
  \[ x = 48.6 \]

Daisy was willing to spend $48.6.

---

**56) Problem #PRAHXCU "PRAHXCU - Percent of - Word problem 2"**

Natasha went shopping with $88 in her pocket, but she didn't want to spend it all. She decided to spend 26% of her money at most, and save the rest for later. How much was Natasha willing to spend?

**Algebraic Expression:**
22.88
22.88
$22.88
22.88 dollars

Hints:

- 26% is the same as 26/100.

Rewrite the problem as:

\[
\frac{26}{100} = \frac{x}{88}
\]

where x is the part, so it's across from 26, and 88 is the whole, so it's across from 100.

- Multiply both sides of the above equation by 88 × 100, so you get:

\[
26 \times 88 = 100x
\]

Now solve for x.

- \[26 \times 88 = 100x\]

\[2288 = 100x\]

\[2288/100 = x\]

\[x = 22.88\]

Natasha was willing to spend $22.88.

57) Problem #PRAHXBR "PRAHXBR - Percent of - Word problem 1"
Ryan has 959 cookies. He decides to give 94% of them to a friend as a birthday present. How many cookies does Ryan give away?

Round your answer to the nearest whole number.

Algebraic Expression:

901

Hints:

- When dealing with percents, use this equation:

\[\text{Part} = \text{Percent} \times \text{Whole}\]

In this case, you're given the whole (959) and the percent (94%, or 0.94).

Use these to find the part.
• Substitute the given values into the equation:

\[ \text{Part} = 0.94 \times 959 \]

Now solve for part.

Remember to round afterwards!

• \[ \text{Part} = 0.94 \times 959 \]

\[ \text{Part} = 901.46 \]

Rounded, the answer is 901.

Ryan gives away 901 cookies.

58) Problem #PRAHXCF "PRAHXCF - Percent of - Word problem 2"

Rebecca went shopping with $54 in her pocket, but she didn't want to spend it all. She decided to spend 86% of her money at most, and save the rest for later. How much was Rebecca willing to spend?

**Algebraic Expression:**

\[ \hat{\text{46.44}} \]

**Hints:**

• 86% is the same as 86/100.

Rewrite the problem as:

\[ \frac{86}{100} = \frac{x}{54} \]

where \( x \) is the part, so it's across from 86, and 54 is the whole, so it's across from 100.

• Multiply both sides of the above equation by 54 \( \times \) 100, so you get:

\[ 86 \times 54 = 100x \]

Now solve for \( x \).

• \[ 86 \times 54 = 100x \]

\[ 4644 = 100x \]

\[ 4644/100 = x \]

\[ x = 46.44 \]

Rebecca was willing to spend $46.44.
59) Problem PRAHXC - Percent of - Word problem 3

Anthony is running a lemonade stand. He expects to make $108 for the day, but ends up making 204% of that amount. How much money did Anthony make that day?

**Exact Match (case sensitive):**

- 220.32
- 220.320
- 220.32.00

**Hints:**

- This is a Part = Percent × Whole problem.

You're given the percent (204%, or 2.04) and the whole (108).

Substitute these into the equation to find the part.

- Part = 2.04 × 108

Part = 220.32

Anthony made $220.32.

Type in 220.32.

60) Problem PRAHXB7 - Percent of - Word problem 2

Natasha went shopping with $146 in her pocket, but she didn't want to spend it all. She decided to spend 47% of her money at most, and save the rest for later. How much was Natasha willing to spend?

**Algebraic Expression:**

- 68.62

**Hints:**

- 47% is the same as 47/100.

Rewrite the problem as:

\[
\frac{47}{100} = \frac{x}{146}
\]

where x is the part, so it's across from 47, and 146 is the whole, so it's across from 100.

- Multiply both sides of the above equation by 146 × 100, so you get:

\[47 \times 146 = 100x\]

Now solve for x.

- \[47 \times 146 = 100x\]
Natasha was willing to spend $68.62.

6862 = 100x

6862/100 = x

x = 68.62

---

61) Problem #PRAHXBC "PRAHXBC - Percent of - Word problem 1"

David has 785 comics. He decides to give 92% of them to a friend as a birthday present. How many comics does David give away?

Round your answer to the nearest whole number.

Algebraic Expression:

722

Hints:

- When dealing with percents, use this equation:
  
  Part = Percent × Whole

In this case, you're given the whole (785) and the percent (92%, or 0.92).

Use these to find the part.

- Substitute the given values into the equation:

Part = 0.92 × 785

Now solve for part.

Remember to round afterwards!

- Part = 0.92 × 785

Part = 722.2

Rounded, the answer is 722.

David gives away 722 comics.

---

62) Problem #PRAHXCM "PRAHXCM - Percent of - Word problem 2"

Meredith went shopping with $148 in her pocket, but she didn't want to spend it all. She decided to spend 22% of her money at most, and save the rest for later. How much was Meredith willing to spend?

Algebraic Expression:

32.56

✓ $32.56
32.56 dollars

Hints:
- 22% is the same as 22/100.

Rewrite the problem as:

\[
\frac{22}{100} = \frac{x}{148}
\]

where \(x\) is the part, so it's across from 22, and 148 is the whole, so it's across from 100.

- Multiply both sides of the above equation by 148 \times 100, so you get:

\[
22 \times 148 = 100x
\]

Now solve for \(x\).
- \(22 \times 148 = 100x\)

\[
3256 = 100x
\]

\[
3256/100 = x
\]

\(x = 32.56\)

Meredith was willing to spend $32.56.

---

63) Problem #PRAHXCJ "PRAHXCJ - Percent of - Word problem 2"

Daisy went shopping with $137 in her pocket, but she didn't want to spend it all. She decided to spend 42% of her money at most, and save the rest for later. How much was Daisy willing to spend?

**Algebraic Expression:**

\(57.54\)

Hints:
- 42% is the same as 42/100.

Rewrite the problem as:

\[
\frac{42}{100} = \frac{x}{137}
\]

where \(x\) is the part, so it's across from 42, and 137 is the whole, so it's across from 100.

- Multiply both sides of the above equation by 137 \times 100, so you get:

\[
42 \times 137 = 100x
\]
Now solve for x.

- \( 42 \times 137 = 100x \)

\[ 5754 = 100x \]

\[ 5754/100 = x \]

\[ x = 57.54 \]

Daisy was willing to spend $57.54.

---

64) Problem #PRAHXDT "PRAHXDT - Percent of - Word problem 3"
Tracy is running a lemonade stand. She expects to make $62 for the day, but ends up making 280% of that amount. How much money did Tracy make that day?

**Exact Match (case sensitive):**

- \( \checkmark \) 173.6
- \( \checkmark \) 173.60
- \( \checkmark \) 173.6.00

**Hints:**
- This is a Part = Percent \( \times \) Whole problem.

You're given the percent (280%, or 2.8) and the whole (62).

Substitute these into the equation to find the part.

- Part = 2.8 \( \times \) 62

Part = 173.6

Tracy made $173.6.

Type in 173.6.

---

65) Problem #PRAHXBN "PRAHXBN - Percent of - Word problem 1"
Chris has 915 gumballs. He decides to give 51% of them to a friend as a birthday present. How many gumballs does Chris give away?

**Round your answer to the nearest whole number.**

**Algebraic Expression:**

- \( \checkmark \) 467

**Hints:**
- When dealing with percents, use this equation:
Part = Percent × Whole

In this case, you're given the whole (915) and the percent (51%, or 0.51).

Use these to find the part.

- Substitute the given values into the equation:

  \[ \text{Part} = 0.51 \times 915 \]

Now solve for part.

Remember to round afterwards!

- \[ \text{Part} = 0.51 \times 915 \]

  \[ \text{Part} = 466.65 \]

  Rounded, the answer is 467.

Chris gives away 467 gumballs.

---

66) Problem #PRAHB88 "PRAHB88 - Percent of - Word problem 2"

Kate went shopping with $55 in her pocket, but she didn't want to spend it all. She decided to spend 78% of her money at most, and save the rest for later. How much was Kate willing to spend?

**Algebraic Expression:**

\[ 42.9 \]

**Hints:**

- 78% is the same as 78/100.

Rewrite the problem as:

\[ \frac{78}{100} = \frac{x}{55} \]

where \( x \) is the part, so it's across from 78, and 55 is the whole, so it's across from 100.

- Multiply both sides of the above equation by \( 55 \times 100 \), so you get:

\[ 78 \times 55 = 100x \]

Now solve for \( x \).

- \[ 78 \times 55 = 100x \]

\[ 4290 = 100x \]
\[ \frac{4290}{100} = x \]
\[ x = 42.9 \]

Kate was willing to spend $42.9.

67) Problem #PRAHXC4 "PRAHXC4 - Percent of - Word problem 3"
Sam is running a lemonade stand. He expects to make $54 for the day, but ends up making 223% of that amount. How much money did Sam make that day?

**Exact Match (case sensitive):**

- 120.42
- 120.420
- 120.42.00

**Hints:**
- This is a Part = Percent \times Whole problem.

You're given the percent (223%, or 2.23) and the whole (54).

Substitute these into the equation to find the part.

- \( \text{Part} = 2.23 \times 54 \)

Part = 120.42

Sam made $120.42.

Type in 120.42.

68) Problem #PRAHXC7 "PRAHXC7 - Percent of - Word problem 3"
Anthony is running a lemonade stand. He expects to make $69 for the day, but ends up making 492% of that amount. How much money did Anthony make that day?

**Exact Match (case sensitive):**

- 339.48
- 339.480
- 339.48.00

**Hints:**
- This is a Part = Percent \times Whole problem.

You're given the percent (492%, or 4.92) and the whole (69).

Substitute these into the equation to find the part.

- \( \text{Part} = 4.92 \times 69 \)
Part = 339.48

Anthony made $339.48.

Type in 339.48.

69) Problem #PRAHXCS "PRAHXCS - Percent of - Word problem 2"
Natasha went shopping with $84 in her pocket, but she didn't want to spend it all. She decided to spend 82% of her money at most, and save the rest for later. How much was Natasha willing to spend?

**Algebraic Expression:**

- 68.88
- $68.88
- 68.88 dollars

**Hints:**
- 82% is the same as 82/100.

Rewrite the problem as:

\[
\frac{82}{100} = \frac{x}{84}
\]

where x is the part, so it's across from 82, and 84 is the whole, so it's across from 100.

- Multiply both sides of the above equation by 84 × 100, so you get:

\[
82 \times 84 = 100x
\]

Now solve for x.
- \(82 \times 84 = 100x\)

\[6888 = 100x\]

\[6888/100 = x\]

\[x = 68.88\]

Natasha was willing to spend $68.88.

70) Problem #PRAHXCB "PRAHXCB - Percent of - Word problem 2"
Natasha went shopping with $139 in her pocket, but she didn't want to spend it all. She decided to spend 88% of her money at most, and save the rest for later. How much was Natasha willing to spend?

**Algebraic Expression:**

- 122.32
Hints:
- 88% is the same as 88/100.

Rewrite the problem as:

\[
\frac{88}{100} = \frac{x}{139}
\]

where \(x\) is the part, so it's across from 88, and 139 is the whole, so it's across from 100.

- Multiply both sides of the above equation by 139 \(\times\) 100, so you get:

\[
88 \times 139 = 100x
\]

Now solve for \(x\).

- \(88 \times 139 = 100x\)

\[
12232 = 100x
\]

\[
12232/100 = x
\]

\(x = 122.32\)

Natasha was willing to spend $122.32.

---

71) Problem #PRAHXDD "PRAHXDD - Percent of - Word problem 3"

Tracy is running a lemonade stand. She expects to make $101 for the day, but ends up making 257% of that amount. How much money did Tracy make that day?

Exact Match (case sensitive):

- ✓ 259.57
- ✓ 259.570
- ✓ 259.57.00

Hints:
- This is a Part = Percent \(\times\) Whole problem.

You're given the percent (257%, or 2.57) and the whole (101).

Substitute these into the equation to find the part.

- Part = 2.57 \(\times\) 101

Part = 259.57

Tracy made $259.57.
Rebecca went shopping with $97 in her pocket, but she didn't want to spend it all. She decided to spend 62% of her money at most, and save the rest for later. How much was Rebecca willing to spend?

**Algebraic Expression:**

\[
\frac{62}{100} = \frac{x}{97}
\]

where \( x \) is the part, so it's across from 62, and 97 is the whole, so it's across from 100.

- Multiply both sides of the above equation by 97 \times 100, so you get:

\[
62 \times 97 = 100x
\]

Now solve for \( x \).

- \( 62 \times 97 = 100x \)

\[
6014 = 100x
\]

\[
6014/100 = x
\]

\[x = 60.14\]

Rebecca was willing to spend $60.14.

---

David has 574 gumballs. He decides to give 41% of them to a friend as a birthday present. How many gumballs does David give away?

**Round your answer to the nearest whole number.**

**Algebraic Expression:**

\[
235
\]

**Hints:**

- When dealing with percents, use this equation:
Part = Percent \times Whole

In this case, you're given the whole (574) and the percent (41\%, or 0.41).

Use these to find the part.

• Substitute the given values into the equation:

Part = 0.41 \times 574

Now solve for part.

Remember to round afterwards!

• Part = 0.41 \times 574

Part = 235.34

Rounded, the answer is 235.

David gives away 235 gumballs.

Kate went shopping with $53 in her pocket, but she didn't want to spend it all. She decided to spend 48\% of her money at most, and save the rest for later. How much was Kate willing to spend?

**Algebraic Expression:**

\[ 25.44 \]

**Hints:**

• 48\% is the same as 48/100.

Rewrite the problem as:

\[
\frac{48}{100} = \frac{x}{53}
\]

where x is the part, so it's across from 48, and 53 is the whole, so it's across from 100.

• Multiply both sides of the above equation by 53 \times 100, so you get:

\[ 48 \times 53 = 100x \]

Now solve for x.

• \[ 48 \times 53 = 100x \]

\[ 2544 = 100x \]

\[ 2544/100 = x \]
x = 25.44

Kate was willing to spend $25.44.

75) Problem #PRAHXDJ "PRAHXDJ - Percent of - Word problem 3"
Anthony is running a lemonade stand. He expects to make $142 for the day, but ends up making 164% of that amount. How much money did Anthony make that day?

**Exact Match (case sensitive):**
- 232.88
- 232.880
- 232.88.00

**Hints:**
- This is a Part = Percent \times Whole problem.

You're given the percent (164%, or 1.64) and the whole (142).

Substitute these into the equation to find the part.
- Part = 1.64 \times 142

Part = 232.88

Anthony made $232.88.

Type in 232.88.

76) Problem #PRAHXBM "PRAHXBM - Percent of - Word problem 1"
Ryan has 829 cookies. He decides to give 10% of them to a friend as a birthday present. How many cookies does Ryan give away?

**Round your answer to the nearest whole number.**

**Algebraic Expression:**
- 83

**Hints:**
- When dealing with percents, use this equation:
  
  \text{Part} = \text{Percent} \times \text{Whole}

  In this case, you're given the whole (829) and the percent (10%, or 0.10).

  Use these to find the part.
  - Substitute the given values into the equation:
Part = 0.10 × 829

Now solve for part.

Remember to round afterwards!

- Part = 0.10 × 829

Part = 82.9

Rounded, the answer is 83.

Ryan gives away 83 cookies.

77) Problem #PRAHXCT "PRAHXCT - Percent of - Word problem 2"
Daisy went shopping with $145 in her pocket, but she didn't want to spend it all. She decided to spend 68% of her money at most, and save the rest for later. How much was Daisy willing to spend?

Algebraic Expression:

- 98.6
- $98.6
- 98.6 dollars

Hints:

- 68% is the same as 68/100.

Rewrite the problem as:

\[
\frac{68}{100} = \frac{x}{145}
\]

where x is the part, so it's across from 68, and 145 is the whole, so it's across from 100.

- Multiply both sides of the above equation by 145 × 100, so you get:

\[68 \times 145 = 100x\]

Now solve for x.

- \[68 \times 145 = 100x\]

9860 = 100x

9860/100 = x

x = 98.6
Daisy was willing to spend $98.6.

78) Problem #PRAHXBP "PRAHXBP - Percent of - Word problem 1"
Chris has 482 comics. He decides to give 94% of them to a friend as a birthday present. How many comics does Chris give away?

Round your answer to the nearest whole number.
Algebraic Expression:
✓ 453

Hints:
• When dealing with percents, use this equation:

Part = Percent \times Whole

In this case, you're given the whole (482) and the percent (94%, or 0.94).

Use these to find the part.
• Substitute the given values into the equation:

Part = 0.94 \times 482

Now solve for part.

Remember to round afterwards!
• Part = 0.94 \times 482

Part = 453.08

Rounded, the answer is 453.

Chris gives away 453 comics.

79) Problem #PRAHXB6 "PRAHXB6 - Percent of - Word problem 2"
Rebecca went shopping with $117 in her pocket, but she didn't want to spend it all. She decided to spend 19% of her money at most, and save the rest for later. How much was Rebecca willing to spend?

Algebraic Expression:
✓ 22.23

Hints:
• 19% is the same as 19/100.

Rewrite the problem as:
\[
\frac{19}{100} = \frac{x}{117}
\]

where \(x\) is the part, so it's across from 19, and 117 is the whole, so it's across from 100.

- Multiply both sides of the above equation by \(117 \times 100\), so you get:

\[
19 \times 117 = 100x
\]

Now solve for \(x\).

- \(19 \times 117 = 100x\)

\[
2223 = 100x
\]

\[
2223/100 = x
\]

\[
x = 22.23
\]

Rebecca was willing to spend $22.23.

80) Problem #PRAHXC9 "PRAHXC9 - Percent of - Word problem 3"
Emily is running a lemonade stand. She expects to make $135 for the day, but ends up making 142% of that amount. How much money did Emily make that day?

**Exact Match (case sensitive):**

- ✔️ 191.7
- ✔️ 191.70
- ✔️ 191.7.00

**Hints:**

- This is a Part = Percent \(\times\) Whole problem.

You're given the percent (142%, or 1.42) and the whole (135).

Substitute these into the equation to find the part.

- Part = \(1.42 \times 135\)

Part = 191.7

Emily made $191.7.

Type in 191.7.

81) Problem #PRAHXCC "PRAHXCC - Percent of - Word problem 2"
Natasha went shopping with $130 in her pocket, but she didn't want to spend it all. She decided to spend 25% of her money at most, and save the rest for later. How much was Natasha willing to spend?
Algebraic Expression:

32.5

Hints:

- 25% is the same as 25/100.

Rewrite the problem as:

\[
\frac{25}{100} = \frac{x}{130}
\]

where \( x \) is the part, so it's across from 25, and 130 is the whole, so it's across from 100.

- Multiply both sides of the above equation by \( 130 \times 100 \), so you get:

\[
25 \times 130 = 100x
\]

Now solve for \( x \).

- \( 25 \times 130 = 100x \)

\[
3250 = 100x
\]

\[
3250/100 = x
\]

\[
x = 32.5
\]

Natasha was willing to spend $32.5.

---

82) Problem #PRAHXA4 "PRAHXA4 - Percent of - Word problem 1"

Ryan has 117 comics. He decides to give 61% of them to a friend as a birthday present. How many comics does Ryan give away?

Round your answer to the nearest whole number.

Algebraic Expression:

71

Hints:

- When dealing with percents, use this equation:

\[
\text{Part} = \text{Percent} \times \text{Whole}
\]

In this case, you're given the whole (117) and the percent (61%, or 0.61).

Use these to find the part.

- Substitute the given values into the equation:
Part = 0.61 \times 117

Now solve for part.

Remember to round afterwards!

- Part = 0.61 \times 117

Part = 71.37

Rounded, the answer is 71.

Ryan gives away 71 comics.

---

83) Problem #PRAHXBE "PRAHXBE - Percent of - Word problem 1"
Ryan has 865 gumballs. He decides to give 57% of them to a friend as a birthday present. How many gumballs does Ryan give away?

Round your answer to the nearest whole number.

**Algebraic Expression:**

\checkmark 493

**Hints:**

- When dealing with percents, use this equation:

\[ \text{Part} = \text{Percent} \times \text{Whole} \]

In this case, you're given the whole (865) and the percent (57%, or 0.57).

Use these to find the part.

- Substitute the given values into the equation:

\[ \text{Part} = 0.57 \times 865 \]

Now solve for part.

Remember to round afterwards!

- Part = 0.57 \times 865

Part = 493.05

Rounded, the answer is 493.

Ryan gives away 493 gumballs.

---

84) Problem #PRAHXDP "PRAHXDP - Percent of - Word problem 3"
Tracy is running a lemonade stand. She expects to make $68 for the day, but ends up making 337% of that amount. How much money did Tracy make that day?

**Exact Match (case sensitive):**
- 229.16
- 229.160
- 229.16.00

**Hints:**
- This is a Part = Percent × Whole problem.

You're given the percent (337%, or 3.37) and the whole (68).

Substitute these into the equation to find the part.
- Part = 3.37 × 68

Part = 229.16

Tracy made $229.16.

Type in 229.16.

---

85) Problem #PRAHXBK "PRAHXBK - Percent of - Word problem 1"

Chris has 777 comics. He decides to give 46% of them to a friend as a birthday present. How many comics does Chris give away?

**Round your answer to the nearest whole number.**

**Algebraic Expression:**
- 357

**Hints:**
- When dealing with percents, use this equation:

Part = Percent × Whole

In this case, you're given the whole (777) and the percent (46%, or 0.46).

Use these to find the part.
- Substitute the given values into the equation:

Part = 0.46 × 777

Now solve for part.

Remember to round afterwards!
- Part = 0.46 × 777
Part = 357.42

Rounded, the answer is 357.

Chris gives away 357 comics.

---

**86) Problem #PRAHXB2 "PRAHXB2 - Percent of - Word problem 2"

Kate went shopping with $111 in her pocket, but she didn't want to spend it all. She decided to spend 41% of her money at most, and save the rest for later. How much was Kate willing to spend?

**Algebraic Expression:**

\[
\text{45.51}
\]

**Hints:**

- 41% is the same as 41/100.

Rewrite the problem as:

\[
\frac{41}{100} = \frac{x}{111}
\]

where \( x \) is the part, so it's across from 41, and 111 is the whole, so it's across from 100.

- Multiply both sides of the above equation by 111 \( \times \) 100, so you get:

\[
41 \times 111 = 100x
\]

Now solve for \( x \).

- \( 41 \times 111 = 100x \)

\[
4551 = 100x
\]

\[
4551/100 = x
\]

\[
x = 45.51
\]

Kate was willing to spend $45.51.

---

**87) Problem #PRAHXAZ "PRAHXAZ - Percent of - Word problem 1"

David has 294 cookies. He decides to give 13% of them to a friend as a birthday present. How many cookies does David give away?

Round your answer to the nearest whole number.

**Algebraic Expression:**

\[
\text{38}
\]
Hints:
- When dealing with percents, use this equation:

\[ \text{Part} = \text{Percent} \times \text{Whole} \]

In this case, you're given the whole (294) and the percent (13%, or 0.13).

Use these to find the part.
- Substitute the given values into the equation:

\[ \text{Part} = 0.13 \times 294 \]

Now solve for part.

Remember to round afterwards!
- \[ \text{Part} = 0.13 \times 294 \]

Part = 38.22

Rounded, the answer is 38.

David gives away 38 cookies.

------

**88) Problem #PRAHXCY "PRAHXCY - Percent of - Word problem 3"**

Sam is running a lemonade stand. He expects to make $78 for the day, but ends up making 480% of that amount. How much money did Sam make that day?

Exact Match (case sensitive):

✔ 374.4
✔ 374.40
✔ 374.4.00

Hints:
- This is a Part = Percent × Whole problem.

You're given the percent (480%, or 4.8) and the whole (78).

Substitute these into the equation to find the part.
- \[ \text{Part} = 4.8 \times 78 \]

Part = 374.4

Sam made $374.4.

Type in 374.4.
89) Problem PRAHXDK "PRAHXDK - Percent of - Word problem 3"
Sam is running a lemonade stand. He expects to make $140 for the day, but ends up making 435% of that amount. How much money did Sam make that day?

**Exact Match (case sensitive):**

- ✓ 609
- ✓ 6090
- ✓ 609.00

**Hints:**
- This is a Part = Percent × Whole problem.

You're given the percent (435%, or 4.35) and the whole (140).

Substitute these into the equation to find the part.

- Part = 4.35 × 140

Part = 609

Sam made $609.

Type in 609.

90) Problem PRAHXBU "PRAHXBU - Percent of - Word problem 1"
Andrew has 200 comics. He decides to give 50% of them to a friend as a birthday present. How many comics does Andrew give away?

**Round your answer to the nearest whole number.**
**Algebraic Expression:**

- ✓ 100

**Hints:**
- When dealing with percents, use this equation:

  Part = Percent × Whole

In this case, you're given the whole (200) and the percent (50%, or 0.50).

Use these to find the part.

- Substitute the given values into the equation:

  Part = 0.50 × 200

Now solve for part.

Remember to round afterwards!
- Part = $0.50 \times 200$

Part = 100

Rounded, the answer is 100.

Andrew gives away 100 comics.
A spherical tank will be used for the storage of Paint. The radius of the Paint tank is 2 feet. What is the volume of Paint that the tank can hold (in cubic feet)? Use 3.14 for Π and round to the nearest hundredth.

Algebraic Expression:

✓ 33.49

✗ 33.5

• Round to the nearest hundredth.

Hints:

Volume of A Sphere: \( V = \frac{4}{3} \pi \times \text{radius}^3 \)
We are given the radius, so substitute it into the formula.

\[
V = \frac{4}{3} \pi \cdot \text{radius}^3
\]

\[
V = \frac{4}{3} \times 3.14 \cdot 2^3
\]
\[ V = \frac{4}{3} \pi r^3 \]

\[ V = \frac{4}{3} \times 3.14 \times 2^3 \]

\[ V = 33.4933333333333 \quad \text{Simplify} \]

\[ V = 33.49 \quad \text{Round to the nearest hundredth} \]

The Volume of the spherical Paint tank is 33.49 cubic feet, therefore it can store 33.49 cubic feet of Paint.

Type 33.49

---

2) Problem #PRACH3G "PRACH3G - 60108 - Volume of Sphere (radius)"

The sphere below has a radius of 2 inches.

What is the volume of this sphere (in cubic inches)?

Use 3.14 for \( \pi \) and round to the nearest hundredth.

Algebraic Expression:

\[ 33.49 \]

Hints:
Volume of A Sphere: \( V = \frac{4}{3} \pi \times \text{radius}^3 \)

We are given the radius, so substitute it into the formula:

\( V = \frac{4}{3} \times 3.14 \times 2^3 \)
The Volume of the Sphere is 33.49 cubic inches.

Type 33.49
What is the volume of this sphere (in cubic inches)?
Use 3.14 for \( \pi \) and round to the nearest hundredth.

**Algebraic Expression:**

\[ V = \frac{4}{3} \pi \text{ radius}^3 \]

- 33.49

**Hints:**

PSAKHM 3.1
Volume of A Sphere: \( V = \frac{4}{3} \pi \cdot \text{radius}^3 \)

\textbf{Diameter (D) = 2 x Radius (R)}

\[
\text{Radius} = \frac{\text{Diameter}}{2}
\]

Solve for Radius

\[
\text{Radius} = \frac{4}{2} = 2 \quad \text{Plug in Diameter and Simplify}
\]
V = \frac{4}{3} \pi \cdot \text{radius}^3

V = \frac{4}{3} \cdot 3.14 \cdot 2^3

We solved for the radius (R = 2), so substitute it into the formula

V = 33.49

Round to the nearest hundredth

The Volume of the Sphere is 33.49 cubic inches.

Type 33.49
What is the volume of this sphere (in cubic inches)?
Use 3.14 for Π and round to the nearest hundredth.

**Algebraic Expression:**

- 904.32

**Hints:**

- Volume of A Sphere: \[ V = \frac{4}{3} \pi \times \text{radius}^3 \]

- Diameter (D) = 2 x Radius (R)
  
  \[ \text{Radius} = \frac{\text{Diameter}}{2} \]

  - \[ \text{Radius} = \frac{12}{2} = 6 \]

  - Plug in Diameter and Simplify

  \[ V = \frac{4}{3} \pi \times 6^3 \]

  - We solved for the radius (R = 6), so substitute it into the formula
A spherical tank will be used for the storage of Gasoline. The radius of the Gasoline tank is 4 feet. What is the volume of Gasoline that the tank can hold (in cubic feet)?

Use 3.14 for \( \pi \) and round to the nearest hundredth.

**Number:**
- ✔️ 267.95
- ✗️ 267.94
  - Round to the nearest hundredth.

**Hints:**
- Volume of A Sphere: \( V = \frac{4}{3} \pi \text{ radius}^3 \)
We are given the radius, so substitute it into the formula

\[ V = \frac{4}{3} \pi r^3 \]

\[ V = \frac{4}{3} \times 3.14 \times 4^3 \]

\[ V = 267.946666666667 \quad \text{Simplify} \]

\[ V = 267.95 \quad \text{Round to the nearest hundredth} \]

The Volume of the spherical Gasoline tank is 267.95 cubic feet, therefore it can store 267.95 cubic feet of Gasoline.

Type 267.95

6) Problem #PRACHZH "PRACHZH - 60109 - Volume of Sphere (diameter)"
The sphere below has a diameter of 16 inches.

What is the volume of this sphere (in cubic inches)?
Use 3.14 for \( \pi \) and round to the nearest hundredth.

Algebraic Expression:
\[ 2143.57 \]

Hints:
•
Volume of A Sphere: $V = \frac{4}{3} \pi \cdot \text{radius}^3$

\[
\cdot \\
\text{Volume of A Sphere: } V = \frac{4}{3} \pi \cdot \text{radius}^3 \\
\text{Diameter (D) = 2 x Radius (R)}
\]

Radius = \frac{\text{Diameter}}{2} \quad \text{Solve for Radius}

\[
\frac{16}{2} = 8 \quad \text{Plug in Diameter and Simplify}
\]

\[
\cdot \quad \frac{4}{3} \pi \cdot \text{radius}^3
\]

\[
\frac{4}{3} \cdot 3.14 \cdot 8^3 \quad \text{We solved for the radius (R = 8), so substitute it into the formula}
\]

\[
\cdot \quad \frac{4}{3} \cdot 3.14 \cdot 8^3
\]

\[V = 2143.57\text{ cubic inches.}
\]

Type 2143.57
A spherical tank will be used for the storage of Milk. The diameter of the Milk tank is 4 feet. What is the volume of Milk that the tank can hold (in cubic feet)? Use 3.14 for Π and round to the nearest hundredth.

Algebraic Expression:

33.49

Hints:

1. Volume of A Sphere: \( V = \frac{4}{3} \pi \text{ radius}^3 \)

2. Diameter (D) = 2 x Radius (R)

   \[
   \text{Radius} = \frac{D}{2} \quad \text{Solve for Radius}
   \]

   \[
   \text{Radius} = \frac{4}{2} = 2 \quad \text{Plug in Diameter and Simplify}
   \]

   \[
   V = \frac{4}{3} \pi \text{ radius}^3 \quad \text{We solved for the radius (R = 2), so substitute it into the formula}
   \]

   \[
   V = \frac{4}{3} \times 3.14 \times 2^3
   \]
\[ V = \frac{4 \cdot 3.14 \cdot 2^3}{3} \]

\[ V = 33.4933333333333 \quad \text{Simplify} \]

\[ V = 33.49 \quad \text{Round to the nearest hundredth} \]

The Volume of the Sphere is 33.49 cubic feet and therefore it can hold 33.49 cubic feet of Milk.

Type 33.49

8) Problem #PRACHZ7 "PRACHZ7 - 60110 - Volume of Sphere (diameter, word problem)"

A spherical tank will be used for the storage of Paint. The diameter of the Paint tank is 16 feet. What is the volume of Paint that the tank can hold (in cubic feet)? Use 3.14 for \( \Pi \) and round to the nearest hundredth.

**Algebraic Expression:**

\[ 2143.57 \]

**Hints:**

- Volume of A Sphere: \( V = \frac{4}{3} \Pi \cdot \text{radius}^3 \)

- Volume of A Sphere: \( V = \frac{4}{3} \Pi \cdot \text{radius}^3 \)

**Diameter (D) = 2 x Radius (R)**

**Diameter**

\[ \text{Radius} = \frac{16}{2} \quad \text{Solve for Radius} \]

\[ \text{Radius} = 8 \quad \text{Plug in Diameter and Simplify} \]
We solved for the radius \( R = 8 \), so substitute it into the formula.

The Volume of the Sphere is 2143.57 cubic feet and therefore it can hold 2143.57 cubic feet of Paint.

Type 2143.57

9) Problem #PRACH3F "PRACH3F - 60108 - Volume of Sphere (radius)"
The sphere below has a radius of 4 inches.

What is the volume of this sphere (in cubic inches)?
Use $\pi$ for $\Pi$ and round to the nearest hundredth.

Number:

✓ 267.95

Hints:

• Volume of A Sphere: $V = \frac{4}{3} \pi \times radius^3$

• $V = \frac{4}{3} \pi \times radius^3$

• $V = \frac{4}{3} \times 3.14 \times 4^3$ We are given the radius, so substitute it into the formula

• $V = \frac{4}{3} \times 3.14 \times 4^3$

$V = 267.946666666667$ Simplify

$V = 267.95$ Round to the nearest hundredth

The Volume of the Sphere is 267.95 cubic inches.

Type 267.95

☐ 10) Problem #PRACH3K "PRACH3K - 60108 - Volume of Sphere (radius)"
The sphere below has a radius of 9 inches.
What is the volume of this sphere (in cubic inches)?

Use 3.14 for \( \Pi \) and round to the nearest hundredth.

**Number:**

\[ 3052.08 \]

**Hints:**

- Volume of a Sphere: \( V = \frac{4}{3} \Pi \times \text{radius}^3 \)

- \( V = \frac{4}{3} \Pi \times \text{radius}^3 \)

\[ V = \frac{4}{3} \times 3.14 \times 9^3 \quad \text{We are given the radius, so substitute it into the formula} \]

- \( V = \frac{4}{3} \Pi \times \text{radius}^3 \)

\[ V = \frac{4}{3} \times 3.14 \times 9^3 \]

\[ V = 3052.08 \quad \text{Simplify} \]

\[ V = 3052.08 \quad \text{Round to the nearest hundredth} \]

The Volume of the Sphere is 3052.08 cubic inches.
The sphere below has a radius of 8 inches.

What is the volume of this sphere (in cubic inches)?

Use 3.14 for \( \Pi \) and round to the nearest hundredth.

Number:

✓ 2143.57

Hints:

•

Volume of A Sphere: \( V = \frac{4}{3} \Pi \times \text{radius}^3 \)

•

\[ V = \frac{4}{3} \Pi \times \text{radius}^3 \]

\[ V = \frac{4}{3} \times 3.14 \times 8^3 \quad \text{We are given the radius, so substitute it into the formula} \]

•

\[ V = \frac{4}{3} \Pi \times \text{radius}^3 \]

\[ V = \frac{4}{3} \times 3.14 \times 8^3 \]
The Volume of the Sphere is 2143.57 cubic inches.

Type 2143.57
\[ V = 1436.03 \text{ cubic feet} \]

**Simplify**

\[ V = 1436.02666666667 \]

**Round to the nearest hundredth**

The Volume of the spherical Paint tank is 1436.03 cubic feet, therefore it can store 1436.03 cubic feet of Paint.

Type 1436.03

---

13) Problem #PRACH3A "PRACH3A - 60111 - Volume of Sphere (radius, word problem)"

A spherical tank will be used for the storage of Water. The radius of the Water tank is 2 feet. What is the volume of Water that the tank can hold (in cubic feet)?

Use 3.14 for \( \Pi \) and round to the nearest hundredth.

**Number:**

✓ 33.49

**Hints:**

- Volume of A Sphere: \( V = \frac{4}{3} \Pi \times \text{radius}^3 \)

- \( V = \frac{4}{3} \Pi \times \text{radius}^3 \)

- \( V = \frac{4}{3} \times 3.14 \times 2^3 \) **We are given the radius, so substitute it into the formula**

- \( V = \frac{4}{3} \times 3.14 \times 2^3 \)

- \( V = 33.4933333333333 \text{ cubic feet} \)

**Simplify**

\[ V = 33.49 \text{ cubic feet} \]

**Round to the nearest hundredth**

The Volume of the spherical Water tank is 33.49 cubic feet, therefore it can store 33.49 cubic feet of Water.
What is the volume of this sphere (in cubic inches)?

Use 3.14 for π and round to the nearest hundredth.

**Algebraic Expression:**

\[ V = \frac{4}{3} \pi \cdot r^3 \]

**Hints:**

- Volume of a Sphere: \( V = \frac{4}{3} \pi \cdot r^3 \)
- \( V = \frac{4}{3} \pi \cdot r^3 \)
- \( V = \frac{4}{3} \cdot 3.14 \cdot 9^3 \)  
  We are given the radius, so substitute it into the formula.
The Volume of the Sphere is 3052.08 cubic inches.

Type 3052.08

A spherical tank will be used for the storage of Gasoline. The diameter of the Gasoline tank is 10 feet. What is the volume of Gasoline that the tank can hold (in cubic feet)?
Use 3.14 for \( \Pi \) and round to the nearest hundredth.

Algebraic Expression:

\[
V = \frac{4}{3} \Pi \text{ radius}^3
\]

Hints:

1. Diameter (D) = 2 \times \text{Radius (R)}
2. \[
\text{Radius} = \frac{D}{2}
\]

Radius = \[
\frac{10}{2} = 5
\]

Plug in Diameter and Simplify

\[
V = \frac{4}{3} \Pi \text{ radius}^3
\]
We solved for the radius \( R = 5 \), so substitute it into the formula:

\[
V = \frac{4}{3} \pi r^3
\]

Substituting \( r = 5 \):

\[
V = \frac{4}{3} \pi \cdot 5^3
\]

Simplifying:

\[
V = \frac{4}{3} \cdot 3.14 \cdot 5^3
\]

\[
V = \frac{523.333333333333}{3}
\]

Round to the nearest hundredth:

\[
V = 523.33
\]

The Volume of the Sphere is 523.33 cubic feet and therefore it can hold 523.33 cubic feet of Gasoline.

Type 523.33
Algebraic Expression:

\[ V = \frac{4}{3} \pi \text{ radius}^3 \]

Hints:

- Volume of A Sphere: \( V = \frac{4}{3} \pi \text{ radius}^3 \)

Diameter (D) = 2 x Radius (R)

\[
\text{Diameter} \quad \text{Radius} = \frac{\text{Diameter}}{2} \quad \text{Solve for Radius}
\]

\[
\text{Radius} = \frac{16}{2} = 8 \quad \text{Plug in Diameter and Simplify}
\]

- \( V = \frac{4}{3} \pi \text{ radius}^3 \)

\[
V = \frac{4}{3} \times 3.14 \times 8^3 \quad \text{We solved for the radius (R = 8), so substitute it into the formula}
\]

- \( V = \frac{4}{3} \pi \text{ radius}^3 \)

\[
V = \frac{4}{3} \times 3.14 \times 8^3
\]

\[
V = 2143.5733333333333 \quad \text{Simplify}
\]
The Volume of the Sphere is 2143.57 cubic inches.

Type 2143.57

17) Problem #PRACH29 "PRACH29 - 60111 - Volume of Sphere (radius, word problem)"

A spherical tank will be used for the storage of Gasoline. The radius of the Gasoline tank is 9 feet. What is the volume of Gasoline that the tank can hold (in cubic feet)?

Use 3.14 for Π and round to the nearest hundredth.

Number:
✓ 3052.08

Hints:
•
Volume of A Sphere: \( V = \frac{4}{3} \pi \text{ * radius}^3 \)

•
\[ V = \frac{4}{3} \pi \text{ * radius}^3 \]

\[ V = \frac{4}{3} \times 3.14 \times 9^3 \] \hspace{1cm} \text{We are given the radius, so substitute it into the formula}

•
\[ V = \frac{4}{3} \pi \text{ * radius}^3 \]

\[ V = \frac{4}{3} \times 3.14 \times 9^3 \]

\[ V = 3052.08 \] \hspace{1cm} \text{Simplify}

\[ V = 3052.08 \] \hspace{1cm} \text{Round to the nearest hundredth}

The Volume of the spherical Gasoline tank is 3052.08 cubic feet, therefore it can store 3052.08 cubic feet of Gasoline.
The sphere below has a radius of 1 inches.

What is the volume of this sphere (in cubic inches)?

Use 3.14 for $\Pi$ and round to the nearest hundredth.

**Number:**

4.19

**Hints:**

- Volume of A Sphere: $V = \frac{4}{3} \Pi * \text{radius}^3$

- $V = \frac{4}{3} \Pi * \text{radius}^3$

- $V = \frac{4}{3} 3.14 * 1^3$  We are given the radius, so substitute it into the formula

- $V = \frac{4}{3} \Pi * \text{radius}^3$

- $V = \frac{4}{3} 3.14 * 1^3$
The Volume of the Sphere is 4.19 cubic inches.

Type 4.19

The sphere below has a diameter of 16 inches.

What is the volume of this sphere (in cubic inches)?
Use 3.14 for $\Pi$ and round to the nearest hundredth.

Algebraic Expression:

$\sqrt{2143.57}$

Hints:

• $\text{Volume of A Sphere: } V = \frac{4}{3} \Pi \times \text{radius}^3$

• $\text{Volume of A Sphere: } V = \frac{4}{3} \Pi \times \text{radius}^3$
Diameter (D) = 2 x Radius (R)

Radius = \frac{Diameter}{2} \quad \text{Solve for Radius}

Radius = \frac{16}{2} = 8 \quad \text{Plug in Diameter and Simplify}

V = \frac{4}{3} \pi * radius^3

V = \frac{4}{3} \times 3.14 \times 8^3 \quad \text{We solved for the radius (R = 8), so substitute it into the formula}

V = 2143.57 \quad \text{Round to the nearest hundredth}

The Volume of the Sphere is 2143.57 cubic inches.

Type 2143.57

20) Problem #PRACH3E "PRACH3E - 60111 - Volume of Sphere (radius, word problem)"
A spherical tank will be used for the storage of Water. The radius of the Water tank is 4 feet. What is the volume of Water that the tank can hold (in cubic feet)?
Use 3.14 for Π and round to the nearest hundredth.

Number:
✓ 267.95

Hints:

•

Volume of A Sphere: \( V = \frac{4}{3} \pi \cdot \text{radius}^3 \)

•

\( V = \frac{4}{3} \pi \cdot \text{radius}^3 \) We are given the radius, so substitute it into the formula

•

\( V = \frac{4}{3} \cdot 3.14 \cdot 4^3 \)

\( V = \frac{267.946666666667}{3} \) Simplify

\( V = 267.95 \) Round to the nearest hundredth

The Volume of the spherical Water tank is 267.95 cubic feet, therefore it can store 267.95 cubic feet of Water.

Type 267.95

21) Problem #PRACH26 "PRACH26 - 60111 - Volume of Sphere (radius, word problem)"

A spherical tank will be used for the storage of Gasoline. The radius of the Gasoline tank is 1 feet. What is the volume of Gasoline that the tank can hold (in cubic feet)?

Use 3.14 for Π and round to the nearest hundredth.

Number:
✓ 4.19

Hints:
Volume of A Sphere: \( V = \frac{4}{3} \pi r^3 \)

\[
V = \frac{4}{3} \pi r^3
\]

We are given the radius, so substitute it into the formula

\[
V = \frac{4}{3} 3.14 * 1^3
\]

Simplify

\[
V = 4.18666666666667
\]

Round to the nearest hundredth

The Volume of the spherical Gasoline tank is 4.19 cubic feet, therefore it can store 4.19 cubic feet of Gasoline.

Type 4.19

A spherical tank will be used for the storage of Milk. The diameter of the Milk tank is 2 feet. What is the volume of Milk that the tank can hold (in cubic feet)? Use 3.14 for \( \pi \) and round to the nearest hundredth.

Algebraic Expression:

\( 4.19 \)

Hints:

Volume of A Sphere: \( V = \frac{4}{3} \pi r^3 \)
Volume of A Sphere: \( V = \frac{4}{3} \pi r^3 \)

Diameter \((D) = 2 \times \text{Radius} \((R)\) 

\[
\text{Radius} = \frac{\text{Diameter}}{2} \quad \text{Solve for Radius}
\]

Radius = \( \frac{2}{2} = 1 \quad \text{Plug in Diameter and Simplify} \)

\[
V = \frac{4}{3} \pi (1)^3 \quad \text{We solved for the radius (R = 1), so substitute it into the formula}
\]

\[
V = \frac{4}{3} 3.14 \times 1^3 \quad \text{Simplify}
\]

\[
V = 4.18666666666667 \quad \text{Round to the nearest hundredth}
\]

The Volume of the Sphere is 4.19 cubic feet and therefore it can hold 4.19 cubic feet of Milk.

Type 4.19
A spherical tank will be used for the storage of Gasoline. The radius of the Gasoline tank is 9 feet. What is the volume of Gasoline that the tank can hold (in cubic feet)?

Use 3.14 for Π and round to the nearest hundredth.

**Number:**

✓ 3052.08

**Hints:**

•

Volume of A Sphere: \( V = \frac{4}{3} \Pi * \text{radius}^3 \)

•

\[ V = \frac{4}{3} \times 3.14 \times 9^3 \quad \text{We are given the radius, so substitute it into the formula} \]

•

\[ V = \frac{4}{3} \times 3.14 \times 9^3 \]

\[ V = 3052.08 \quad \text{Simplify} \]

\[ V = 3052.08 \quad \text{Round to the nearest hundredth} \]

The Volume of the spherical Gasoline tank is 3052.08 cubic feet, therefore it can store 3052.08 cubic feet of Gasoline.

Type 3052.08

☐ 24) Problem #PRACHZU "PRACHZU - 60109 - Volume of Sphere (diameter)"

The sphere below has a diameter of 2 inches.
What is the volume of this sphere (in cubic inches)?

Use 3.14 for $\pi$ and round to the nearest hundredth.

**Algebraic Expression:**

✓ 4.19

**Hints:**

- Volume of A Sphere: $V = \frac{4}{3} \pi \cdot \text{radius}^3$

- Diameter (D) = 2 x Radius (R)

Radius = \frac{D}{2} \quad \text{Solve for Radius}

Radius = \frac{2}{2} = 1 \quad \text{Plug in Diameter and Simplify}

$V = \frac{4}{3} \pi \cdot \text{radius}^3$

$V = \frac{4}{3} \times 3.14 \times 1^3 \quad \text{We solved for the radius (R = 1), so substitute it into the formula}$
The Volume of the Sphere is 4.19 cubic inches.

Type 4.19

25) Problem #PRACH27 "PRACH27 - 60111 - Volume of Sphere (radius, word problem)"
A spherical tank will be used for the storage of Gasoline. The radius of the Gasoline tank is 5 feet. What is the volume of Gasoline that the tank can hold (in cubic feet)?

Use 3.14 for Π and round to the nearest hundredth.

Number:

√ 523.33

Hints:

•

Volume of A Sphere: \[ V = \frac{4}{3} \Pi \times \text{radius}^3 \]

•

\[ V = \frac{4}{3} \Pi \times \text{radius}^3 \]

\[ V = \frac{4}{3} \times 3.14 \times 5^3 \quad \text{We are given the radius, so substitute it into the formula} \]
\[ V = \frac{4}{3} \pi \cdot \text{radius}^3 \]

\[ V = \frac{4}{3} \cdot 3.14 \cdot 5^3 \]

\[ V = 523.33 \quad \text{Simplify} \]

\[ V = 523.33 \quad \text{Round to the nearest hundredth} \]

The Volume of the spherical Gasoline tank is 523.33 cubic feet, therefore it can store 523.33 cubic feet of Gasoline.

Type 523.33

26) Problem #PRACHZ4 "PRACHZ4 - 60109 - Volume of Sphere (diameter)"

The sphere below has a diameter of 14 inches.

What is the volume of this sphere (in cubic inches)?
Use 3.14 for \( \pi \) and round to the nearest hundredth.

**Algebraic Expression:**

\[ 1436.03 \]

**Hints:**

- Volume of A Sphere: \( V = \frac{4}{3} \pi \cdot \text{radius}^3 \)
Volume of A Sphere: \( V = \frac{4}{3} \pi \text{ radius}^3 \)

Diameter (D) = 2 x Radius (R)

Radius = \( \frac{\text{Diameter}}{2} \) \hspace{1cm} \text{Solve for Radius}

\[ \text{Radius} = \frac{14}{2} = 7 \] \hspace{1cm} \text{Plug in Diameter and Simplify}

\[ V = \frac{4}{3} \pi \text{ radius}^3 \]

\[ V = \frac{4}{3} \times 3.14 \times 7^3 \] \hspace{1cm} \text{We solved for the radius (R = 7), so substitute it into the formula}

\[ V = \frac{4}{3} \times 3.14 \times 343 \]

\[ V = 1436.02666666667 \] \hspace{1cm} \text{Simplify}

\[ V = 1436.03 \] \hspace{1cm} \text{Round to the nearest hundredth}

The Volume of the Sphere is 1436.03 cubic inches.

Type 1436.03
A spherical tank will be used for the storage of Water. The diameter of the Water tank is 4 feet. What is the volume of Water that the tank can hold (in cubic feet)? Use 3.14 for $\Pi$ and round to the nearest hundredth.

**Algebraic Expression:**

33.49

**Hints:**

1. Volume of a sphere: $V = \frac{4}{3} \Pi \times \text{radius}^3$

2. Diameter ($D$) = 2 x Radius ($R$)

   Radius = $\frac{D}{2}$

   Solve for Radius

   Radius = $\frac{4}{2} = 2$ Plug in Diameter and Simplify

   $V = \frac{4}{3} \Pi \times 2^3$ We solved for the radius ($R = 2$), so substitute it into the formula

   $V = \frac{4}{3} \times 3.14 \times 2^3$
V = 33.4933333333333 Simplify

V = 33.49 Round to the nearest hundredth

The Volume of the Sphere is 33.49 cubic feet and therefore it can hold 33.49 cubic feet of Water.

Type 33.49

28) Problem #PRACHZW "PRACHZW - 60109 - Volume of Sphere (diameter)"
The sphere below has a diameter of 10 inches.

What is the volume of this sphere (in cubic inches)?
Use 3.14 for Π and round to the nearest hundredth.

Algebraic Expression:

523.33

Hints:

• Volume of A Sphere: \( V = \frac{4}{3} \pi \cdot \text{radius}^3 \)
Diameter (D) = 2 x Radius (R)

Diameter
Radius = \frac{\text{Diameter}}{2} \quad \text{Solve for Radius}

\text{Radius} = \frac{10}{2} = 5 \quad \text{Plug in Diameter and Simplify}

V = \frac{4}{3} \pi \text{ radius}^3

V = \frac{4}{3} \cdot 3.14 \cdot 5^3 \quad \text{We solved for the radius (R = 5), so substitute it into the formula}

V = \frac{4}{3} \cdot 3.14 \cdot 5^3

V = 523.3333333333333 \quad \text{Simplify}

V = 523.33 \quad \text{Round to the nearest hundredth}

The Volume of the Sphere is 523.33 cubic inches.

Type 523.33

☐ 29) Problem #PRACH2X "PRACH2X - 60111 - Volume of Sphere (radius, word problem)"

A spherical tank will be used for the storage of Oil. The radius of the Oil tank is 7 feet. What is the volume of Oil that the tank can hold (in cubic feet)?
Use 3.14 for \( \pi \) and round to the nearest hundredth.

Number:

\[ \sqrt{1436.03} \]

Hints:

- Volume of a Sphere: \( V = \frac{4}{3} \pi \cdot r^3 \)

\[ V = \frac{4}{3} \pi \cdot 7^3 \]

We are given the radius, so substitute it into the formula

\[ V = \frac{4}{3} \times 3.14 \cdot 7^3 \]

\[ V = 1436.02666666667 \]

Simplify

\[ V = 1436.03 \]

Round to the nearest hundredth

The Volume of the spherical Oil tank is 1436.03 cubic feet, therefore it can store 1436.03 cubic feet of Oil.

Type 1436.03

30) Problem #PRACHZV "PRACHZV - 60109 - Volume of Sphere (diameter)"

The sphere below has a diameter of 16 inches.
What is the volume of this sphere (in cubic inches)?
Use 3.14 for \( \pi \) and round to the nearest hundredth.

**Algebraic Expression:**

\[ V = \frac{4}{3} \pi \text{ radius}^3 \]

Hints:

- \( \text{Volume of A Sphere: } V = \frac{4}{3} \pi \text{ radius}^3 \)

\( \text{Diameter (D)} = 2 \times \text{Radius (R)} \)

\[ \text{Radius} = \frac{\text{Diameter}}{2} \]

Solve for Radius

\[ \text{Radius} = \frac{16}{2} = 8 \]

Plug in Diameter and Simplify

\[ V = \frac{4}{3} \pi \text{ radius}^3 \]

\[ V = \frac{4}{3} \times 3.14 \times 8^3 \]

We solved for the radius \( R = 8 \), so substitute it into the formula
\[ V = \frac{4}{3} \pi \cdot r^3 \]

\[ V = \frac{4}{3} \cdot 3.14 \cdot 8^3 \]

\[ V = 2143.57 \quad \text{Round to the nearest hundredth} \]

The Volume of the Sphere is 2143.57 cubic inches.

Type 2143.57

---

31) Problem #PRACH2B "PRACH2B - 60110 - Volume of Sphere (diameter, word problem)"

A spherical tank will be used for the storage of Oil. The diameter of the Oil tank is 4 feet.

What is the volume of Oil that the tank can hold (in cubic feet)?

Use 3.14 for \( \pi \) and round to the nearest hundredth.

Algebraic Expression:

\( \sqrt{33.49} \)

Hints:

- Volume of A Sphere: \( V = \frac{4}{3} \pi \cdot r^3 \)

- Diameter (D) = 2 x Radius (R)

Radius = \frac{\text{Diameter}}{2} \quad \text{Solve for Radius}
Radius = \( \frac{4}{2} = 2 \)  Plug in Diameter and Simplify

\[
V = \frac{4}{3} \pi \cdot \text{radius}^3
\]

\[
V = \frac{4}{3} \cdot 3.14 \cdot 2^3
\]

We solved for the radius (\( R = 2 \)), so substitute it into the formula

\[
V = \frac{4}{3} \cdot 3.14 \cdot 2^3
\]

\[
V = \frac{33.5}{} 
\]

Simplify

\[
V = 33.49 
\]

Round to the nearest hundredth

The Volume of the Sphere is 33.49 cubic feet and therefore it can hold 33.49 cubic feet of Oil.

Type 33.49

32) Problem #PRACH3H "PRACH3H - 60108 - Volume of Sphere (radius)"
The sphere below has a radius of 8 inches.
What is the volume of this sphere (in cubic inches)?

Use 3.14 for Π and round to the nearest hundredth.

**Number:**

✓ 2143.57

**Hints:**

- **Volume of A Sphere:** $V = \frac{4}{3} \Pi \cdot \text{radius}^3$

- $V = \frac{4}{3} \times 3.14 \times 8^3$

  We are given the radius, so substitute it into the formula

- $V = \frac{4}{3} \times 3.14 \times 8^3$

- $V = \frac{4}{3} \times 3.14 \times 8^3$

$V = 2143.5733333333333$  
**Simplify**

$V = 2143.57$  
**Round to the nearest hundredth**
The Volume of the Sphere is 2143.57 cubic inches.

Type 2143.57

33) Problem #PRACH3Q "PRACH3Q - 60108 - Volume of Sphere (radius)"
The sphere below has a radius of 5 inches.

What is the volume of this sphere (in cubic inches)?

Use 3.14 for Π and round to the nearest hundredth.

Number:
✓ 523.33

Hints:
•
Volume of A Sphere: \( V = \frac{4}{3} \Pi * \text{radius}^3 \)

•
\[ V = \frac{4}{3} \Pi * \text{radius}^3 \]

\[ V = \frac{4}{3} * 3.14 * 5^3 \] We are given the radius, so substitute it into the formula

•
\[ V = 4 \Pi * \text{radius}^3 \]
\[
\begin{align*}
V &= \frac{4}{3} \pi r^3 \\
V &= \frac{4}{3} \times 3.14 \times 5^3 \\
V &= 523.333333333333 \\
&= 523.33 \\
&\text{Round to the nearest hundredth}
\end{align*}
\]

The Volume of the Sphere is 523.33 cubic inches.

Type 523.33

---

Problem #PRACHZ9 "PRACHZ9 - 60110 - Volume of Sphere (diameter, word problem)"

A spherical tank will be used for the storage of Paint. The diameter of the Paint tank is 10 feet. What is the volume of Paint that the tank can hold (in cubic feet)? Use 3.14 for \( \pi \) and round to the nearest hundredth.

**Algebraic Expression:**

\[ 523.33 \]

**Hints:**

- Volume of A Sphere: \( V = \frac{4}{3} \pi r^3 \)

- Diameter (D) = 2 x Radius (R)

- \[ \text{Radius} = \frac{\text{Diameter}}{2} \]

- Plug in Diameter and Simplify
\[
V = \frac{4}{3} \pi \times \text{radius}^3
\]

\[
V = \frac{4}{3} \times 3.14 \times 5^3
\]

We solved for the radius \( R = 5 \), so substitute it into the formula.

\[
V = \frac{4}{3} \times 3.14 \times 5^3
\]

\[
V = 523.33 \quad \text{Simplify}
\]

\[
V = 523.33 \quad \text{Round to the nearest hundredth}
\]

The Volume of the Sphere is 523.33 cubic feet and therefore it can hold 523.33 cubic feet of Paint.

Type 523.33

35) Problem #PRACHZY "PRACHZY - 60109 - Volume of Sphere (diameter)"
The sphere below has a diameter of 4 inches.
What is the volume of this sphere (in cubic inches)?
Use 3.14 for $\pi$ and round to the nearest hundredth.

**Algebraic Expression:**

- $33.49$

**Hints:**

- Volume of A Sphere: $V = \frac{4}{3} \pi \cdot \text{radius}^3$

- Diameter ($D$) = $2 \times$ Radius ($R$)

  \[
  \text{Radius} = \frac{D}{2} \quad \text{Solve for Radius}
  \]

  \[
  \text{Radius} = \frac{4}{2} = 2 \quad \text{Plug in Diameter and Simplify}
  \]

  \[
  V = \frac{4}{3} \pi \cdot \text{radius}^3
  \]

  \[
  V = \frac{4}{3} \times 3.14 \times 2^3 \quad \text{We solved for the radius (R = 2), so substitute it into the formula}
  \]
3

•

\[ V = \frac{4}{3} \pi \text{ radius}^3 \]

\[ V = \frac{4}{3} \times 3.14 \times 2^3 \]

\[ V = 33.4933333333333 \quad \text{Simplify} \]

\[ V = 33.49 \quad \text{Round to the nearest hundredth} \]

The Volume of the Sphere is 33.49 cubic inches.

Type 33.49

☐ 36) Problem #PRACH2J "PRACH2J - 60110 - Volume of Sphere (diameter, word problem)"

A spherical tank will be used for the storage of Milk. The diameter of the Milk tank is 2 feet. What is the volume of Milk that the tank can hold (in cubic feet)? Use 3.14 for \( \pi \) and round to the nearest hundredth.

Algebraic Expression:

✓ 4.19

Hints:

•

Volume of A Sphere: \[ V = \frac{4}{3} \pi \text{ radius}^3 \]

•

Volume of A Sphere: \[ V = \frac{4}{3} \pi \text{ radius}^3 \]

Diameter (D) = 2 x Radius (R)
Radius = \[ \frac{\text{Diameter}}{2} \] Solve for Radius
Radius = \( \frac{2}{2} = 1 \) \quad Plug in Diameter and Simplify

\[
V = \frac{4}{3} \pi \cdot \text{radius}^3
\]

\[
V = \frac{4}{3} \cdot 3.14 \cdot 1^3 \quad \text{We solved for the radius (R = 1), so substitute it into the formula}
\]

\[
V = \frac{4}{3} \cdot 3.14 \cdot 1^3
\]

\[
V = 4.18666666666667 \quad \text{Simplify}
\]

\[
V = 4.19 \quad \text{Round to the nearest hundredth}
\]

The Volume of the Sphere is 4.19 cubic feet and therefore it can hold 4.19 cubic feet of Milk.

Type 4.19

37) Problem #PRACH3Z "PRACH3Z - 60108 - Volume of Sphere (radius)"

The sphere below has a radius of 4 inches.
What is the volume of this sphere (in cubic inches)?

Use 3.14 for $\Pi$ and round to the nearest hundredth.

**Number:**

$\checkmark$ 267.95

**Hints:**

1. Volume of A Sphere: $V = \frac{4}{3} \Pi * \text{radius}^3$

2. We are given the radius, so substitute it into the formula $V = \frac{4}{3} 3.14 * 4^3$

3. Round to the nearest hundredth
The Volume of the Sphere is 267.95 cubic inches.
Type 267.95

38) Problem #PRACHZQ "PRACHZQ - 60109 - Volume of Sphere (diameter)"
The sphere below has a diameter of 20 inches.

What is the volume of this sphere (in cubic inches)?
Use 3.14 for $\Pi$ and round to the nearest hundredth.

Algebraic Expression:
✓ 4186.67

Hints:
•
Volume of A Sphere: $V = \frac{4}{3} \Pi \times \text{radius}^3$

•
Volume of A Sphere: $V = \frac{4}{3} \Pi \times \text{radius}^3$

Diameter (D) = 2 x Radius (R)
\[ \text{Radius} = \frac{\text{Diameter}}{2} \quad \text{Solve for Radius} \]
Radius = \( \frac{20}{2} = 10 \) \hspace{10mm} \text{Plug in Diameter and Simplify}

\[ V = \frac{4}{3} \pi \times \text{radius}^3 \]

\[ V = \frac{4}{3} \times 3.14 \times 10^3 \] \hspace{10mm} \text{We solved for the radius (R = 10), so substitute it into the formula}

\[ V = \frac{4}{3} \times 3.14 \times 10^3 \]

\[ V = 4186.67 \] \hspace{10mm} \text{Simplify}

\[ V = 4186.67 \] \hspace{10mm} \text{Round to the nearest hundredth}

The Volume of the Sphere is 4186.67 cubic inches.

Type 4186.67

---

39) Problem #PRACH2M "PRACH2M - 60110 - Volume of Sphere (diameter, word problem)"
A spherical tank will be used for the storage of Water. The diameter of the Water tank is 20 feet. What is the volume of Water that the tank can hold (in cubic feet)? Use 3.14 for \( \pi \) and round to the nearest hundredth.

\textbf{Algebraic Expression:} \hspace{10mm} 4186.67
Hints:

- Volume of A Sphere: \( V = \frac{4}{3} \pi \times \text{radius}^3 \)

- Volume of A Sphere: \( V = \frac{4}{3} \pi \times \text{radius}^3 \)

Diameter (D) = 2 x Radius (R)

\[
\text{Radius} = \frac{\text{Diameter}}{2} \quad \text{Solve for Radius}
\]

\[
\text{Radius} = \frac{20}{2} = 10 \quad \text{Plug in Diameter and Simplify}
\]

- \( V = \frac{4}{3} \pi \times \text{radius}^3 \)

\[
V = \frac{4}{3} \times 3.14 \times 10^3 \quad \text{We solved for the radius (R = 10), so substitute it into the formula}
\]

- \( V = \frac{4}{3} \pi \times \text{radius}^3 \)

\[
V = \frac{4}{3} \times 3.14 \times 10^3
\]

\[
V = 4186.6666666667 \quad \text{Simplify}
\]

\[
V = 4186.67 \quad \text{Round to the nearest hundredth}
\]

The Volume of the Sphere is 4186.67 cubic feet and therefore it can hold 4186.67 cubic feet of Water.
The sphere below has a radius of 4 inches.

What is the volume of this sphere (in cubic inches)?

Use $3.14$ for $\Pi$ and round to the nearest hundredth.

**Number:**

✓ 267.95

**Hints:**

- Volume of A Sphere: $V = \frac{4}{3} \Pi * radius^3$

- $V = \frac{4}{3} \Pi * radius^3$

- $V = \frac{4}{3} 3.14 * 4^3$  We are given the radius, so substitute it into the formula

- $V = \frac{4}{3} 3.14 * 4^3$

- $V = 4 3.14 * 4^3$
The volume of the sphere is 267.95 cubic inches.

Type 267.95
Radius = \frac{14}{2} = 7 \quad \text{Plug in Diameter and Simplify}

\begin{align*}
V &= \frac{4}{3} \pi \times \text{radius}^3 \\
V &= \frac{4}{3} \times 3.14 \times 7^3 \\
\text{We solved for the radius (R = 7), so substitute it into the formula}
\end{align*}

\begin{align*}
V &= \frac{4}{3} \times 3.14 \times 7^3 \\
\text{Simplify}
\end{align*}

\begin{align*}
V &= 1436.02666666667 \\
V &= 1436.03 \quad \text{Round to the nearest hundredth}
\end{align*}

The Volume of the Sphere is 1436.03 cubic inches.

Type 1436.03

42) Problem #PRACH3X "PRACH3X - 60108 - Volume of Sphere (radius)"
The sphere below has a radius of 4 inches.
What is the volume of this sphere (in cubic inches)?

Use 3.14 for π and round to the nearest hundredth.

**Number:**

✓ 267.95

**Hints:**

- Volume of a Sphere: \( V = \frac{4}{3} \pi \times \text{radius}^3 \)

- \( V = \frac{4}{3} \pi \times \text{radius}^3 \)

- \( V = \frac{4}{3} \times 3.14 \times 4^3 \)  We are given the radius, so substitute it into the formula

- \( V = \frac{4}{3} \times 3.14 \times 4^3 \)

- Simplify

- \( V = 267.94666666667 \)

- Round to the nearest hundredth

The Volume of the Sphere is 267.95 cubic inches.
A spherical tank will be used for the storage of Water. The diameter of the Water tank is 2 feet. What is the volume of Water that the tank can hold (in cubic feet)? Use 3.14 for Π and round to the nearest hundredth.

Algebraic Expression:

\[ V = \frac{4}{3} \pi r^3 \]

Hints:

- Volume of A Sphere: \( V = \frac{4}{3} \pi r^3 \)
- \( \text{Diameter (D)} = 2 \times \text{Radius (R)} \)
- \( \text{Radius} = \frac{\text{Diameter}}{2} \)
- \( \text{Radius} = \frac{2}{2} = 1 \) Plug in Diameter and Simplify
- We solved for the radius (\( R = 1 \)) so substitute it into the formula

\[ V = \frac{4}{3} \pi \cdot 1^3 \]
\[ V = \frac{4}{3} \pi \times 1^3 \]

\[ V = 4.18666666666667 \quad \text{Simplify} \]

\[ V = 4.19 \quad \text{Round to the nearest hundredth} \]

The Volume of the Sphere is 4.19 cubic feet and therefore it can hold 4.19 cubic feet of Water.

Type 4.19

☐ 44) Problem #PRACHZ8 "PRACHZ8 - 60110 - Volume of Sphere (diameter, word problem)"

A spherical tank will be used for the storage of Gasoline. The diameter of the Gasoline tank is 8 feet. What is the volume of Gasoline that the tank can hold (in cubic feet)?

Use 3.14 for \( \pi \) and round to the nearest hundredth.

Algebraic Expression:

✓ 267.95

Hints:

• Volume of A Sphere: \( V = \frac{4}{3} \pi \times \text{radius}^3 \)

• Volume of A Sphere: \( V = \frac{4}{3} \pi \times \text{radius}^3 \)

Diameter (D) = 2 x Radius (R)

\[
\text{Radius} = \frac{\text{Diameter}}{2} \quad \text{Solve for Radius}
\]

Radius = \( \frac{8}{2} = 4 \quad \text{Plug in Diameter and Simplify} \)
\[
V = \frac{4}{3} \pi \cdot \text{radius}^3
\]

\[
V = \frac{4}{3} \cdot 3.14 \cdot 4^3
\]

We solved for the radius \((R = 4)\), so substitute it into the formula

\[
V = \frac{4}{3} \cdot 3.14 \cdot 4^3
\]

\[
V = 267.946666666667 \quad \text{Simplify}
\]

\[
V = 267.95 \quad \text{Round to the nearest hundredth}
\]

The Volume of the Sphere is 267.95 cubic feet and therefore it can hold 267.95 cubic feet of Gasoline.

Type 267.95
Volume of A Sphere: \( V = \frac{4}{3} \pi \cdot \text{radius}^3 \)

Diameter (D) = 2 x Radius (R)  
\[
\text{Radius} = \frac{\text{Diameter}}{2} \quad \text{Solve for Radius}
\]

\[
\text{Radius} = \frac{8}{2} = 4 \quad \text{Plug in Diameter and Simplify}
\]

\[
V = \frac{4}{3} \pi \cdot 4^3 \quad \text{We solved for the radius (R = 4), so substitute it into the formula}
\]

\[
V = \frac{4}{3} \cdot 3.14 \cdot 4^3
\]

\[
V = 267.946666666667 \quad \text{Simplify}
\]

\[
V = 267.95 \quad \text{Round to the nearest hundredth}
\]

The Volume of the Sphere is 267.95 cubic feet and therefore it can hold 267.95 cubic feet of Oil.

Type 267.95
The sphere below has a radius of 5 inches.

What is the volume of this sphere (in cubic inches)?

Use 3.14 for Π and round to the nearest hundredth.

Number:

523.33

Hints:

1. Volume of A Sphere: \( V = \frac{4}{3} \Pi \times \text{radius}^3 \)

2. \( V = \frac{4}{3} \times 3.14 \times 5^3 \)  We are given the radius, so substitute it into the formula

3. \( V = \frac{4}{3} \times 3.14 \times 5^3 \)

4. \( V = \frac{4}{3} \times 3.14 \times 5^3 \)  Simplify
The Volume of the Sphere is 523.33 cubic inches.

Type 523.33

The sphere below has a radius of 8 inches.

What is the volume of this sphere (in cubic inches)?

Use 3.14 for $\Pi$ and round to the nearest hundredth.

Number:

2143.57

Hints:

•

Volume of A Sphere: $V = \frac{4}{3} \Pi * \text{radius}^3$

•

$V = \frac{4}{3} \Pi * \text{radius}^3$

$V = \frac{4}{3} 3.14 * 8^3$ We are given the radius, so substitute it into the formula

•

$V = \frac{4}{3} \Pi * \text{radius}^3$
The sphere below has a diameter of 2 inches.

What is the volume of this sphere (in cubic inches)?
Use 3.14 for $\Pi$ and round to the nearest hundredth.

Algebraic Expression:

$\checkmark$ 4.19

Hints:

- Volume of A Sphere: $V = \frac{4}{3} \Pi \cdot radius^3$

- Volume of A Sphere: $V = \frac{4}{3} \Pi \cdot radius^3$
Diameter (D) = 2 \times \text{Radius (R)}

\text{Radius} = \frac{\text{Diameter}}{2} \quad \text{Solve for Radius}

\text{Radius} = \frac{2}{2} = 1 \quad \text{Plug in Diameter and Simplify}

V = \frac{4}{3} \pi \times \text{radius}^3 \quad \text{We solved for the radius (R = 1), so substitute it into the formula}

V = \frac{4}{3} \times 3.14 \times 1^3

V = 4.18666666666667 \quad \text{Simplify}

V = 4.19 \quad \text{Round to the nearest hundredth}

The Volume of the Sphere is 4.19 cubic inches.

Type 4.19

☐ 49) Problem #PRACH22 "PRACH22 - 60111 - Volume of Sphere (radius, word problem)"

A spherical tank will be used for the storage of Oil. The radius of the Oil tank is 4 feet. What is the volume of Oil that the tank can hold (in cubic feet)?
Use 3.14 for $\pi$ and round to the nearest hundredth.

**Number:**

$\checkmark$ 267.95

**Hints:**

- Volume of A Sphere: $V = \frac{4}{3} \pi * \text{radius}^3$

- $V = \frac{4}{3} \pi * \text{radius}^3$

  We are given the radius, so substitute it into the formula

- $V = \frac{4}{3} 3.14 * 4^3$

  Simplify

  $V = 267.946666666667$

  Round to the nearest hundredth

  $V = 267.95$

  The Volume of the spherical Oil tank is 267.95 cubic feet, therefore it can store 267.95 cubic feet of Oil.

  Type 267.95

☐ 50) Problem #PRACHZ2 "PRACHZ2 - 60109 - Volume of Sphere (diameter)"

The sphere below has a diameter of 14 inches.
What is the volume of this sphere (in cubic inches)?
Use 3.14 for $\pi$ and round to the nearest hundredth.

**Algebraic Expression:**

$\sqrt{1436.03}$

**Hints:**

- Volume of a Sphere: $V = \frac{4}{3} \pi \cdot \text{radius}^3$

- Diameter ($D$) = $2 \times$ Radius ($R$)
  
  Radius = \frac{D}{2} \quad \text{Solve for Radius}

Radius = \frac{14}{2} = 7 \quad \text{Plug in Diameter and Simplify}

$V = \frac{4}{3} \pi \cdot \text{radius}^3$

$V = \frac{4}{3} \cdot 3.14 \cdot 7^3 \quad \text{We solved for the radius (R = 7), so substitute it into the formula}$
\[ V = \frac{4}{3} \pi \cdot r^3 \]

\[ V = \frac{4}{3} \cdot 3.14 \cdot 7^3 \]

\[ V = 1436.02666666667 \quad \text{Simplify} \]

\[ V = 1436.03 \quad \text{Round to the nearest hundredth} \]

The Volume of the Sphere is 1436.03 cubic inches.

Type 1436.03

51) Problem #PRACH2V "PRACH2V - 60111 - Volume of Sphere (radius, word problem)"

A spherical tank will be used for the storage of Oil. The radius of the Oil tank is 1 feet. What is the volume of Oil that the tank can hold (in cubic feet)?

Use 3.14 for \( \pi \) and round to the nearest hundredth.

Number:

\[ \checkmark 4.19 \]

Hints:

- Volume of A Sphere: \[ V = \frac{4}{3} \pi \cdot \text{radius}^3 \]

- \[ V = \frac{4}{3} \pi \cdot \text{radius}^3 \quad \text{We are given the radius, so substitute it into the formula} \]
V = \frac{4}{3} \pi r^3

V = \frac{4}{3} \times 3.14 \times 1^3

V = 4.18666666666667 \quad \text{Simplify}

V = 4.19 \quad \text{Round to the nearest hundredth}

The volume of the spherical Oil tank is 4.19 cubic feet, therefore it can store 4.19 cubic feet of Oil.

Type 4.19

52) Problem #PRACH3D "PRACH3D - 60111 - Volume of Sphere (radius, word problem)"
A spherical tank will be used for the storage of Milk. The radius of the Milk tank is 9 feet. What is the volume of Milk that the tank can hold (in cubic feet)?

Use 3.14 for \pi and round to the nearest hundredth.

Number:

\checkmark 3052.08

Hints:

- Volume of A Sphere: V = \frac{4}{3} \pi r^3

- V = \frac{4}{3} \pi r^3

- V = \frac{4}{3} \times 3.14 \times 9^3 \quad \text{We are given the radius, so substitute it into the formula}

- V = \frac{4}{3} \pi r^3

- V = \frac{4}{3} \times 3.14 \times 9^3
The Volume of the spherical Milk tank is 3052.08 cubic feet, therefore it can store 3052.08 cubic feet of Milk.

Type 3052.08

A spherical tank will be used for the storage of Gasoline. The radius of the Gasoline tank is 8 feet. What is the volume of Gasoline that the tank can hold (in cubic feet)?

Use 3.14 for Π and round to the nearest hundredth.

Number:

2143.57

Hints:

•

Volume of A Sphere: \( V = \frac{4}{3} \pi r^3 \)

•

\( V = \frac{4}{3} \pi r^3 \) 

We are given the radius, so substitute it into the formula

•

\( V = \frac{4}{3} \times 3.14 \times 8^3 \)

The Volume of the spherical Gasoline tank is 2143.57 cubic feet, therefore it can store 2143.57 cubic feet.
The sphere below has a radius of 9 inches.

What is the volume of this sphere (in cubic inches)?

Use 3.14 for \( \pi \) and round to the nearest hundredth.

**Number:**

\( \checkmark \) 3052.08

**Hints:**

- Volume of a Sphere: \[ V = \frac{4}{3} \pi r^3 \]

- \[ V = \frac{4}{3} \pi * 9^3 \] We are given the radius, so substitute it into the formula

- \[ V = \frac{4}{3} * 3.14 * 9^3 \]
The Volume of the Sphere is 3052.08 cubic inches.

Type 3052.08

A spherical tank will be used for the storage of Water. The diameter of the Water tank is 12 feet. What is the volume of Water that the tank can hold (in cubic feet)? Use 3.14 for \( \Pi \) and round to the nearest hundredth.

**Algebraic Expression:**

\[ V = \frac{4}{3} \pi \cdot \text{radius}^3 \]

**Hints:**

- Volume of A Sphere: \( V = \frac{4}{3} \pi \cdot \text{radius}^3 \)

- Diameter (D) = 2 x Radius (R)

\[
\text{Radius} = \frac{D}{2} \\
\text{Radius} = \frac{12}{2} = 6 \\
\text{Plug in Diameter and Simplify}
\]

- \( V = \frac{4}{3} \pi \cdot \text{radius}^3 \)

We solved for the radius \( R = 6 \), so substitute it into the formula
\[ V = \frac{4}{3} \pi \cdot r^3 \]

\[ V = \frac{4}{3} \cdot 3.14 \cdot 6^3 \]

\[ V = 904.32 \quad \text{Simplify} \]

\[ V = 904.32 \quad \text{Round to the nearest hundredth} \]

The Volume of the Sphere is 904.32 cubic feet and therefore it can hold 904.32 cubic feet of Water.

Type 904.32

56) Problem #PRACH3M "PRACH3M - 60108 - Volume of Sphere (radius)"

The sphere below has a radius of 7 inches.

![Diagram of a sphere]

What is the volume of this sphere (in cubic inches)?

Use 3.14 for \( \pi \) and round to the nearest hundredth.

Number:

\[ \checkmark \quad 1436.03 \]

Hints:
Volume of A Sphere: \( V = \frac{4}{3} \pi \text{ radius}^3 \)

\[ V = \frac{4}{3} \times 3.14 \times 7^3 \]

We are given the radius, so substitute it into the formula

\[ V = 1436.03 \]

Round to the nearest hundredth

The Volume of the Sphere is 1436.03 cubic inches.

Type 1436.03

57) Problem #PRACH2R "PRACH2R - 60110 - Volume of Sphere (diameter, word problem)"

A spherical tank will be used for the storage of Paint. The diameter of the Paint tank is 20 feet. What is the volume of Paint that the tank can hold (in cubic feet)?
Use 3.14 for \( \pi \) and round to the nearest hundredth.

Algebraic Expression:

\[ V = 1418.67 \]

Hints:

Volume of A Sphere: \( V = \frac{4}{3} \pi \text{ radius}^3 \)
Volume of A Sphere: \( V = \frac{4}{3} \pi \cdot \text{radius}^3 \)

Diameter (D) = 2 x Radius (R)

\[
\text{Radius} = \frac{\text{Diameter}}{2} \quad \text{Solve for Radius}
\]

\[
\begin{align*}
\text{Radius} &= \frac{20}{2} = 10 \quad \text{Plug in Diameter and Simplify}
\end{align*}
\]

\[
V = \frac{4}{3} \pi \cdot \text{radius}^3
\]

\[
V = \frac{4}{3} \cdot 3.14 \cdot 10^3 \quad \text{We solved for the radius (R = 10), so substitute it into the formula}
\]

\[
V = \frac{4}{3} \cdot 3.14 \cdot 10^3
\]

\[
V = 4186.66666666667 \quad \text{Simplify}
\]

\[
V = 4186.67 \quad \text{Round to the nearest hundredth}
\]

The Volume of the Sphere is 4186.67 cubic feet and therefore it can hold 4186.67 cubic feet of Paint.

Type 4186.67
The sphere below has a diameter of 6 inches.

What is the volume of this sphere (in cubic inches)?
Use 3.14 for $\Pi$ and round to the nearest hundredth.

**Algebraic Expression:**

✓ 113.04

**Hints:**

1. Volume of A Sphere: $V = \frac{4}{3} \Pi \cdot \text{radius}^3$

2. Diameter (D) = 2 x Radius (R)
   
   \[
   \text{Radius} = \frac{\text{Diameter}}{2} \quad \text{Solve for Radius}
   \]

   \[
   \text{Radius} = \frac{6}{2} = 3 \quad \text{Plug in Diameter and Simplify}
   \]

3. 
   \[
   V = \frac{4}{3} \Pi \cdot \text{radius}^3
   \]

   \[
   V = 4 \quad \text{We solved for the radius (R = 3), so substitute it into the formula}
   \]
The Volume of the Sphere is 113.04 cubic inches.
Type 113.04

59) Problem #PRACH2K “PRACH2K - 60110 - Volume of Sphere (diameter, word problem)”
A spherical tank will be used for the storage of Paint. The diameter of the Paint tank is 14 feet. What is the volume of Paint that the tank can hold (in cubic feet)? Use 3.14 for \(\Pi\) and round to the nearest hundredth.

Algebraic Expression:

\[
V = \frac{4}{3} \Pi \times radius^3
\]

\[
Diameter \ (D) = 2 \times Radius \ (R) \\
Radius = \frac{Diameter}{2} \quad \text{Solve for Radius}
\]

\[
V = 1436.03
\]

Hints:

\[
Volume \ of \ A \ Sphere: \ V = \frac{4}{3} \Pi \times radius^3
\]

\[
Volume \ of \ A \ Sphere: \ V = \frac{4}{3} \Pi \times radius^3
\]
Radius = \frac{14}{2} = 7 \quad \text{Plug in Diameter and Simplify}

V = \frac{4}{3} \pi r^3

V = \frac{4}{3} \cdot 3.14 \cdot 7^3 \quad \text{We solved for the radius (R = 7), so substitute it into the formula}

V = \frac{4}{3} \cdot 3.14 \cdot 7^3

V = 1436.02666666667 \quad \text{Simplify}

V = 1436.03 \quad \text{Round to the nearest hundredth}

The Volume of the Sphere is 1436.03 cubic feet and therefore it can hold 1436.03 cubic feet of Paint.

Type 1436.03
Hints:

- Volume of A Sphere: \( V = \frac{4}{3} \pi r^3 \)

- \( V = \frac{4}{3} \pi r^3 \)

- \( V = \frac{4}{3} \times 3.14 \times 10^3 \) \textit{ We are given the radius, so substitute it into the formula }

- \( V = \frac{4}{3} \times 3.14 \times 10^3 \)

- \( V = 4186.66666666667 \) \textit{ Simplify }

- \( V = 4186.67 \) \textit{ Round to the nearest hundredth }

The Volume of the spherical Gasoline tank is 4186.67 cubic feet, therefore it can store 4186.67 cubic feet of Gasoline.

Type 4186.67

☐ 61) Problem #PRACH3C "PRACH3C - 60111 - Volume of Sphere (radius, word problem)"

A spherical tank will be used for the storage of Oil. The radius of the Oil tank is 3 feet. What is the volume of Oil that the tank can hold (in cubic feet)?

Use 3.14 for \( \pi \) and round to the nearest hundredth.

Number:

\( \checkmark \) 113.04

Hints:

- Volume of A Sphere: \( V = \frac{4}{3} \pi r^3 \)
We are given the radius, so substitute it into the formula

\[ V = \frac{4}{3} \pi \times (3)^3 \]

\[ V = \frac{4}{3} \times 3.14 \times 3 \]

\[ V = 113.04 \]

Simplify

\[ V = 113.04 \]

Round to the nearest hundredth

The Volume of the spherical Oil tank is 113.04 cubic feet, therefore it can store 113.04 cubic feet of Oil.

Type 113.04

62) Problem #PRACH2Q "PRACH2Q - 60110 - Volume of Sphere (diameter, word problem)"

A spherical tank will be used for the storage of Water. The diameter of the Water tank is 20 feet. What is the volume of Water that the tank can hold (in cubic feet)? Use 3.14 for \( \pi \) and round to the nearest hundredth.

Algebraic Expression:

\[ 4186.67 \]

Hints:

1. \[ \text{Volume of A Sphere: } V = \frac{4}{3} \pi \times \text{radius}^3 \]

Diameter (D) = 2 x Radius (R)

Radius = \frac{\text{Diameter}}{2} \quad \text{Solve for Radius}
Radius = \frac{20}{2} = 10 \quad \text{Plug in Diameter and Simplify}

V = \frac{4}{3} \pi \cdot \text{radius}^3

V = \frac{4}{3} \cdot 3.14 \cdot 10^3 \quad \text{We solved for the radius (R = 10), so substitute it into the formula}

V = \frac{4}{3} \cdot 3.14 \cdot 10^3

V = 4186.66666666667 \quad \text{Simplify}

V = 4186.67 \quad \text{Round to the nearest hundredth}

The Volume of the Sphere is 4186.67 cubic feet and therefore it can hold 4186.67 cubic feet of Water.

Type 4186.67

63) Problem #PRACH2G "PRACH2G - 60110 - Volume of Sphere (diameter, word problem)"
A spherical tank will be used for the storage of Water. The diameter of the Water tank is 8 feet.
What is the volume of Water that the tank can hold (in cubic feet)?
Use 3.14 for \pi and round to the nearest hundredth.

Algebraic Expression:
267.95
Hints:

- Volume of a Sphere: \( V = \frac{4}{3} \pi \times \text{radius}^3 \)

- Diameter (D) = 2 x Radius (R)
  
  \[
  \text{Radius} = \frac{\text{Diameter}}{2}
  \]

  Radius = \( \frac{8}{2} = 4 \)  Plug in Diameter and Simplify

- \( V = \frac{4}{3} \pi \times \text{radius}^3 \)

  \[
  V = \frac{4}{3} \times 3.14 \times 4^3
  \]

  We solved for the radius (R = 4), so substitute it into the formula

- \( V = \frac{4}{3} \pi \times \text{radius}^3 \)

  \[
  V = \frac{4}{3} \times 3.14 \times 4^3
  \]

  \[\text{Simplify} \]

  \[V = 267.946666666667\]

  \[\text{Round to the nearest hundredth} \]

  \[V = 267.95\]
The Volume of the Sphere is 267.95 cubic feet and therefore it can hold 267.95 cubic feet of Water.

Type 267.95

64) Problem #PRACH33 "PRACH33 - 60108 - Volume of Sphere (radius)"
The sphere below has a radius of 7 inches.

What is the volume of this sphere (in cubic inches)?

Use 3.14 for \( \pi \) and round to the nearest hundredth.

**Number:**

✓ 1436.03

**Hints:**

- Volume of A Sphere: \( V = \frac{4}{3} \pi \times \text{radius}^3 \)

- \( V = \frac{4}{3} \pi \times \text{radius}^3 \)  We are given the radius, so substitute it into the formula

- \( V = \frac{4}{3} \times 3.14 \times 7^3 \)
The Volume of the Sphere is 1436.03 cubic inches.

Type 1436.03
V = 33.49 \quad \text{Round to the nearest hundredth}

The Volume of the spherical Paint tank is 33.49 cubic feet, therefore it can store 33.49 cubic feet of Paint.

Type 33.49

66) Problem #PRACH3Y "PRACH3Y - 60108 - Volume of Sphere (radius)"
The sphere below has a radius of 8 inches.

What is the volume of this sphere (in cubic inches)?

Use 3.14 for Π and round to the nearest hundredth.

Number:

\checkmark 2143.57

Hints:

•

Volume of A Sphere: \( V = \frac{4}{3} \Pi * \text{radius}^3 \)

•

\( V = \frac{4}{3} \Pi * \text{radius}^3 \)

\( V = \frac{4}{3} 3.14 * 8^3 \) \quad \text{We are given the radius, so substitute it into the formula}

•

\( V = \frac{4}{3} \Pi * \text{radius}^3 \)
The sphere below has a diameter of 4 inches.

What is the volume of this sphere (in cubic inches)?
Use 3.14 for $\Pi$ and round to the nearest hundredth.

**Algebraic Expression:**

3.14

**Hints:**

- Volume of A Sphere: $V = \frac{4}{3} \Pi \times \text{radius}^3$

- Volume of A Sphere: $V = \frac{4}{3} \Pi \times \text{radius}^3$
Diameter (D) = 2 x Radius (R)

Radius = \frac{Diameter}{2} \quad \text{Solve for Radius}

\text{Radius} = \frac{4}{2} = 2 \quad \text{Plug in Diameter and Simplify}

V = \frac{4}{3} \pi \cdot \text{radius}^3

V = \frac{4}{3} \cdot 3.14 \cdot 2^3 \quad \text{We solved for the radius (R = 2), so substitute it into the formula}

V = \frac{4}{3} \cdot 3.14 \cdot 2^3

V = 33.49 \quad \text{Simplify}

V = 33.49 \quad \text{Round to the nearest hundredth}

The Volume of the Sphere is 33.49 cubic inches.

Type 33.49

A spherical tank will be used for the storage of Water. The diameter of the Water tank is 16 feet. What is the volume of Water that the tank can hold (in cubic feet)? Use 3.14 for \( \pi \) and round to the nearest hundredth.
Algebraic Expression:  

✓ 2143.57

Hints: 

• 

Volume of A Sphere: \( V = \frac{4}{3} \pi \cdot \text{radius}^3 \)


• 

Volume of A Sphere: \( V = \frac{4}{3} \pi \cdot \text{radius}^3 \)

\text{Diameter (D)} = 2 \times \text{Radius (R)}

\text{Diameter}

\text{Radius} = \frac{\text{Diameter}}{2} \quad \text{Solve for Radius}

\text{Radius} = \frac{16}{2} = 8 \quad \text{Plug in Diameter and Simplify}

• 

\( V = \frac{4}{3} \pi \cdot \text{radius}^3 \)

\[ V = \frac{4}{3} \cdot 3.14 \cdot 8^3 \quad \text{We solved for the radius (R = 8), so substitute it into the formula} \]

• 

\( V = \frac{4}{3} \pi \cdot \text{radius}^3 \)

\[ V = \frac{4}{3} \cdot 3.14 \cdot 8^3 \]

\[ V = 2143.5733333333 \quad \text{Simplify} \]
The Volume of the Sphere is 2143.57 cubic feet and therefore it can hold 2143.57 cubic feet of Water.

Type 2143.57

A spherical tank will be used for the storage of Milk. The radius of the Milk tank is 6 feet. What is the volume of Milk that the tank can hold (in cubic feet)?

Use 3.14 for \( \Pi \) and round to the nearest hundredth.

Number: 904.32

Hints:

- Volume of A Sphere: \( V = \frac{4}{3} \Pi * \text{radius}^3 \)

- \( V = \frac{4}{3} \Pi * \text{radius}^3 \) We are given the radius, so substitute it into the formula

- \( V = \frac{4}{3} \times 3.14 \times 6^3 \) Simplify

- \( V = 904.32 \) Round to the nearest hundredth

The Volume of the spherical Milk tank is 904.32 cubic feet, therefore it can store 904.32 cubic feet of Milk.
The sphere below has a diameter of 4 inches.

What is the volume of this sphere (in cubic inches)?
Use 3.14 for $\pi$ and round to the nearest hundredth.

**Algebraic Expression:**

$\checkmark$ 33.49

**Hints:**

- Volume of A Sphere: $V = \frac{4}{3} \pi \cdot \text{radius}^3$

- Diameter ($D$) = 2 x Radius ($R$)
  
  $\text{Radius} = \frac{D}{2}$  \hspace{1cm} \text{Solve for Radius}

Radius $= \frac{4}{2} = 2$  \hspace{1cm} \text{Plug in Diameter and Simplify}
We solved for the radius (R = 2), so substitute it into the formula.

$$V = \frac{4}{3} \pi r^3$$

$$V = \frac{4}{3} \times 3.14 \times 2^3$$

$$V = 33.49$$

The Volume of the Sphere is 33.49 cubic inches.

Type 33.49
Use 3.14 for \( \Pi \) and round to the nearest hundredth.

Number:

\[904.32\]

Hints:

- Volume of A Sphere: \( V = \frac{4}{3} \Pi * \text{radius}^3 \)

- \( V = \frac{4}{3} \Pi * \text{radius}^3 \)

- \( V = \frac{4}{3} \times 3.14 \times 6^3 \) \hspace{1cm} We are given the radius, so substitute it into the formula

- \( V = \frac{4}{3} \times 3.14 \times 6^3 \)

- \( V = 904.32 \) \hspace{1cm} Simplify

- \( V = 904.32 \) \hspace{1cm} Round to the nearest hundredth

The Volume of the Sphere is 904.32 cubic inches.

Type 904.32

---

72) Problem #PRACH2H "PRACH2H - 60110 - Volume of Sphere (diameter, word problem)"

A spherical tank will be used for the storage of Water. The diameter of the Water tank is 4 feet.
What is the volume of Water that the tank can hold (in cubic feet)?
Use 3.14 for \( \Pi \) and round to the nearest hundredth.

Algebraic Expression:

\[33.49\]
Hints:

\[ V = \frac{4}{3} \pi r^3 \]

Volume of A Sphere

\[ \text{Diameter (D)} = 2 \times \text{Radius (R)} \]
\[ \text{Radius} = \frac{D}{2} \]

Solve for Radius

\[ \text{Radius} = \frac{4}{2} = 2 \]

Plug in Diameter and Simplify

\[ V = \frac{4}{3} \pi (2)^3 \]

We solved for the radius \( (R = 2) \), so substitute it into the formula

\[ V = \frac{4}{3} \times 3.14 \times 2^3 \]

Simplify

\[ V = 33.49 \]

Round to the nearest hundredth

The Volume of the Sphere is 33.49 cubic feet and therefore it can hold 33.49 cubic feet of Water.
Problem #PRACHZR "PRACHZR - 60109 - Volume of Sphere (diameter)"

The sphere below has a diameter of 10 inches.

What is the volume of this sphere (in cubic inches)?
Use 3.14 for Π and round to the nearest hundredth.

Algebraic Expression:

523.33

Hints:

Volume of a Sphere: \( V = \frac{4}{3} \pi r^3 \)

Diameter (D) = 2 x Radius (R)

Radius = \( \frac{D}{2} \)

\[
\text{Radius} = \frac{10}{2} = 5 \quad \text{Plug in Diameter and Simplify}
\]
The sphere below has a radius of 8 inches.

The Volume of the Sphere is 523.33 cubic inches.

Type 523.33
What is the volume of this sphere (in cubic inches)?

Use 3.14 for \( \pi \) and round to the nearest hundredth.

Number:

\[ \boxed{2143.57} \]

Hints:

- Volume of A Sphere: \( V = \frac{4}{3} \pi \cdot \text{radius}^3 \)

- \[ V = \frac{4}{3} \times 3.14 \times 8^3 \]
  - We are given the radius, so substitute it into the formula

- \[ V = \frac{4}{3} \times 3.14 \times 8^3 \]

- \[ V = 2143.57333333333 \]
  - Simplify

- \[ V = 2143.57 \]
  - Round to the nearest hundredth

The Volume of the Sphere is 2143.57 cubic inches.

Type 2143.57
75) Problem #PRACH28 "PRACH28 - 60111 - Volume of Sphere (radius, word problem)"
A spherical tank will be used for the storage of Milk. The radius of the Milk tank is 4 feet. What is the volume of Milk that the tank can hold (in cubic feet)?

Use 3.14 for Π and round to the nearest hundredth.

Number:
✓ 267.95

Hints:

•
Volume of A Sphere: \( V = \frac{4}{3} \Pi \times \text{radius}^3 \)

•
\( V = \frac{4}{3} \Pi \times \text{radius}^3 \)

\( V = \frac{4}{3} \times 3.14 \times 4^3 \)  We are given the radius, so substitute it into the formula

•
\( V = \frac{4}{3} \Pi \times \text{radius}^3 \)

\( V = \frac{4}{3} \times 3.14 \times 4^3 \)

\( V = 267.946666666667 \)  Simplify

\( V = 267.95 \)  Round to the nearest hundredth

The Volume of the spherical Milk tank is 267.95 cubic feet, therefore it can store 267.95 cubic feet of Milk.

Type 267.95

76) Problem #PRACHZ5 "PRACHZ5 - 60109 - Volume of Sphere (diameter)"
The sphere below has a diameter of 10 inches.
What is the volume of this sphere (in cubic inches)?
Use 3.14 for \( \Pi \) and round to the nearest hundredth.

**Algebraic Expression:**

\[ V = \frac{4}{3} \Pi \times \text{radius}^3 \]

**Hints:**

1. Diameter (D) = 2 x Radius (R)
2. \[ \text{Radius} = \frac{\text{Diameter}}{2} \]
3. \[ V = \frac{4}{3} \Pi \times \text{radius}^3 \]

Plug in Diameter and Simplify

\[ V = \frac{4}{3} \times 3.14 \times 5^3 \]

We solved for the radius (R = 5), so substitute it into the formula...
V = \frac{4}{3} \pi \times 5^3

V = 523.33 \quad \text{Round to the nearest hundredth}

The Volume of the Sphere is 523.33 cubic inches.

Type 523.33
Radius = \frac{16}{2} = 8 \quad \text{Plug in Diameter and Simplify}

V = \frac{4\pi \cdot \text{radius}^3}{3}

V = \frac{4 \cdot 3.14 \cdot 8^3}{3} \quad \text{We solved for the radius (R = 8), so substitute it into the formula}

V = \frac{4 \cdot 3.14 \cdot 8^3}{3}

V = 2143.57333333333 \quad \text{Simplify}

V = 2143.57 \quad \text{Round to the nearest hundredth}

The Volume of the Sphere is 2143.57 cubic feet and therefore it can hold 2143.57 cubic feet of Water.

Type 2143.57
What is the volume of this sphere (in cubic inches)?

Use 3.14 for Π and round to the nearest hundredth.

**Number:**

✓ 33.49

**Hints:**

- Volume of A Sphere: $V = \frac{4}{3} \Pi \cdot \text{radius}^3$

- We are given the radius, so substitute it into the formula

$V = \frac{4}{3} \cdot 3.14 \cdot 2^3$

$V = 33.49333333333333$  
Simplify

$V = 33.49$  
Round to the nearest hundredth

The Volume of the Sphere is 33.49 cubic inches.

Type 33.49
The sphere below has a diameter of 14 inches.

What is the volume of this sphere (in cubic inches)? Use 3.14 for \( \pi \) and round to the nearest hundredth.

**Algebraic Expression:**

1436.03

**Hints:**

- Volume of A Sphere: \( V = \frac{4}{3} \pi \cdot \text{radius}^3 \)

- Diameter (D) = 2 x Radius (R)

Solve for Radius

Radius = \( \frac{14}{2} = 7 \)  Plug in Diameter and Simplify
V = \frac{4}{3} \pi r^3

V = \frac{4}{3} \times 3.14 \times 7^3

We solved for the radius (R = 7), so substitute it into the formula

V = \frac{4}{3} \times 3.14 \times 7^3

V = 1436.03

Round to the nearest hundredth

The Volume of the Sphere is 1436.03 cubic inches.

Type 1436.03

80) Problem #PRACH2Z "PRACH2Z - 60111 - Volume of Sphere (radius, word problem)"

A spherical tank will be used for the storage of Oil. The radius of the Oil tank is 6 feet. What is the volume of Oil that the tank can hold (in cubic feet)?

Use 3.14 for \pi and round to the nearest hundredth.

Number:

\checkmark 904.32

Hints:

Volume of A Sphere: V = \frac{4}{3} \pi r^3

V = 4
\[ V = \frac{4}{3} \pi r^3 \]  

We are given the radius, so substitute it into the formula

\[ V = \frac{4}{3} \cdot 3.14 \cdot 6^3 \]

\[ V = 904.32 \quad \text{Simplify} \]

\[ V = 904.32 \quad \text{Round to the nearest hundredth} \]

The Volume of the spherical Oil tank is 904.32 cubic feet, therefore it can store 904.32 cubic feet of Oil.

Type 904.32
Select All

1) Problem #PRADCK2 "PRADCK2 - 43232 - Factoring polynomials (Quadratic Formula)"

A) Solve for the two roots of the following equation,
(Round to the nearest thousandths if applicable, though the answer might not be a decimal.)

This problem is divided into two parts, you will first be asked for one root then the other:

$$3x^2 + 8x + 2 = 0$$

What is one root of this equation?

**Algebraic Expression:**

-0.279

-2.387

-0.279

-2.388

**Hints:**

- The polynomial does not factor easily so to find the roots of this equation, you can use the quadratic formula.

$$\frac{-b \pm \sqrt{b^2 - 4ac}}{2a}$$

- a, b, and c can be found here:

$$ax^2 + bx + c = 0$$

$$(3x^2) + 8x + 2$$

a = 3

b = 8

c = 2

- Now, you can just plug those terms into the quadratic formula.

Term A = 3   Term B = 8   Term C = 2

$$-8 \pm \sqrt{(8^2 - 4(3*2))}$$
Now let's simplify the expression for one of the roots. Here, we begin with general simplification.

\[-8 \pm \sqrt{(8^2 - 4(3 \times 2))}\]

\[\frac{2 \times 3}{2 \times 3}\]

\[-8 \pm \sqrt{(8^2 - 4(3 \times 2))}\]

\[\frac{2 \times 3}{2 \times 3}\]

\[-8 \pm \sqrt{(64 - 24)}\]

\[\frac{6}{6}\]

\[-8 \pm \sqrt{(40)}\]

\[\frac{6}{6}\]
Good! Now that the equation is simplified, you need to solve the equation. Here, we solve for the root with addition.

\[-8\pm 6.32455532033676 \div 6\]

\[\frac{-1.67544467966324}{6}\]

\[\text{root}_1 = -0.279240779943873\]

Now round to the nearest thousandth.

\[x = -0.279\]

Type in \(-0.279\).

The other root is also an acceptable answer.

B) \[3x^2 + 8x + 2 = 0\]
What is the value of the **remaining** root: *(Round to the nearest thousandths if applicable, though the answer might not be a decimal.)*

**Algebraic Expression:**

-2.387
-0.279
-0.279
-2.388

**Hints:**
- Remember we used the **quadratic** formula to get to this point:

\[ \frac{-8 \pm \sqrt{6.32455532033676}}{6} \]

- Since we used addition on the previous root we must use **subtraction** here rather than addition.
- Now we will use subtraction to get the remaining root.

\[ \frac{-14.3245553203368}{6} \]

Root 2 = -2.38742588672279

Now round to the nearest thousandth.

x = -2.387
Type in -2.387

---

2) Problem #PRADCK3 "PRADCK3 - 43232 - Factoring polynomials (Quadratic Formula)"

A) Solve for the two **roots** of the following equation,
*(Round to the nearest thousandths if applicable, though the answer might not be a decimal.)*

This problem is divided into two parts, you will first be asked for one root then the other:

\[ 2x^2 + 6x + 3 = 0 \]
What is one root of this equation?

**Algebraic Expression:**

-0.634
-2.366
-0.634
-2.366

**Hints:**
- The polynomial does not factor easily so to find the roots of this equation, you can use the **quadratic** formula.

\[
\frac{-b \pm \sqrt{b^2 - 4ac}}{2a}
\]

- a, b, and c can be found here:

\[ax^2 + bx + c = 0\]

\[(2x^2) + 6x + 3\]

\[a = 2\]
\[b = 6\]
\[c = 3\]

- Now, you can just plug those terms into the **quadratic** formula. 
Term A = 2  Term B = 6  Term C = 3

\[
\frac{-6 \pm \sqrt{(6^2 - 4(2*3))}}{2*2}
\]

- Now lets simplify the expression for one of the roots. Here, we begin with general simplification.
\[-\frac{6 \pm \sqrt{(6^2 - 4(2 \times 3))}}{2 \times 2}\]

\[-\frac{6 \pm \sqrt{(6^2 - 4(2 \times 3))}}{2 \times 2}\]

\[-6 \pm \sqrt{(36 - 24)}\]

\[-6 \pm \sqrt{(12)}\]

\[-6 \pm 3.46410161513775\]

Good! Now that the equation is simplified, you need to solve the equation. Here, we solve for the root with addition.
Now round to the nearest thousandth.

\[ x = -0.634 \]
Type in -0.634
The other root is also an acceptable answer.

B) \( 2x^2 + 6x + 3 = 0 \)

What is the value of the remaining root: (Round to the nearest thousandths if applicable, though the answer might not be a decimal.)

**Algebraic Expression:**

-2.366
-0.634
-0.634
-0.634
-2.366

**Hints:**
- Remember we used the quadratic formula to get to this point:
Since we used addition on the previous root we must use subtraction here rather than addition.

Now we will use subtraction to get the remaining root.

\[
\frac{-6 - 3.46410161513775}{4}
\]

\[
\frac{-9.46410161513775}{4}
\]

Root 2 = -2.36602540378444

Now round to the nearest thousandth.

\[x = -2.366\]

Type in -2.366

3) Problem #PRADCK4 "PRADCK4 - 43232 - Factoring polynomials (Quadratic Formula)"

A) Solve for the two roots of the following equation,
   (Round to the nearest thousandths if applicable, though the answer might not be a decimal.)

This problem is divided into two parts, you will first be asked for one root then the other:

\[2x^2 + 6x + 3 = 0\]

What is one root of this equation?

**Algebraic Expression:**

-0.634
-2.366

**Hints:**

- The polynomial does not factor easily so to find the roots of this equation, you can use the quadratic formula.

\[-b \pm \sqrt{b^2 - 4ac}\]
2a

- a, b, and c can be found here:

\[ ax^2 + bx + c = 0 \]

\[(2x^2)+6x+3\]

\[ a = 2 \]
\[ b = 6 \]
\[ c = 3 \]

- Now, you can just plug those terms into the quadratic formula. Term A = 2 Term B = 6 Term C = 3

\[-6 \pm \sqrt{(6^2 - 4(2*3))} \]
\[ 2*2 \]

- Now lets simplify the expression for one of the roots. Here, we begin with general simplification.

\[-6 \pm \sqrt{(36 - 24)} \]
\[ 4 \]
-6±√(12)
  4

-6±3.46410161513775
  4

Good! Now that the equation is simplified, you need to solve the equation. Here, we solve for the root with addition.

(-6+3.46410161513775)
  4

-2.53589838486225
  4
\[ \text{root}_1 = -0.633974596215563 \]

Now round to the nearest thousandth.

\[ x = -0.634 \]

Type in \(-0.634\)

The other root is also an acceptable answer.

**B)** \(2x^2 + 6x + 3 = 0\)

What is the value of the remaining root: (Round to the nearest thousandths if applicable, though the answer might not be a decimal.)

**Algebraic Expression:**

\[ \checkmark -2.366 \]
\[ \checkmark -0.634 \]
\[ \checkmark -0.634 \]
\[ \checkmark -2.364 \]
\[ \checkmark -2.366 \]

**Hints:**

- Remember we used the **quadratic** formula to get to this point:

\[
\frac{-6 \pm 3.46410161513775}{4}
\]

- Since we used addition on the previous root we must use **subtraction** here rather than addition.
- Now we will use subtraction to get the remaining root.

\[
\frac{(-6-3.46410161513775)}{4}
\]

\[ -9.46410161513775 \]

\[ 4 \]

\[ \text{root}_2 = -2.36602540378444 \]
Now round to the nearest thousandth.

\[ x = -2.366 \]
Type in -2.366

4) Problem #PRADCK5 "PRADCK5 - 43232 - Factoring polynomials (Quadratic Formula)"

A) Solve for the two roots of the following equation,

(Round to the nearest thousandths if applicable, though the answer might not be a decimal.)

This problem is divided into two parts, you will first be asked for one root then the other:

\[ 2x^2 + 8x + 2 = 0 \]

What is one root of this equation?

**Algebraic Expression:**

✓ -0.268
✓ -3.732
✓ -0.268
✓ -3.732

**Hints:**

- The polynomial does not factor easily so to find the roots of this equation, you can use the quadratic formula.

\[
\frac{-b \pm \sqrt{b^2 - 4ac}}{2a}
\]

- a, b, and c can be found here:

\[ ax^2 + bx + c = 0 \]

(2*x^2)+8x+2

\[ a = 2 \]
\[ b = 8 \]
\[ c = 2 \]

- Now, you can just plug those terms into the quadratic formula.

Term A = 2   Term B = 8   Term C = 2
Now lets simplify the expression for one of the roots. Here, we begin with general simplification.

\[-8 \pm \sqrt{(8^2 - 4(2*2))} \div 2*2\]

\[-8 \pm \sqrt{(64 - 16)} \div 4\]

\[-8 \pm \sqrt{48} \div 4\]
-8±6.92820323027551
4

Good! Now that the equation is simplified, you need to solve the equation. Here, we solve for the root with addition.

(-8+6.92820323027551)
4

-1.07179676972449
4

root1 = -0.267949192431123

Now round to the nearest thousandth.

x = -0.268
Type in -0.268
The other root is also an acceptable answer.

B) $2x^2 + 8x + 2 = 0$
What is the value of the **remaining** root: (Round to the nearest thousandths if applicable, though the answer might not be a decimal.)

**Algebraic Expression:**

-3.732
-0.268
-0.268
-3.732

**Hints:**

- Remember we used the **quadratic** formula to get to this point:

\[ -8 \pm \sqrt{6.92820323027551} \]

\[ \frac{4}{4} \]

- Since we used addition on the previous root we must use **subtraction** here rather than addition.
- Now we will use subtraction to get the remaining root.

\[ (-8 - \sqrt{6.92820323027551}) \]

\[ \frac{4}{4} \]

\[ -14.9282032302755 \]

\[ \frac{4}{4} \]

root 2 = -3.73205080756888

Now round to the nearest thousandth.

\[ x = -3.732 \]

Type in -3.732

5) Problem #PRADCK6 "PRADCK6 - 43232 - Factoring polynomials (Quadratic Formula)"

A) Solve for the two **roots** of the following equation,

(Round to the nearest thousandths if applicable, though the answer might not be a decimal.)

This problem is divided into two parts, you will first be asked for one root then the other:

\[ 2x^2 + 6x + 1 = 0 \]
What is one root of this equation?

Algebraic Expression:

\[
\begin{align*}
\checkmark & -0.177 \\
\checkmark & -2.823 \\
\checkmark & -0.177 \\
\checkmark & -2.823
\end{align*}
\]

Hints:
- The polynomial does not factor easily so to find the roots of this equation, you can use the quadratic formula.

\[
\frac{-b \pm \sqrt{b^2 - 4ac}}{2a}
\]
- \(a\), \(b\), and \(c\) can be found here:

\[
ax^2 + bx + c = 0
\]

\[
(2x^2)+6x+1
\]

\[
a = 2 \\
b = 6 \\
c = 1
\]

- Now, you can just plug those terms into the quadratic formula. Term A = 2 Term B = 6 Term C = 1

\[
\frac{-6 \pm \sqrt{(6^2 - 4(2*1))}}{2*2}
\]

Now lets simplify the expression for one of the roots. Here, we begin with general simplification.
\[-6 \pm \sqrt{(6^2 - 4(2*1))} \]
\[\frac{2*2}{2*2}\]

\[-6 \pm \sqrt{(6^2 - 4(2*1))} \]
\[\frac{2*2}{2*2}\]

\[-6 \pm \sqrt{36 - 8} \]
\[\frac{4}{4}\]

\[-6 \pm \sqrt{28} \]
\[\frac{4}{4}\]

\[-6 \pm 5.29150262212918 \]
\[\frac{4}{4}\]

Good! Now that the equation is simplified, you need to solve the equation. Here, we solve for the root with addition.
Now round to the nearest thousandth.

\[ x = -0.177 \]

Type in \(-0.177\)

The other root is also an acceptable answer.

B) \(2x^2 + 6x + 1 = 0\)

What is the value of the remaining root: (Round to the nearest thousandths if applicable, though the answer might not be a decimal.)

**Algebraic Expression:**

-2.823 
-0.177
-0.177
-0.177
-2.823

**Hints:**
- Remember we used the quadratic formula to get to this point:
Since we used addition on the previous root we must use **subtraction** here rather than addition.

Now we will use subtraction to get the remaining root.

\[
\frac{-6-5.29150262212918}{4} = \frac{-11.2915026221292}{4}
\]

Root 2 = -2.82287565553229

Now round to the nearest thousandth.

x = -2.823

Type in -2.823

6) Problem #PRADCK7 "PRADCK7 - 43232 - Factoring polynomials (Quadratic Formula)"

A) Solve for the two roots of the following equation,

(Round to the nearest thousandths if applicable, though the answer might not be a decimal.)

This problem is divided into two parts, you will first be asked for one root then the other:

\[3x^2 + 6x + 1 = 0\]

What is one root of this equation?

**Algebraic Expression:**

✓ -0.184
✓ -1.816
✓ -0.184
✓ -1.817

**Hints:**

- The polynomial does not factor easily so to find the roots of this equation, you can use the **quadratic** formula.

\[-b \pm \sqrt{b^2 - 4ac}\]
2a

- a, b, and c can be found here:

\[ ax^2 + bx + c = 0 \]

\[(3x^2) + 6x + 1\]

\[ a = 3 \]
\[ b = 6 \]
\[ c = 1 \]

- Now, you can just plug those terms into the **quadratic** formula.

Term A = 3  Term B = 6  Term C = 1

\[ \frac{-b \pm \sqrt{b^2 - 4ac}}{2a} \]

\[ \frac{-6 \pm \sqrt{(6^2 - 4(3*1))}}{2*3} \]

- Now let's simplify the expression for one of the roots. Here, we begin with general simplification.

\[ \frac{-6 \pm \sqrt{(36 - 12)}}{2*3} \]

\[ \frac{-6 \pm \sqrt{24}}{6} \]
\[
-6 \pm \sqrt{24}
\]
\[
\frac{-6 \pm \sqrt{24}}{6}
\]

Good! Now that the equation is simplified, you need to solve the equation. Here, we solve for the root with addition.

\[
(\frac{-6 + 4.89897948556636}{6})
\]

\[
\frac{-1.10102051443364}{6}
\]
\[ \text{root1} = -0.183503419072273 \]

Now round to the nearest thousandth.

\[ x = -0.184 \]

Type in \(-0.184\)

The other root is also an acceptable answer.

B) \[ 3x^2 + 6x + 1 = 0 \]

What is the value of the \textit{remaining} root: \hspace{1em} (Round to the nearest thousandths if applicable, though the answer might not be a decimal.)

\textbf{Algebraic Expression:}

\checkmark -1.816
\checkmark -0.184
\checkmark -0.184
\checkmark -0.184
\checkmark -1.817

\textbf{Hints:}

- Remember we used the \textit{quadratic} formula to get to this point:

\[-6 \pm 4.89897948556636 \]

\[ \frac{6}{6} \]

- Since we used addition on the previous root we must use \textit{subtraction} here rather than addition.

- Now we will use subtraction to get the remaining root.

\[ (-6 - 4.89897948556636) \]

\[ \frac{6}{6} \]

\[ -10.8989794855664 \]

\[ \frac{6}{6} \]

\[ \text{root 2} = -1.81649658092773 \]
Now round to the nearest thousandth.

x = -1.816
Type in -1.816

7) Problem #PRADCK8 "PRADCK8 - 43232 - Factoring polynomials (Quadratic Formula)"
A) Solve for the two roots of the following equation,
(Round to the nearest thousandths if applicable, though the answer might not be a decimal.)

This problem is divided into two parts, you will first be asked for one root then the other:

\[ 1x^2 + 9x + 1 = 0 \]

What is one root of this equation?

**Algebraic Expression:**

-0.113
-8.887
-0.113
-8.888

**Hints:**

- The polynomial does not factor easily so to find the roots of this equation, you can use the quadratic formula.

\[ \frac{-b \pm \sqrt{b^2 - 4ac}}{2a} \]

- a, b, and c can be found here:

\[ ax^2 + bx + c = 0 \]

\[ (1x^2) + 9x + 1 \]

a = 1
b = 9
c = 1

- Now, you can just plug those terms into the quadratic formula.
Term A = 1 Term B = 9 Term C = 1
Now let's simplify the expression for one of the roots. Here, we begin with general simplification.

\[-9 \pm \sqrt{(9^2 - 4(1 \times 1))} \]
\[\quad \div 2 \times 1\]

\[-9 \pm \sqrt{(81 - 4)} \]
\[\quad \div 2\]

\[-9 \pm \sqrt{77} \]
\[\quad \div 2\]
Good! Now that the equation is simplified, you need to solve the equation. Here, we solve for the root with addition.

\[
\frac{-9 \pm 8.77496438739212}{2}
\]

\[
\frac{( -9 + 8.77496438739212)}{2} = \frac{-0.225035612607879}{2}
\]

\[
\text{root1} = -0.11251780630394
\]

Now round to the nearest thousandth.

\[x = -0.113\]

Type in \[-0.113\]

The other root is also an acceptable answer.

B) \[x^2 + 9x + 1 = 0\]
What is the value of the remaining root:  
(Round to the nearest thousandths if applicable, though the answer might not be a decimal.)

**Algebraic Expression:**

-8.887
-0.113
-0.113
-8.888

**Hints:**
- Remember we used the **quadratic** formula to get to this point:

\[ \frac{-9 \pm \sqrt{8.77496438739212}}{2} \]

- Since we used addition on the previous root we must use subtraction here rather than addition.
- Now we will use subtraction to get the remaining root.

\[ \frac{(-9-8.77496438739212)}{2} \]

\[ -17.7749643873921 \]

root 2 = -8.88748219369606

Now round to the nearest thousandth.

x = -8.887
Type in -8.887

---

8) Problem #PRADCK9 "PRADCK9 - 43232 - Factoring polynomials (Quadratic Formula)"

A) Solve for the two roots of the following equation,
(Round to the nearest thousandths if applicable, though the answer might not be a decimal.)

This problem is divided into two parts, you will first be asked for one root then the other:

\[ x^2+7x+2 = 0 \]
What is one root of this equation?

**Algebraic Expression:**
-0.298
-6.702
-0.299
-6.702

**Hints:**
- The polynomial does not factor easily so to find the roots of this equation, you can use the **quadratic** formula.

\[-\frac{b \pm \sqrt{(b^2 - 4ac)}}{2a}\]

- a, b, and c can be found here:

\[ax^2 + bx + c = 0\]

\[(1x^2) + 7x + 2\]

- \(a = 1\)
- \(b = 7\)
- \(c = 2\)

- Now, you can just plug those terms into the **quadratic** formula.

Term A = 1   Term B = 7   Term C = 2

\[-\frac{7 \pm \sqrt{(7^2 - 4(1*2))}}{2*1}\]

- Now lets simplify the expression for one of the roots. Here, we begin with general simplification.
\[-7 \pm \sqrt{(7^2 - 4(1 \times 2))} \]
\[= \frac{-7 \pm \sqrt{(49 - 8)}}{2} \]
\[= \frac{-7 \pm \sqrt{41}}{2} \]
\[= \frac{-7 \pm 6.40312423743285}{2} \]

Good! Now that the equation is simplified, you need to solve the equation. Here, we solve for the root with addition.
(-7+6.40312423743285)

\[ \frac{2}{2} \]

\[ -0.59687576256715 \]

\[ -0.298437881283575 \]

root1 = -0.298437881283575

Now round to the nearest thousandth.

\( x = -0.298 \)

Type in -0.298

The other root is also an acceptable answer.

B) \( 1x^2+7x+2 = 0 \)

What is the value of the remaining root:  (Round to the nearest thousandths if applicable, though the answer might not be a decimal.)

Algebraic Expression:

✓ -6.702
✓ -0.298
✓ -0.299
✓ -6.702

Hints:

- Remember we used the quadratic formula to get to this point:

\[ -7\pm6.40312423743285 \]

\[ \frac{2}{2} \]
Since we used addition on the previous root we must use **subtraction** here rather than addition.

Now we will use subtraction to get the remaining root.

\[
\begin{align*}
(-7.40312423743285) \\
2
\end{align*}
\]

\[
-13.4031242374329 \\
2
\]

root 2 = -6.70156211871643

Now round to the nearest thousandth.

\[x = -6.702\]

Type in -6.702

---

9) Problem #PRADCMA "PRADCMA - 43232 - Factoring polynomials (Quadratic Formula)"

A) Solve for the two roots of the following equation, (Round to the nearest thousandths if applicable, though the answer might not be a decimal.)

This problem is divided into two parts, you will first be asked for one root then the other:

\[3x^2+9x+3 = 0\]

What is one root of this equation?

**Algebraic Expression:**

-0.382 √
-2.618 √
-0.382 √
-2.618 √

**Hints:**

- The polynomial does not factor easily so to find the roots of this equation, you can use the **quadratic** formula.

\[-b±\sqrt{b^2-4ac}\]
2a
• a, b, and c can be found here:

\[ ax^2 + bx + c = 0 \]

\[(3x^2)+9x+3\]

\[ a = 3 \]
\[ b = 9 \]
\[ c = 3 \]

• Now, you can just plug those terms into the \textbf{quadratic} formula.

Term A = 3  Term B = 9  Term C = 3

\[-\frac{9 \pm \sqrt{(9^2 - 4(3 \cdot 3))}}{2 \cdot 3}\]

-9±\sqrt{(9^2 - 4(3 \cdot 3))}/2\cdot3

• Now let's simplify the expression for one of the roots. Here, we begin with general simplification.

\[-\frac{9 \pm \sqrt{(9^2 - 4(3 \cdot 3))}}{2 \cdot 3}\]

\[-\frac{9 \pm \sqrt{(9^2 - 4(3 \cdot 3))}}{2 \cdot 3}\]

\[-\frac{9 \pm \sqrt{(81-36)}}{2 \cdot 3}\]

\[-\frac{9 \pm \sqrt{(81-36)}}{2}\]

-9±\sqrt{(81-36)}/6
\[-9 \pm \sqrt{45} \]
\[\frac{6}{6}\]

\[-9 \pm 6.70820393249937 \]
\[\frac{6}{6}\]

Good! Now that the equation is simplified, you need to solve the equation. Here, we solve for the root with addition.

\((-9 + 6.70820393249937)\)
\[\frac{6}{6}\]

\[-2.29179606750063 \]
\[\frac{6}{6}\]
\[
\text{root}_1 = -0.381966011250105 \\
\text{Now round to the nearest thousandth.}
\]

\[
\text{x} = -0.382 \\
\text{Type in} \ -0.382 \\
\text{The other root is also an acceptable answer.}
\]

B) \[3x^2 + 9x + 3 = 0\]

What is the value of the remaining root: (Round to the nearest thousandths if applicable, though the answer might not be a decimal.)

**Algebraic Expression:**

-2.618
-0.382
-0.382
-0.382
-2.618

**Hints:**
- Remember we used the quadratic formula to get to this point:

\[
\frac{-9 \pm 6.70820393249937}{6}
\]

- Since we used addition on the previous root we must use subtraction here rather than addition.
- Now we will use subtraction to get the remaining root.

\[
\frac{(-9 - 6.70820393249937)}{6}
\]

\[
-15.7082039324994 \\
6
\]

\[
\text{root}_2 = -2.61803398874989
\]
Now round to the nearest thousandth.

\[ x = -2.618 \]
Type in -2.618

10) Problem #PRADCMB "PRADCMB - 43232 - Factoring polynomials (Quadratic Formula)"

A) Solve for the two roots of the following equation,
(Round to the nearest thousandths if applicable, though the answer might not be a decimal.)

This problem is divided into two parts, you will first be asked for one root then the other:

\[ 2x^2 + 9x + 3 = 0 \]

What is one root of this equation?

**Algebraic Expression:**

-0.363
-4.137
-0.363
-4.138

**Hints:**
- The polynomial does not factor easily so to find the roots of this equation, you can use the quadratic formula.

\[
\frac{-b \pm \sqrt{b^2 - 4ac}}{2a}
\]
- a, b, and c can be found here:

\[ ax^2 + bx + c = 0 \]

\[ (2\times x^2) + 9x + 3 \]

\[ a = 2 \]
\[ b = 9 \]
\[ c = 3 \]

- Now, you can just plug those terms into the quadratic formula.

Term A = 2  Term B = 9  Term C = 3
\[ -9 \pm \sqrt{(9^2 - 4(2 \times 3))} \]
\[ \frac{2 \times 2}{2} \]

Now let's simplify the expression for one of the roots. Here, we begin with general simplification.

\[ -9 \pm \sqrt{(9^2 - 4(2 \times 3))} \]
\[ \frac{2 \times 2}{2} \]

\[ -9 \pm \sqrt{(81 - 24)} \]
\[ \frac{4}{4} \]

\[ -9 \pm \sqrt{57} \]
\[ \frac{4}{4} \]
Good! Now that the equation is simplified, you need to solve the equation. Here, we solve for the root with addition.

\[
\frac{-9 \pm 7.54983443527075}{4}
\]

\[
\frac{(-9 + 7.54983443527075)}{4}
\]

\[
\frac{-1.45016556472925}{4}
\]

\[
\text{root}_1 = -0.362541391182313
\]

Now round to the nearest thousandth.

\[
x = -0.363
\]

Type in \(-0.363\)

The other root is also an acceptable answer.

\[
B) \quad 2x^2 + 9x + 3 = 0
\]
What is the value of the remaining root: (Round to the nearest thousandths if applicable, though the answer might not be a decimal.)

**Algebraic Expression:**

✓ -4.137  
✓ -0.363  
✓ -0.363  
✓ -4.138  

**Hints:**

- Remember we used the **quadratic** formula to get to this point:

\[-9 \pm \sqrt{7.54983443527075} \]

\[4\]

- Since we used addition on the previous root we must use **subtraction** here rather than addition.

- Now we will use subtraction to get the remaining root.

\[(-9 - \sqrt{7.54983443527075}) \]

\[4\]

\[-16.5498344352707\]

\[4\]

root 2 = -4.13745860881769

Now round to the nearest thousandth.

x = -4.137  
Type in -4.137

---

11) Problem #PRADCMC "PRADCMC - 43232 - Factoring polynomials (Quadratic Formula)"

A) Solve for the two roots of the following equation,  
(Round to the nearest thousandths if applicable, though the answer might not be a decimal.)

This problem is divided into two parts, you will first be asked for one root then the other:

\[2x^2 + 6x + 2 = 0\]
What is one root of this equation?

**Algebraic Expression:**
-0.382
-2.618
-0.382
-2.618

**Hints:**
- The polynomial does not factor easily so to find the roots of this equation, you can use the **quadratic** formula.

\[-\frac{b \pm \sqrt{b^2-4ac}}{2a}\]

- a, b, and c can be found here:

\[ax^2 + bx + c = 0\]

\[(2x^2) + 6x + 2\]

a = 2
b = 6
c = 2

- Now, you can just plug those terms into the **quadratic** formula. Term A = 2 Term B = 6 Term C = 2

\[-\frac{6 \pm \sqrt{(6^2-4(2*2))}}{2*2}\]

Now let's simplify the expression for one of the roots. Here, we begin with general simplification.
\[-6 \pm \sqrt{(6^2 - 4(2 \times 2))} \]
\[\frac{2 \times 2}{4}\]
\[-6 \pm \sqrt{(6^2 - 4(2 \times 2))} \]
\[\frac{2 \times 2}{4}\]
\[-6 \pm \sqrt{(36 - 16)} \]
\[\frac{4}{4}\]
\[-6 \pm \sqrt{(20)} \]
\[\frac{4}{4}\]
\[-6 \pm 4.47213595499958 \]
\[\frac{4}{4}\]

Good! Now that the equation is simplified, you need to solve the equation. Here, we solve for the root with addition.
\[
\frac{-6 \pm 4.47213595499958}{4}
\]

\[
-1.52786404500042
\]

\[
\frac{4}{4}
\]

\[
\text{root}1 = -0.381966011250105
\]

Now round to the nearest thousandth.

\[
x = -0.382
\]

Type in \(-0.382\)

The other root is also an acceptable answer.

\(\text{B)}\quad 2x^2+6x+2 = 0\)

What is the value of the \textit{remaining} root:  \(\text{(Round to the nearest thousandths if applicable, though the answer might not be a decimal.)}\)

**Algebraic Expression:**

\(
\checkmark\ -2.618
\)

\(
\checkmark\ -0.382
\)

\(
\checkmark\ -0.382
\)

\(
\checkmark\ -0.382
\)

\(
\checkmark\ -2.618
\)

**Hints:**

- Remember we used the \textit{quadratic} formula to get to this point:
• Since we used addition on the previous root we must use subtraction here rather than addition.
• Now we will use subtraction to get the remaining root.

\[
\begin{align*}
(-6-4.47213595499958) \\
4 \\
-10.4721359549996 \\
4
\end{align*}
\]

root 2 = -2.61803398874989

Now round to the nearest thousandth.

x = -2.618
Type in -2.618

12) Problem #PRADCMD "PRADCMD - 43232 - Factoring polynomials (Quadratic Formula)"

A) Solve for the two roots of the following equation,
(Round to the nearest thousandths if applicable, though the answer might not be a decimal.)

This problem is divided into two parts, you will first be asked for one root then the other:

\[2x^2 + 8x + 2 = 0\]

What is one root of this equation?

**Algebraic Expression:**

✅ -0.268
✅ -3.732
✅ -0.268
✅ -3.732

**Hints:**
- The polynomial does not factor easily so to find the roots of this equation, you can use the **quadratic** formula.

\[-b \pm \sqrt{b^2 - 4ac}\]
a, b, and c can be found here:

\[ ax^2 + bx + c = 0 \]

\[(2x^2) + 8x + 2\]

\[ a = 2 \]
\[ b = 8 \]
\[ c = 2 \]

Now, you can just plug those terms into the quadratic formula.

Term A = 2  Term B = 8  Term C = 2

\[-8 \pm \sqrt{(8^2 - 4(2*2))} \]
\[ 2*2 \]

Now lets simplify the expression for one of the roots. Here, we begin with general simplification.

\[-8 \pm \sqrt{(64 - 16)} \]
\[ 4 \]
-8±\sqrt{48}
\frac{4}{4}

-8±6.92820323027551
\frac{4}{4}

Good! Now that the equation is simplified, you need to solve the equation. Here, we solve for the root with addition.

\frac{(-8+6.92820323027551)}{4}

-1.07179676972449
\frac{4}{4}
\( \text{root}1 = -0.267949192431123 \)

Now round to the nearest thousandth.

\( x = -0.268 \)

Type in \(-0.268\)

The other root is also an acceptable answer.

\[ B) \quad 2x^2 + 8x + 2 = 0 \]

What is the value of the \textbf{remaining} root: \( \text{(Round to the nearest thousandths if applicable, though the answer might not be a decimal.)} \)

\textbf{Algebraic Expression:}

\( \sqrt{-3.732} \)

\( \sqrt{-0.268} \)

\( \sqrt{-0.268} \)

\( \sqrt{-3.732} \)

\textbf{Hints:}

- Remember we used the \textit{quadratic} formula to get to this point:

\[ -8 \pm 6.92820323027551 \]

\[ 4 \]

- Since we used addition on the previous root we must use \textit{subtraction} here rather than addition.

- Now we will use subtraction to get the remaining root.

\[ (-8 - 6.92820323027551) \]

\[ 4 \]

\[ -14.9282032302755 \]

\[ 4 \]

\( \text{root} 2 = -3.73205080756888 \)
Now round to the nearest thousandth.

\[ x = -3.732 \]

Type in -3.732

13) Problem #PRADCME "PRADCME - 43232 - Factoring polynomials (Quadratic Formula)"

A) Solve for the two roots of the following equation,
(Round to the nearest thousandths if applicable, though the answer might not be a decimal.)

This problem is divided into two parts, you will first be asked for one root then the other:

\[ 3x^2 + 6x + 2 = 0 \]

What is one root of this equation?

**Algebraic Expression:**
-0.423
-1.577
-0.423
-1.577

**Hints:**
- The polynomial does not factor easily so to find the roots of this equation, you can use the quadratic formula.

\[
\frac{-b \pm \sqrt{b^2 - 4ac}}{2a}
\]

- a, b, and c can be found here:

ax^2 + bx + c = 0

(3x^2) + 6x + 2

a = 3
b = 6
c = 2

- Now, you can just plug those terms into the quadratic formula.
Term A = 3 Termb = 6 Term c = 2
$$\frac{-6 \pm \sqrt{(6^2 - 4(3 \times 2))}}{2 \times 3}$$

Now let's simplify the expression for one of the roots. Here, we begin with general simplification.

$$\frac{-6 \pm \sqrt{(6^2 - 4(3 \times 2))}}{2 \times 3}$$

$$\frac{-6 \pm \sqrt{(36 - 24)}}{6}$$

$$\frac{-6 \pm \sqrt{(12)}}{6}$$
Good! Now that the equation is simplified, you need to solve the equation. Here, we solve for the root with addition.

\[
\frac{-6 \pm 3.46410161513775}{6}
\]

\[
\frac{-6+3.46410161513775}{6} = -2.53589838486225
\]

\[
\frac{\text{root1}}{6} = -0.422649730810375
\]

Now round to the nearest thousandth.

\[
x = -0.423
\]

Type in -0.423

The other root is also an acceptable answer.

B) \[ 3x^2 + 6x + 2 = 0 \]
What is the value of the remaining root: (Round to the nearest thousandths if applicable, though the answer might not be a decimal.)

Algebraic Expression:

✓ -1.577
✓ -0.423
✓ -0.423
✓ -1.577

Hints:

• Remember we used the quadratic formula to get to this point:

\[-6\pm3.46410161513775\]
\[6\]

• Since we used addition on the previous root we must use subtraction here rather than addition.

• Now we will use subtraction to get the remaining root.

\[(-6-3.46410161513775)\]
\[6\]

\[-9.46410161513775\]
\[6\]

root 2 = -1.57735026918963

Now round to the nearest thousandth.

x = -1.577
Type in -1.577

14) Problem #PRADCMF "PRADCMF - 43232 - Factoring polynomials (Quadratic Formula)"
A) Solve for the two roots of the following equation,
(Round to the nearest thousandths if applicable, though the answer might not be a decimal.)

This problem is divided into two parts, you will first be asked for one root then the other:

\[3x^2 + 6x + 1 = 0\]
What is one root of this equation?

**Algebraic Expression:**

-0.184  
-1.816  
-0.184  
-1.817

**Hints:**
- The polynomial does not factor easily so to find the roots of this equation, you can use the quadratic formula.

\[
\frac{-b \pm \sqrt{b^2 - 4ac}}{2a}
\]

- a, b, and c can be found here:

\[ax^2 + bx + c = 0\]

\[3x^2 + 6x + 1\]

a = 3  
b = 6  
c = 1

- Now, you can just plug those terms into the quadratic formula.  
Term A = 3  Term B = 6  Term C = 1

\[
\frac{-6 \pm \sqrt{(6^2 - 4(3*1))}}{2*3}
\]

Now lets simplify the expression for one of the roots. Here, we begin with general simplification.
\frac{-6 \pm \sqrt{(6^2 - 4(3*1))}}{2*3}

\frac{-6 \pm \sqrt{(6^2 - 4(3*1))}}{2*3}

\frac{-6 \pm \sqrt{36-12}}{6}

\frac{-6 \pm \sqrt{24}}{6}

\frac{-6 \pm 4.89897948556636}{6}

Good! Now that the equation is simplified, you need to solve the equation. Here, we solve for the root with addition.
\[
\pm \frac{4.89897948556636}{6}
\]

\[
-1.10102051443364
\]

\[
\frac{-0.183503419072273}{6}
\]

\[
\text{root}_1 = -0.183503419072273
\]

Now round to the nearest thousandth.

\[
x = -0.184
\]

Type in \(-0.184\)

The other root is also an acceptable answer.

B) \(3x^2+6x+1 = 0\)

What is the value of the remaining root: (Round to the nearest thousandths if applicable, though the answer might not be a decimal.)

**Algebraic Expression:**

1. \(-1.816\) (✓)
2. \(-0.184\) (✓)
3. \(-0.184\) (✓)
4. \(-0.184\) (✓)
5. \(-1.817\) (✓)

**Hints:**

- Remember we used the **quadratic** formula to get to this point:

\[
\pm \frac{4.89897948556636}{6}
\]
Since we used addition on the previous root we must use subtraction here rather than addition.

Now we will use subtraction to get the remaining root.

\[ -6 - 4.89897948556636 \]
\[ \frac{6}{6} \]

\[ -10.8989794855664 \]
\[ \frac{6}{6} \]

root 2 = -1.81649658092773

Now round to the nearest thousandth.

\[ x = -1.816 \]

Type in -1.816

15) Problem #PRADCMG "PRADCMG - 43232 - Factoring polynomials (Quadratic Formula)"

A) Solve for the two roots of the following equation,
(Round to the nearest thousandths if applicable, though the answer might not be a decimal.)

This problem is divided into two parts, you will first be asked for one root then the other:

\[ 2x^2 + 6x + 1 = 0 \]

What is one root of this equation?

**Algebraic Expression:**

-0.177

-2.823

-0.177

-2.823

**Hints:**

- The polynomial does not factor easily so to find the roots of this equation, you can use the quadratic formula.

\[-b \pm \sqrt{b^2 - 4ac}\]
2a
- a, b, and c can be found here:

\[ ax^2 + bx + c = 0 \]

\[ (2x^2)+6x+1 \]

a = 2
b= 6
c= 1

- Now, you can just plug those terms into the **quadratic** formula. Term A = 2  Term B = 6 Term C = 1

\[-6 \pm \sqrt{(6^2-4(2*1))} \]
\[ 2*2 \]

- Now lets simplify the expression for one of the roots. Here, we begin with general simplification.

\[-6 \pm \sqrt{36-8} \]
\[ 4 \]
\[-6 \pm \sqrt{28} \]

\[
\frac{-6 \pm 5.29150262212918}{4}
\]

Good! Now that the equation is simplified, you need to solve the equation. Here, we solve for the root with addition.

\[
\frac{-0.70849737787082}{4}
\]
root1 = -0.177124344467705

Now round to the nearest thousandth.

\[ x = -0.177 \]

Type in -0.177

The other root is also an acceptable answer.

B) \[ 2x^2 + 6x + 1 = 0 \]

What is the value of the remaining root? (Round to the nearest thousandths if applicable, though the answer might not be a decimal.)

**Algebraic Expression:**

\[ \checkmark -2.823 \]
\[ \checkmark -0.177 \]
\[ \checkmark -0.177 \]
\[ \checkmark -2.823 \]

**Hints:**

- Remember we used the *quadratic* formula to get to this point:

\[ \frac{-6 \pm \sqrt{5.29150262212918}}{4} \]

- Since we used addition on the previous root we must use *subtraction* here rather than addition.

- Now we will use subtraction to get the remaining root.

\[ \frac{(-6-\sqrt{5.29150262212918})}{4} \]

\[ \frac{-11.2915026221292}{4} \]

\[ \text{root 2} = -2.82287565553229 \]
Now round to the nearest thousandth.

\[ x = -2.823 \]
Type in -2.823

16) Problem #PRADCMH "PRADCMH - 43232 - Factoring polynomials (Quadratic Formula)"
A) Solve for the two roots of the following equation,
(Round to the nearest thousandths if applicable, though the answer might not be a decimal.)

This problem is divided into two parts, you will first be asked for one root then the other:

\[ 2x^2 + 9x + 2 = 0 \]

What is one root of this equation?

**Algebraic Expression:**

✓ -0.234
✓ -4.266
✓ -0.235
✓ -4.266

**Hints:**

- The polynomial does not factor easily so to find the roots of this equation, you can use the quadratic formula.

\[ \frac{-b \pm \sqrt{b^2 - 4ac}}{2a} \]

- a, b, and c can be found here:

\[ ax^2 + bx + c = 0 \]

\[ (2x^2) + 9x + 2 \]

\[ a = 2 \]
\[ b = 9 \]
\[ c = 2 \]

- Now, you can just plug those terms into the quadratic formula.

Term A = 2  Term B = 9  Term C = 2
\[-9 \pm \sqrt{(9^2 - 4(2*2))} \]
\[2*2\]

Now let's simplify the expression for one of the roots. Here, we begin with general simplification.

\[-9 \pm \sqrt{(9^2 - 4(2*2))} \]
\[2*2\]

\[-9 \pm \sqrt{(9^2 - 4(2*2))} \]
\[2*2\]

\[-9 \pm \sqrt{(81 - 16)} \]
\[4\]

\[-9 \pm \sqrt{(65)} \]
\[4\]
Good! Now that the equation is simplified, you need to solve the equation. Here, we solve for the root with addition.

\[ \frac{-9 \pm 8.06225774829855}{4} \]

\[ \frac{-0.937742251701451}{4} \]

\[ root_1 = -0.234435562925363 \]

Now round to the nearest thousandth.

\[ x = -0.234 \]

Type in -0.234

The other root is also an acceptable answer.

B) \[ 2x^2 + 9x + 2 = 0 \]
What is the value of the remaining root: \( \text{(Round to the nearest thousandths if applicable, though the answer might not be a decimal.)} \)

**Algebraic Expression:**

-4.266
-0.234
-0.235
-4.266

**Hints:**
- Remember we used the \textit{quadratic} formula to get to this point:
  \[
  \frac{-9 \pm \sqrt{8.06225774829855}}{4}
  \]
- Since we used addition on the previous root we must use \textit{subtraction} here rather than addition.
- Now we will use subtraction to get the remaining root.
  \[
  \frac{-9 - 8.06225774829855}{4} = -17.0622577482985
  \]
  \[
  \frac{-17.0622577482985}{4} = -4.26556443707464
  \]
  Root 2 = -4.26556443707464
  Now round to the nearest thousandth.
  \( x = -4.266 \)
  Type in -4.266

---

17) Problem #PRADCMJ "PRADCMJ - 43232 - Factoring polynomials (Quadratic Formula)"

A) Solve for the two roots of the following equation,
\( \text{(Round to the nearest thousandths if applicable, though the answer might not be a decimal.)} \)

This problem is divided into two parts, you will first be asked for one root then the other:

\[ 2x^2 + 7x + 2 = 0 \]
What is one root of this equation?

Algebraic Expression:
✓ -0.314
✓ -3.186
✓ -0.314
✓ -3.186

Hints:
- The polynomial does not factor easily so to find the roots of this equation, you can use the quadratic formula.

\[-\frac{b \pm \sqrt{b^2 - 4ac}}{2a}\]

- a, b, and c can be found here:

\[ax^2 + bx + c = 0\]

\[(2x^2) + 7x + 2\]

a = 2
b = 7
c = 2

- Now, you can just plug those terms into the quadratic formula. Term A = 2  Term B = 7  Term C = 2

\[-\frac{7 \pm \sqrt{7^2 - 4(2*2)}}{2*2}\]

- Now lets simplify the expression for one of the roots. Here, we begin with general simplification.
Good! Now that the equation is simplified, you need to solve the equation. Here, we solve for the root with addition.
\[ -7 \pm 5.744562664653803 \]
\[ \frac{4}{4} \]

\[ -1.25543735346197 \]
\[ \frac{4}{4} \]

\[
\text{root}_1 = -0.313859338365492
\]

Now round to the nearest thousandth.

\[ x = -0.314 \]

Type in \(-0.314\)

The other root is also an acceptable answer.

B) \(2x^2 + 7x + 2 = 0\)

What is the value of the remaining root: (Round to the nearest thousandths if applicable, though the answer might not be a decimal.)

**Algebraic Expression:**

-3.186

-0.314

-0.314

-0.314

-3.186

**Hints:**

- Remember we used the **quadratic** formula to get to this point:

\[ -7 \pm 5.744562664653803 \]
\[ \frac{4}{4} \]
Since we used addition on the previous root we must use subtraction here rather than addition.

Now we will use subtraction to get the remaining root.

\[ (-7 - 5.74456264653803) \]
\[ 4 \]
\[ -12.744562646538 \]
\[ 4 \]

\text{root 2} = -3.18614066163451

Now round to the nearest thousandth.

\[ x = -3.186 \]

Type in -3.186

\[ \sqrt{b^2 - 4ac} \]
2a
- a, b, and c can be found here:

\[ ax^2 + bx + c = 0 \]

\[(1x^2) + 9x + 2\]

a = 1
b = 9
c = 2

- Now, you can just plug those terms into the \textit{quadratic} formula.
  Term A = 1  Term B = 9  Term C = 2

\[-9 \pm \sqrt{9^2 - 4(1*2)} \]
\[2*1\]

- Now lets simplify the expression for one of the roots. Here, we begin with general simplification.

\[-9 \pm \sqrt{9^2 - 4(1*2)} \]
\[2*1\]

\[-9 \pm \sqrt{81-8} \]
\[2\]
Good! Now that the equation is simplified, you need to solve the equation. Here, we solve for the root with addition.
\[ \text{root}_1 = -0.227998127341235 \]

Now round to the nearest thousandth.

\[ x = -0.228 \]

Type in \(-0.228\)

The other root is also an acceptable answer.

**B)** \(x^2 + 9x + 2 = 0\)

What is the value of the remaining root? (Round to the nearest thousandths if applicable, though the answer might not be a decimal.)

**Algebraic Expression:**

-8.772

-0.228

-0.228

-8.772

**Hints:**

- Remember we used the \textbf{quadratic} formula to get to this point:

\[ \frac{-9 \pm 8.54400374531753}{2} \]

- Since we used addition on the previous root we must use \textit{subtraction} here rather than addition.

- Now we will use subtraction to get the remaining root.

\[ (\frac{-9 - 8.54400374531753}{2}) \]

\[ -17.5440037453175 \]

\[ \frac{2}{2} \]

\[ \text{root}_2 = -8.77200187265877 \]
Now round to the nearest thousandth.

\[ x = -8.772 \]
Type in -8.772

19) Problem #PRADCMM "PRADCMM - 43232 - Factoring polynomials (Quadratic Formula)"
A) Solve for the two roots of the following equation,
(Round to the nearest thousandths if applicable, though the answer might not be a decimal.)

This problem is divided into two parts, you will first be asked for one root then the other:

\[ 2x^2 + 9x + 3 = 0 \]

What is one root of this equation?

**Algebraic Expression:**

-0.363
-4.137
-0.363
-4.138

**Hints:**
- The polynomial does not factor easily so to find the roots of this equation, you can use the quadratic formula.

\[
\frac{-b \pm \sqrt{b^2 - 4ac}}{2a}
\]

- a, b, and c can be found here:

\[ ax^2 + bx + c = 0 \]

\[ (2x^2) + 9x + 3 \]

a = 2
b = 9
c = 3

- Now, you can just plug those terms into the quadratic formula.
Term A = 2  Term B = 9  Term C = 3
\[-9 \pm \sqrt{(9^2 - 4(2 \cdot 3))}\]
\[\frac{2 \cdot 2}{2 \cdot 2}\]

Now let's simplify the expression for one of the roots. Here, we begin with general simplification.

\[-9 \pm \sqrt{(9^2 - 4(2 \cdot 3))}\]
\[\frac{2 \cdot 2}{2 \cdot 2}\]

\[-9 \pm \sqrt{(9^2 - 4(2 \cdot 3))}\]
\[\frac{2 \cdot 2}{2 \cdot 2}\]

\[-9 \pm \sqrt{(81 - 24)}\]
\[\frac{4}{4}\]

\[-9 \pm \sqrt{(57)}\]
\[\frac{4}{4}\]
\[-9 \pm 7.54983443527075 \div 4\]

Good! Now that the equation is simplified, you need to solve the equation. Here, we solve for the root with addition.

\[(-9 + 7.54983443527075) \div 4\]

\[-1.45016556472925 \div 4\]

\[\text{root1} = -0.362541391182313\]

Now round to the nearest thousandth.

\[x = -0.363\]

Type in \(-0.363\)

The other root is also an acceptable answer.

B) \[2x^2 + 9x + 3 = 0\]
What is the value of the remaining root: (Round to the nearest thousandths if applicable, though the answer might not be a decimal.)

Algebraic Expression:

-4.137
-0.363
-0.363
-4.138

Hints:
- Remember we used the quadratic formula to get to this point:

\[-9 \pm \sqrt{7.54983443527075}\]

Since we used addition on the previous root we must use subtraction here rather than addition.

Now we will use subtraction to get the remaining root.

\[\frac{-9 - \sqrt{7.54983443527075}}{4}\]

\[\frac{-16.5498344352707}{4}\]

root 2 = -4.13745860881769

Now round to the nearest thousandth.

\[x = -4.137\]

Type in -4.137

---

20) Problem #PRADCMN "PRADCMN - 43232 - Factoring polynomials (Quadratic Formula)"

A) Solve for the two roots of the following equation,
(Round to the nearest thousandths if applicable, though the answer might not be a decimal.)

This problem is divided into two parts, you will first be asked for one root then the other:

\[3x^2 + 9x + 2 = 0\]
What is one root of this equation?

**Algebraic Expression:**
-0.242
-2.758
-0.242
-2.758

**Hints:**
- The polynomial does not factor easily so to find the roots of this equation, you can use the **quadratic** formula.

\[-\frac{b \pm \sqrt{b^2 - 4ac}}{2a}\]

- a, b, and c can be found here:

\[ax^2 + bx + c = 0\]

\[(3\times x^2) + 9x + 2\]

a = 3
b = 9
c = 2

- Now, you can just plug those terms into the **quadratic** formula.

Term A = 3  Term B = 9  Term C = 2

\[-\frac{9 \pm \sqrt{9^2 - 4(3\times2)}}{2\times3}\]

- Now let's simplify the expression for one of the roots. Here, we begin with general simplification.
\[-9 \pm \sqrt{9^2 - 4(3 \times 2)} \]
\[= \frac{-9 \pm \sqrt{9^2 - 4(3 \times 2)}}{2 \times 3} \]
\[-9 \pm \sqrt{81 - 24} \]
\[= \frac{-9 \pm \sqrt{57}}{6} \]
\[-9 \pm 7.54983443527075 \]
\[= \frac{-9 \pm 7.54983443527075}{6} \]

Good! Now that the equation is simplified, you need to solve the equation. Here, we solve for the root with addition.
\[\frac{-9 + 7.54983443527075}{6}\]

\[-1.45016556472925\]

\[\frac{6}{6}\]

root\(^1\) = -0.241694260788208

Now round to the nearest thousandth.

\[x = -0.242\]
Type in -0.242
The other root is also an acceptable answer.

B) \[3x^2 + 9x + 2 = 0\]

What is the value of the remaining root: (Round to the nearest thousandths if applicable, though the answer might not be a decimal.)

**Algebraic Expression:**

-2.758
-0.242
-0.242
-0.242
-2.758

**Hints:**

- Remember we used the **quadratic** formula to get to this point:

\[-9\pm7.54983443527075\]

\[6\]
Since we used addition on the previous root we must use subtraction here rather than addition.

Now we will use subtraction to get the remaining root.

\[
\begin{align*}
(-9 - 7.54983443527075) & \div 6 \\
-16.5498344352707 & \div 6
\end{align*}
\]

root 2 = -2.75830573921179

Now round to the nearest thousandth.

x = -2.758

Type in -2.758

21) Problem #PRADCMP "PRADCMP - 43232 - Factoring polynomials (Quadratic Formula)"

A) Solve for the two roots of the following equation,
(Round to the nearest thousandths if applicable, though the answer might not be a decimal.)

This problem is divided into two parts, you will first be asked for one root then the other:

\[3x^2 + 9x + 2 = 0\]

What is one root of this equation?

**Algebraic Expression:**

✅ -0.242

✅ -2.758

✅ -0.242

✅ -2.758

**Hints:**

- The polynomial does not factor easily so to find the roots of this equation, you can use the quadratic formula.

\[-\frac{b \pm \sqrt{b^2 - 4ac}}{2a}\]
2a

- a, b, and c can be found here:

\[ ax^2 + bx + c = 0 \]

\[(3x^2) + 9x + 2\]

\[ a = 3 \]
\[ b = 9 \]
\[ c = 2 \]

- Now, you can just plug those terms into the **quadratic** formula.

Term A = 3  Term B = 9  Term C = 2

\[
\frac{-9 \pm \sqrt{(9^2 - 4(3 \times 2))}}{2 \times 3}
\]

- Now let's simplify the expression for one of the roots. Here, we begin with general simplification.

\[
\frac{-9 \pm \sqrt{(9^2 - 4(3 \times 2))}}{2 \times 3}
\]

\[
\frac{-9 \pm \sqrt{(9^2 - 4(3 \times 2))}}{2 \times 3}
\]

\[
\frac{-9 \pm \sqrt{(81 - 24)}}{2 \times 3}
\]

\[
\frac{-9 \pm \sqrt{57}}{6}
\]
\[-9 \pm \sqrt{57} \]
\[ \frac{6}{6} \]

-9±7.54983443527075
\[ \frac{6}{6} \]

Good! Now that the equation is simplified, you need to solve the equation. Here, we solve for the root with addition.

\[ (-9 + 7.54983443527075) \]
\[ \frac{6}{6} \]

-1.4501656472925
\[ \frac{6}{6} \]
\[ \text{root}_1 = -0.241694260788208 \]

Now round to the nearest thousandth.

\[ x = -0.242 \]

Type in \(-0.242\)

The other root is also an acceptable answer.

**B) \(3x^2 + 9x + 2 = 0\)**

What is the value of the **remaining** root? \((\text{Round to the nearest thousandths if applicable, though the answer might not be a decimal.})\)

**Algebraic Expression:**

\[ \checkmark -2.758 \]
\[ \checkmark -0.242 \]
\[ \checkmark -0.242 \]
\[ \checkmark -2.758 \]

**Hints:**

- Remember we used the **quadratic** formula to get to this point:

\[ \frac{-9 \pm 7.54983443527075}{6} \]

- Since we used addition on the previous root we must use **subtraction** here rather than addition.

- Now we will use subtraction to get the remaining root.

\[ \frac{(-9 - 7.54983443527075)}{6} \]

\[ -16.5498344352707 \]

\[ \frac{6}{6} \]

\[ \text{root}_2 = -2.75830573921179 \]
Now round to the nearest thousandth.

\[ x = -2.758 \]

Type in -2.758

---

22) Problem #PRADCMQ "PRADCMQ - 43232 - Factoring polynomials (Quadratic Formula)"

A) Solve for the two roots of the following equation,

(Round to the nearest thousandths if applicable, though the answer might not be a decimal.)

This problem is divided into two parts, you will first be asked for one root then the other:

\[ 3x^2 + 8x + 1 = 0 \]

What is one root of this equation?

**Algebraic Expression:**

-0.131
-2.535
-0.132
-2.535

**Hints:**

- The polynomial does not factor easily so to find the roots of this equation, you can use the quadratic formula.

\[
\frac{-b \pm \sqrt{b^2 - 4ac}}{2a}
\]

- a, b, and c can be found here:

\[ ax^2 + bx + c = 0 \]

\[ (3x^2) + 8x + 1 \]

- a = 3
- b = 8
- c = 1

- Now, you can just plug those terms into the quadratic formula.

Term A = 3 Term B = 8 Term C = 1
Now let's simplify the expression for one of the roots. Here, we begin with general simplification.

\[-8 \pm \sqrt{(8^2 - 4(3*1))} \]
\[
\frac{2*3}{6}
\]
\[
\frac{-8 \pm \sqrt{6.2110255092798}}{6}
\]

Good! Now that the equation is simplified, you need to solve the equation. Here, we solve for the root with addition.

\[
\frac{(-8 + \sqrt{6.2110255092798})}{6}
\]

\[
\frac{-0.78889744907202}{6}
\]

\[
\text{root}_1 = -0.13148290817867
\]

Now round to the nearest thousandth.

\[
x = -0.131
\]

Type in -0.131
The other root is also an acceptable answer.

\[
\text{B) } 3x^2 + 8x + 1 = 0
\]
What is the value of the **remaining** root: *(Round to the nearest thousandths if applicable, though the answer might not be a decimal.)*

**Algebraic Expression:**

-2.535  
-0.131  
-0.132  
-2.535

**Hints:**

- Remember we used the **quadratic** formula to get to this point:

\[
\frac{-8 \pm \sqrt{7.21110255092798}}{6}
\]

- Since we used addition on the previous root we must use **subtraction** here rather than addition.
- Now we will use subtraction to get the remaining root.

\[
\frac{-8 - 7.21110255092798}{6}
\]

\[
-15.211102550928
\]

\[
\frac{6}
\]

root 2 = -2.535183758488

Now round to the nearest thousandth.

\[
x = -2.535
\]

Type in -2.535

---

23) Problem #PRADCMR "PRADCMR - 43232 - Factoring polynomials (Quadratic Formula)"

A) Solve for the two **roots** of the following equation,  
*(Round to the nearest thousandths if applicable, though the answer might not be a decimal.)*

This problem is divided into two parts, you will first be asked for one root then the other:

\[1x^2 + 9x + 1 = 0\]
What is one root of this equation?

**Algebraic Expression:**

✓ -0.113  
✓ -8.887  
✓ -0.113  
✓ -8.888  
✓ -8.888

**Hints:**

- The polynomial does not factor easily so to find the roots of this equation, you can use the **quadratic** formula.

\[-\frac{b\pm\sqrt{b^2-4ac}}{2a}\]

- a, b, and c can be found here:

\[ax^2+bx+c=0\]

\[(1x^2)+9x+1\]

a = 1  
 b = 9  
 c = 1

- Now, you can just plug those terms into the **quadratic** formula.  
Term A = 1  Term B = 9  Term C = 1

\[-\frac{9\pm\sqrt{9^2-4(1*1)}}{2*1}\]

Now lets simplify the expression for one of the roots. Here, we begin with general simplification.
\[-9 \pm \sqrt{(9^2 - 4(1*1))} \]
\[\frac{2*1}{2*1}\]

\[-9 \pm \sqrt{(9^2 - 4(1*1))} \]
\[\frac{2*1}{2*1}\]

\[-9 \pm \sqrt{(81 - 4)} \]
\[\frac{2}{2}\]

\[-9 \pm \sqrt{(77)} \]
\[\frac{2}{2}\]

\[-9 \pm 8.77496438739212 \]
\[\frac{2}{2}\]

Good! Now that the equation is simplified, you need to solve the equation. Here, we solve for the root with addition.
\[
\frac{-9 \pm 8.77496438739212}{2}
\]

\[
\frac{-0.225035612607879}{2}
\]

\[
\text{root1} = -0.11251780630394
\]

Now round to the nearest thousandth.

\[x = -0.113\]

Type in \(-0.113\)

The other root is also an acceptable answer.

B) \[x^2 + 9x + 1 = 0\]

What is the value of the remaining root: (Round to the nearest thousandths if applicable, though the answer might not be a decimal.)

**Algebraic Expression:**

-8.887

-0.113

-0.113

-8.888

**Hints:**

- Remember we used the \textit{quadratic} formula to get to this point:
Since we used addition on the previous root we must use subtraction here rather than addition.

Now we will use subtraction to get the remaining root.

\[
\begin{align*}
(-9.77496438739212) \\
2
\end{align*}
\]

\[
\begin{align*}
-17.7749643873921 \\
2
\end{align*}
\]

root 2 = -8.88748219369606

Now round to the nearest thousandth.

x = -8.887

Type in -8.887

24) Problem #PRADCMS "PRADCMS - 43232 - Factoring polynomials (Quadratic Formula)"

A) Solve for the two roots of the following equation,

(Round to the nearest thousandths if applicable, though the answer might not be a decimal.)

This problem is divided into two parts, you will first be asked for one root then the other:

\[3x^2 + 7x + 3 = 0\]

What is one root of this equation?

**Algebraic Expression:**

-0.566

-1.768

-0.566

-1.768

**Hints:**

- The polynomial does not factor easily so to find the roots of this equation, you can use the quadratic formula.

\[-b \pm \sqrt{b^2 - 4ac}\]
2a

- a, b, and c can be found here:

\( ax^2 + bx + c = 0 \)

\( (3x^2) + 7x + 3 \)

- \( a = 3 \)
- \( b = 7 \)
- \( c = 3 \)

- Now, you can just plug those terms into the **quadratic** formula.
  
  Term A = 3    Term B = 7    Term C = 3

\[-7 \pm \sqrt{7^2 - 4(3*3)} \]

\[ \div 2*3 \]

- Now lets simplify the expression for one of the roots. Here, we begin with general simplification.

\[-7 \pm \sqrt{(7^2 - 4(3*3))} \]

\[ \div 2*3 \]

\[-7 \pm \sqrt{49 - 36} \]

\[ \div 6 \]
\[-7 \pm \sqrt{13} \]
\[\frac{6}{6}

\[-7 \pm 3.6055127546399 \]
\[\frac{6}{6}

\text{Good! Now that the equation is simplified, you need to solve the equation. Here, we solve for the root with addition.}

\[(-7 + 3.6055127546399)\]
\[\frac{6}{6}

\[-3.3944872453601 \]
\[\frac{6}{6}\]
\[ \text{root1} = -0.565741454089335 \]

Now round to the nearest thousandth.

\[ x = -0.566 \]
Type in \(-0.566\)
The other root is also an acceptable answer.

\[ B) \quad 3x^2 + 7x + 3 = 0 \]

What is the value of the remaining root: \(\text{Round to the nearest thousandths if applicable, though the answer might not be a decimal.}\)

\[ \text{Algebraic Expression:} \]

\[ \checkmark -1.768 \]
\[ \checkmark -0.566 \]
\[ \checkmark -0.566 \]
\[ \checkmark -1.766 \]
\[ \checkmark -1.768 \]

\[ \text{Hints:} \]
- Remember we used the \textbf{quadratic} formula to get to this point:

\[ -\frac{7\pm 3.60555127546399}{6} \]

- Since we used addition on the previous root we must use \textbf{subtraction} here rather than addition.
- Now we will use subtraction to get the remaining root.

\[ (-7 - 3.60555127546399) \]

\[ \frac{6}{6} \]

\[ -10.605551275464 \]

\[ \frac{6}{6} \]

\[ \text{root2} = -1.767591879244 \]
Now round to the nearest thousandth.

\[ x = -1.768 \]
Type in -1.768

---

25) Problem #PRADCMT "PRADCMT - 43232 - Factoring polynomials (Quadratic Formula)"

A) Solve for the two roots of the following equation,
(Round to the nearest thousandths if applicable, though the answer might not be a decimal.)

This problem is divided into two parts, you will first be asked for one root then the other:

\[ 1x^2 + 9x + 2 = 0 \]

What is one root of this equation?

**Algebraic Expression:**

-0.228
-8.772
-0.228
-8.772

**Hints:**

- The polynomial does not factor easily so to find the roots of this equation, you can use the **quadratic** formula.

\[
\frac{-b \pm \sqrt{b^2 - 4ac}}{2a}
\]

- \( a, b, \) and \( c \) can be found here:

\[ ax^2 + bx + c = 0 \]

\[ (1x^2) + 9x + 2 \]

\[ a = 1 \]
\[ b = 9 \]
\[ c = 2 \]

- Now, you can just plug those terms into the **quadratic** formula.

Term A = 1   Term B = 9   Term C = 2
Now let's simplify the expression for one of the roots. Here, we begin with general simplification.

$$\frac{-9 \pm \sqrt{9^2 - 4(1*2)}}{2*1}$$

$$\frac{-9 \pm \sqrt{(9^2 - 4*2)}}{2*1}$$

$$\frac{-9 \pm \sqrt{81 - 8}}{2}$$

$$\frac{-9 \pm \sqrt{73}}{2}$$
\[-9 \pm 8.54400374531753 \div 2\]

Good! Now that the equation is simplified, you need to solve the equation. Here, we solve for the root with addition.

\[(-9 + 8.54400374531753) \div 2\]

\[-0.45599625468247 \div 2\]

\[\text{root}_1 = -0.227998127341235\]

Now round to the nearest thousandth.

\[x = -0.228\]

Type in -0.228

The other root is also an acceptable answer.

B) \[x^2 + 9x + 2 = 0\]
What is the value of the **remaining** root:  
(Round to the nearest thousandths if applicable, though the answer might not be a decimal.)

**Algebraic Expression:**

-8.772  
-0.228  
-0.228  
-8.772  

**Hints:**

- Remember we used the **quadratic** formula to get to this point:

\[ \frac{-9 \pm \sqrt{8.54400374531753}}{2} \]

- Since we used addition on the previous root we must use **subtraction** here rather than addition.

- Now we will use subtraction to get the remaining root.

\[ \frac{-9 - \sqrt{8.54400374531753}}{2} \]

\[ \frac{-17.54400374531753}{2} \]

Root 2 = -8.77200187265877

Now round to the nearest thousandth.

\[ x = -8.772 \]

Type in -8.772  

---

26) Problem #PRADCNN "PRADCNN - 43232 - Factoring polynomials (Quadratic Formula)"

A) Solve for the two roots of the following equation,  
(Round to the nearest thousandths if applicable, though the answer might not be a decimal.)

This problem is divided into two parts, you will first be asked for the one root then the other:

\[ x^2 - 9x - 1 = 0 \]
What is one root of this equation?

**Algebraic Expression:**

- 9.11
- -0.11
- 9.11
- -0.11
- 9.11
- -0.11

**Hints:**
- The polynomial does not factor easily so to find the roots of this equation, you can use the quadratic formula.

\[-\frac{b \pm \sqrt{b^2 - 4ac}}{2a}\]

- a, b, and c can be found here:

\[ax^2 + bx + c = 0\]

\[(1x^2) - 9x - 1\]

a = 1  
b = -9  
c = -1

- Now, you can just plug those terms into the quadratic formula.
Term A = 1  Term B = -9  Term C = -1

\[-\frac{(-9) \pm \sqrt{(-9)^2 - 4(1*-1)}}{2*1}\]

- Regardless of which root we're solving for, we should simplify the expression.
\[-9 \pm \sqrt{(-9)^2 - 4(1*-1)} \]
\[
\frac{2*1}{2195445729289}
\]

Good! Now that the equation is simplified, you need to solve the equation. Here we solve for the root using addition.
\[
\frac{9 + 9.21954445729289}{2}
\]

\[
\frac{18.2195444572929}{2}
\]

\[
\root{1} = 9.10977222864645
\]

Now round to the nearest thousandth.

\[x = 9.11\]
Type in \(9.11\)

B) \(1x^2 - 9x - 1 = 0\)

What is the value of the remaining root? (Round to the nearest thousandths if applicable, though the answer might not be a decimal.)

**Algebraic Expression:**
- \(-0.11\)
- \(9.11\)
- \(9.11\)
- \(9.11\)
- \(-0.11\)

**Hints:**
- Remember we used the *quadratic* formula to get to this point:
Since we used addition on the previous root we must use subtraction here rather than addition.

Now we will use subtraction to get the remaining root.

\[(9 - 9.2195445729289) \div 2 \]

\[-0.21954457292891 \div 2 \]

\[\text{root 2} = -0.10977228646445 \]

Now round to the nearest thousandth.

\[x = -0.11 \]

27) Problem #PRADCNP "PRADCNP - 43232 - Factoring polynomials (Quadratic Formula)"

A) Solve for the two roots of the following equation,
(Round to the nearest thousandths if applicable, though the answer might not be a decimal.)

This problem is divided into two parts, you will first be asked for the one root then the other:

\[2x^2 - 8x - 3 = 0 \]

What is one root of this equation?

**Algebraic Expression:**

✓ 4.345
✓ -0.345
✓ 4.345
✓ -0.345
✓ 4.345
✓ -0.345

**Hints:**
The polynomial does not factor easily so to find the roots of this equation, you can use the quadratic formula.

\[
-b \pm \sqrt{b^2 - 4ac}
\]
\[2a\]

- a, b, and c can be found here:

\[ax^2 + bx + c = 0\]

\[(2x^2) - 8x - 3\]

a = 2
b = -8
c = -3

- Now, you can just plug those terms into the quadratic formula.
Term A = 2 Term B = -8 Term C = -3

\[
\frac{-(-8) \pm \sqrt{((-8)^2 - 4(2*-3))}}{2*2}
\]

Regardless of which root we're solving for, we should simplify the expression.

\[
\frac{-(-8) \pm \sqrt{((-8)^2 - 4(2*-3))}}{2*2}
\]

\[
\frac{-(-8) \pm \sqrt{((-8)^2 - 4(2*-3))}}{2*2}
\]
\[
\frac{8 \pm \sqrt{64+24}}{4}
\]

\[
\frac{8 \pm \sqrt{88}}{4}
\]

\[
\frac{8 \pm 9.38083151964686}{4}
\]

Good! Now that the equation is simplified, you need to solve the equation. Here we solve for the root using addition.

\[
\frac{(8 + 9.38083151964686)}{4}
\]

\[
17.3808315196469
\]
\text{root1} = 4.34520787991172

Now round to the nearest thousandth.

\[ x = 4.345 \]
Type in 4.345

\text{B)} \quad 2x^2-8x-3 = 0

What is the value of the remaining root: \textit{(Round to the nearest thousandths if applicable, though the answer might not be a decimal.)}

\textbf{Algebraic Expression:}
\begin{align*}
\checkmark & -0.345 \\
\checkmark & 4.345 \\
\checkmark & 4.345 \\
\checkmark & -0.345
\end{align*}

\textbf{Hints:}
\begin{itemize}
\item Remember we used the \textit{quadratic} formula to get to this point:
\begin{align*}
8 \pm 9.38083151964686 \\
4
\end{align*}
\end{itemize}

\item Since we used addition on the previous root we must use \textit{subtraction} here rather than addition.
\item Now we will use subtraction to get the remaining root.

\begin{align*}
(8 - 9.38083151964686) \\
4
\end{align*}
root 2 = -0.345207879911715

Now round to the nearest thousandth.

x = -0.345

28) Problem #PRADCNQ "PRADCNQ - 43232 - Factoring polynomials (Quadratic Formula)"

A) Solve for the two roots of the following equation,
(Round to the nearest thousandths if applicable, though the answer might not be a decimal.)

This problem is divided into two parts, you will first be asked for the one root then the other:

1x^2 - 8x - 3 = 0

What is one root of this equation?

Algebraic Expression:

✓ 8.359
✓ -0.359
✓ 8.359
✓ -0.359

Hints:

- The polynomial does not factor easily so to find the roots of this equation, you can use the quadratic formula.

\[
\frac{-b \pm \sqrt{b^2 - 4ac}}{2a}
\]

- a, b, and c can be found here:

\[
a x^2 + bx + c = 0
\]

\[
(1 * x^2) - 8x - 3
\]

a = 1
\begin{align*}
\text{b} &= -8 \\
\text{c} &= -3
\end{align*}

- Now, you can just plug those terms into the **quadratic** formula.
  Term A = 1  Term B = -8  Term C = -3

\[-(8)\pm\sqrt{(-8)^2-4(1*-3)}} \]
\[
\frac{2*1}{2}
\]

- Regardless of which root we're solving for, we should simplify the expression.

\[-(8)\pm\sqrt{(-8)^2-4(1*-3)} \]
\[
\frac{2*1}{2}
\]

\[-(8)\pm\sqrt{(-8)^2-4(1*-3)} \]
\[
\frac{2*1}{2}
\]

\[
8\pm\sqrt{64+12} \]
\[
\frac{2}{2}
\]

\[
8\pm\sqrt{76}. \]
\[
\frac{2}{2}
\]
Good! Now that the equation is simplified, you need to solve the equation. Here we solve for the root using addition.

\[
8 \pm 8.71779788708135
\]
\[
\frac{16.7177978870813}{2}
\]

root\(_1\) = 8.35889894354067

Now round to the nearest thousandth.

x = 8.359
Type in 8.359
B) \(1x^2 - 8x - 3 = 0\)

What is the value of the remaining root? (Round to the nearest thousandths if applicable, though the answer might not be a decimal.)

**Algebraic Expression:**

-0.359

8.359

8.359

8.359

-0.359

**Hints:**

- Remember we used the quadratic formula to get to this point:

\[
\frac{8 \pm \sqrt{8.71779788708135}}{2}
\]

- Since we used addition on the previous root we must use subtraction here rather than addition.

- Now we will use subtraction to get the remaining root.

\[
\frac{(8 - \sqrt{8.71779788708135})}{2}
\]

\[
\frac{-0.71779788708135}{2}
\]

\[
\text{root } 2 = -0.358898943540675
\]

Now round to the nearest thousandth.

\[
x = -0.359
\]
A) Solve for the two roots of the following equation,
(Round to the nearest thousandths if applicable, though the answer might not be a decimal.)

This problem is divided into two parts, you will first be asked for the one root then the other:

\[ 2x^2 - 7x - 3 = 0 \]

What is one root of this equation?

**Algebraic Expression:**

- 3.886
- -0.386
- 3.886
- -0.386

**Hints:**
- The polynomial does not factor easily so to find the roots of this equation, you can use the **quadratic** formula.

\[
\frac{-b \pm \sqrt{b^2 - 4ac}}{2a}
\]

- a, b, and c can be found here:

\[ ax^2 + bx + c = 0 \]

\[ (2x^2) - 7x - 3 \]

\[ a = 2 \]
\[ b = -7 \]
\[ c = -3 \]

- Now, you can just plug those terms into the **quadratic** formula.

Term A = 2  Term B = -7  Term C = -3

\[
\frac{-(-7) \pm \sqrt{(-7)^2 - 4(2)(-3)}}{2(2)}
\]
Regardless of which root we're solving for, we should simplify the expression.

\[
\frac{-(-7)\pm\sqrt{((-7)^2-4\cdot(2\cdot\text{-3}))}}{2\cdot2}
\]

\[
\frac{-(-7)\pm\sqrt{((-7)^2-4\cdot(2\cdot\text{-3}))}}{2\cdot2}
\]

\[
\frac{7\pm\sqrt{(49+24)}}{4}
\]

\[
\frac{7\pm\sqrt{(49+24)}}{4}
\]

\[
\frac{7\pm\sqrt{73}}{4}
\]

\[
\frac{7\pm8.54400374531753}{4}
\]
Good! Now that the equation is simplified, you need to solve the equation. Here we solve for the root using addition.

\[
\frac{7 + 8.54400374531753}{4} = \frac{15.54400374531753}{4}
\]

root1 = 3.88600093632938

Now round to the nearest thousandth.

\[x = 3.886\]

Type in 3.886

B) \[2x^2 - 7x - 3 = 0\]

What is the value of the remaining root? (Round to the nearest thousandths if applicable, though the answer might not be a decimal.)

**Algebraic Expression:**

- 0.386
- 3.886
- 3.886
Hints:
- Remember we used the **quadratic** formula to get to this point:

\[
\frac{7 \pm 8.54400374531753}{4}
\]

- Since we used addition on the previous root we must use **subtraction** here rather than addition.
- Now we will use subtraction to get the remaining root.

\[
\frac{(7-8.54400374531753)}{4}
\]

\[
\frac{-1.54400374531753}{4}
\]

root 2 = -0.386000936329383

Now round to the nearest thousandth.

\[x = -0.386\]
What is one root of this equation?

**Algebraic Expression:**
- 6.162
- -0.162
- 6.163
- -0.163

**Hints:**
- The polynomial does not factor easily so to find the roots of this equation, you can use the *quadratic* formula.

\[-b \pm \sqrt{b^2 - 4ac} \over 2a\]

- a, b, and c can be found here:

\[a = 1 \quad b = -6 \quad c = -1\]

- Now, you can just plug those terms into the *quadratic* formula.

\[-(-6) \pm \sqrt{(-6)^2 - 4(1*-1)} \over 2*1\]

- Regardless of which root we're solving for, we should simplify the expression.
\(-6\pm\sqrt{(-6)^2-4(1*-1)}\) \\
\(= 2\cdot 1\)

\(6\pm\sqrt{36+4}\) \\
\(= 2\)

\(6\pm\sqrt{40}\) \\
\(= 2\)

\(6\pm6.32455532033676\) \\
\(= 2\)

Good! Now that the equation is simplified, you need to solve the equation. Here we solve for the root using addition.
\[
\frac{6 + 6.32455532033676}{2} \\
12.3245553203368 \\
\frac{2}{2}
\]

\[\text{root}_1 = 6.16227766016838\]

Now round to the nearest thousandth.

\[x = 6.162\]
Type in 6.162

B) \[1x^2 - 6x - 1 = 0\]

What is the value of the remaining root: (Round to the nearest thousandths if applicable, though the answer might not be a decimal.)

Algebraic Expression:

-0.162
6.162
6.163
-0.163

Hints:

- Remember we used the quadratic formula to get to this point:

\[
\frac{6 \pm 6.32455532033676}{2}
\]

- Since we used addition on the previous root we must use subtraction here rather than addition.
Now we will use subtraction to get the remaining root.

\[
\frac{(6-6.32455532033676)}{2}
\]

\[
\frac{-0.32455532033676}{2}
\]

\[\text{root } 2 = -0.16227766016838\]

Now round to the nearest thousandth.

\[x = -0.162\]

31) Problem #PRADCNT "PRADCNT - 43232 - Factoring polynomials (Quadratic Formula)"

A) Solve for the two roots of the following equation,
(Round to the nearest thousandths if applicable, though the answer might not be a decimal.)

This problem is divided into two parts, you will first be asked for the one root then the other:

\[3x^2 - 7x - 2 = 0\]

What is one root of this equation?

**Algebraic Expression:**

- 2.591
- -0.257
- 2.591
- -0.257

**Hints:**
- The polynomial does not factor easily so to find the roots of this equation, you can use the quadratic formula.
\[ \frac{-b \pm \sqrt{b^2 - 4ac}}{2a} \]

- a, b, and c can be found here:

\[ ax^2 + bx + c = 0 \]

\[ (3x^2) - 7x - 2 \]

\[ a = 3 \]
\[ b = -7 \]
\[ c = -2 \]

- Now, you can just plug those terms into the quadratic formula.
  Term A = 3  Term B = -7  Term C = -2

\[ \frac{-(-7) \pm \sqrt{((-7)^2 - 4(3*-2))}}{2*3} \]

- Regardless of which root we're solving for, we should simplify the expression.

\[ \frac{-(-7) \pm \sqrt{((-7)^2 - 4(3*-2))}}{2*3} \]

\[ \frac{-(-7) \pm \sqrt{((-7)^2 - 4(3*-2))}}{2*3} \]

\[ 7 \pm \sqrt{(49 + 24)} \]
Good! Now that the equation is simplified, you need to solve the equation. Here we solve for the root using addition.
root1 = 2.59066729088625

Now round to the nearest thousandth.

\[ x = 2.591 \]
Type in 2.591

B) \[ 3x^2 - 7x - 2 = 0 \]

What is the value of the remaining root: (Round to the nearest thousandths if applicable, though the answer might not be a decimal.)

**Algebraic Expression:**

✓ -0.257  
✓ 2.591  
✓ 2.591  
✓ -0.257

**Hints:**

- Remember we used the **quadratic** formula to get to this point:

\[ \frac{7 \pm \sqrt{8.54400374531753}}{6} \]

- Since we used addition on the previous root we must use **subtraction** here rather than addition.
- Now we will use subtraction to get the remaining root.

\[ (7 - \sqrt{8.54400374531753}) \]

\[ \frac{6}{6} \]
root 2 = -0.257339552922

Now round to the nearest thousandth.

x = -0.257

32) Problem #PRADCNU "PRADCNU - 43232 - Factoring polynomials (Quadratic Formula)"

A) Solve for the two roots of the following equation, (Round to the nearest thousandths if applicable, though the answer might not be a decimal.)

This problem is divided into two parts, you will first be asked for the one root then the other:

\[ 1x^2 - 6x - 3 = 0 \]

What is one root of this equation?

**Algebraic Expression:**

- 6.464
- -0.464
- 6.464
- -0.464

**Hints:**

- The polynomial does not factor easily so to find the roots of this equation, you can use the quadratic formula.

\[
-x_1 = \frac{-b + \sqrt{b^2 - 4ac}}{2a}
\]

- a, b, and c can be found here:

\[ ax^2 + bx + c = 0 \]

\[ (1x^2)-6x-3 \]

a = 1
\( b = -6 \)
\( c = -3 \)

- Now, you can just plug those terms into the \textit{quadratic} formula.
  Term A = 1  Term B = -6  Term C = -3

\[
\frac{-(-6) \pm \sqrt{(-6)^2 - 4(1 \times -3)}}{2 \times 1}
\]

- Regardless of which root we're solving for, we should simplify the expression.

\[
\frac{-(-6) \pm \sqrt{(-6)^2 - 4(1 \times -3)}}{2 \times 1}
\]

\[
\frac{6 \pm \sqrt{36 + 12}}{2}
\]

\[
\frac{6 \pm \sqrt{48}}{2}
\]
6 ± 6.92820323027551

Good! Now that the equation is simplified, you need to solve the equation. Here we solve for the root using addition.

(6 + 6.92820323027551)

2

12.92820323027551

2

\text{root1} = 6.46410161513776

Now round to the nearest thousandth.

x = 6.464
Type in 6.464
B) \( x^2 - 6x - 3 = 0 \)

What is the value of the \textbf{remaining} root? \textit{(Round to the nearest thousandths if applicable, though the answer might not be a decimal.)}

**Algebraic Expression:**

\[ x = \frac{-b \pm \sqrt{b^2 - 4ac}}{2a} \]

\[ -b = 6 \]

\[ a = 1 \]

\[ c = -3 \]

\[ b^2 - 4ac = 6^2 - 4 \cdot 1 \cdot (-3) = 36 + 12 = 48 \]

\[ \sqrt{48} = 6.928 \]

\[ x = \frac{6 \pm 6.928}{2} \]

Since we used addition on the previous root we must use \textbf{subtraction} here rather than addition.

Now we will use subtraction to get the remaining root.

\[ (6 - 6.928) \]

\[ \frac{6 - 6.928}{2} = -0.928 \]

Now round to the nearest thousandth.

\[ x = -0.464 \]
33) Problem #PRADCNV "PRADCNV - 43232 - Factoring polynomials (Quadratic Formula)"

A) Solve for the two roots of the following equation,
(Round to the nearest thousandths if applicable, though the answer might not be a decimal.)

This problem is divided into two parts, you will first be asked for the one root then the other:

\[ 2x^2 - 7x - 3 = 0 \]

What is one root of this equation?

**Algebraic Expression:**

- \(3.886\)
- \(-0.386\)
- \(3.886\)
- \(-0.386\)

**Hints:**

- The polynomial does not factor easily so to find the roots of this equation, you can use the **quadratic** formula.

\[
\frac{-b \pm \sqrt{b^2 - 4ac}}{2a}
\]

- a, b, and c can be found here:

\[ax^2 + bx + c = 0\]

\[(2x^2) - 7x - 3\]

a = 2
b = -7
c = -3

- Now, you can just plug those terms into the **quadratic** formula.

\[\frac{-(7) \pm \sqrt{(-7)^2 - 4(2*-3)}}{2*2}\]
Regardless of which root we're solving for, we should simplify the expression.

\[-7 \pm \sqrt{(-7)^2 - 4(2 \cdot -3)}}
\]
\[
\frac{2 \cdot 2}{2}\]

\[-7 \pm \sqrt{(-7)^2 - 4(2 \cdot -3)}}
\]
\[
\frac{2 \cdot 2}{2}\]

\[7 \pm \sqrt{49 + 24} \]
\[
\frac{4}{4}\]

\[7 \pm \sqrt{73} \]
\[
\frac{4}{4}\]

\[7 \pm 8.54400374531753 \]
\[
\frac{4}{4}\]
Good! Now that the equation is simplified, you need to solve the equation. Here we solve for the root using addition.

\[
\frac{(7 + 8.54400374531753)}{4}
\]

\[
15.54400374531753
\]

\[
\frac{4}
\]

root1 = 3.8860093632938

Now round to the nearest thousandth.

\[x = 3.886\]

Type in 3.886

B) \(2x^2 - 7x - 3 = 0\)

What is the value of the remaining root: (Round to the nearest thousandths if applicable, though the answer might not be a decimal.)

Algebraic Expression:

-0.386

3.886

3.886
Hints:

- Remember we used the **quadratic** formula to get to this point:
  
  \[
  \frac{7 \pm 8.54400374531753}{4}
  \]

- Since we used addition on the previous root we must use **subtraction** here rather than addition.
- Now we will use subtraction to get the remaining root.

\[
\frac{(7-8.54400374531753)}{4}
\]

\[-1.54400374531753
\]

\[
\frac{4}{4}
\]

\[\text{root 2} = -0.386000936329383\]

Now round to the nearest thousandth.

\[x = -0.386\]
What is one root of this equation?

**Algebraic Expression:**

- 4.608
- -0.108
- 4.609
- -0.109

**Hints:**

- The polynomial does not factor easily so to find the roots of this equation, you can use the **quadratic** formula.

\[
\frac{-b \pm \sqrt{b^2 - 4ac}}{2a}
\]

- a, b, and c can be found here:

\[ax^2 + bx + c = 0\]

\[(2x^2) - 9x - 1\]

- a = 2
- b = -9
- c = -1

- Now, you can just plug those terms into the **quadratic** formula.

Term A = 2  Term B = -9  Term C = -1

\[
\frac{-(-9) \pm \sqrt{(-9)^2 - 4(2\cdot-1)}}{2\cdot2}
\]

- Regardless of which root we're solving for, we should simplify the expression.

\[
\frac{-(-9) \pm \sqrt{(-9)^2 - 4(2\cdot-1)}}{2\cdot2}
\]
\[-\frac{(-9)\pm\sqrt{(-9)^2-4(2*1)}}{2*2}\]

\[9\pm\sqrt{81+8}\]
\[4\]

\[9\pm\sqrt{88.9999999999999}\]
\[4\]

\[9\pm9.4339811320566\]
\[4\]

Good! Now that the equation is simplified, you need to solve the equation. Here we solve for the root using addition.
\[ (9 + 9.4339811320566) \]
\[ \frac{4}{4} \]

\[ 18.4339811320566 \]
\[ \frac{4}{4} \]

\( \text{root1} = 4.60849528301415 \)

Now round to the nearest thousandth.

\( x = 4.608 \)
Type in \( 4.608 \)

B) \( 2x^2 - 9x - 1 = 0 \)

What is the value of the remaining root: (Round to the nearest thousandths if applicable, though the answer might not be a decimal.)

**Algebraic Expression:**
-0.108
4.608
4.609
-0.109

**Hints:**
- Remember we used the \textit{quadratic} formula to get to this point:

\[ 9 \pm 9.4339811320566 \]
\[ \frac{4}{4} \]

- Since we used addition on the previous root we must use \textit{subtraction} here rather than addition.
Now we will use subtraction to get the remaining root.

\[
\frac{(9-9.4339811320566)}{4} = -0.4339811320566
\]

\[
\frac{4 - 0.4339811320566}{4} = 0.10849528301415
\]

\[\text{root 2} = -0.10849528301415\]

Now round to the nearest thousandth.

\[x = -0.108\]

35) Problem #PRADCNX "PRADCNX - 43232 - Factoring polynomials (Quadratic Formula)"

A) Solve for the two roots of the following equation,
(Round to the nearest thousandths if applicable, though the answer might not be a decimal.)

This problem is divided into two parts, you will first be asked for the one root then the other:

\[x^2 - 9x - 1 = 0\]

What is one root of this equation?

**Algebraic Expression:**

- 9.11
- -0.11
- 9.11
- -0.11
- -0.11

**Hints:**

- The polynomial does not factor easily so to find the roots of this equation, you can use the quadratic formula.
\[-b \pm \sqrt{b^2 - 4ac} \over 2a\]

- a, b, and c can be found here:

\[ax^2 + bx + c = 0\]

\[(1x^2) - 9x - 1\]

\[a = 1\]
\[b = -9\]
\[c = -1\]

- Now, you can just plug those terms into the quadratic formula.

Term A = 1  Term B = -9  Term C = -1

\[-(9) \pm \sqrt{((-9)^2 - 4(1*-1))} \over 2*1\]

- Regardless of which root we're solving for, we should simplify the expression.

\[-(9) \pm \sqrt{((-9)^2 - 4(1*-1))} \over 2*1\]

\[-(9) \pm \sqrt{((-9)^2 - 4(1*-1))} \over 2*1\]

\[9 \pm \sqrt{(81 + 4)}\]
\[ 9 \pm \sqrt{(85.0000000000001)} \]
\[
\begin{align*}
\frac{9 \pm 9.2195445729289}{2}
\end{align*}
\]

Good! Now that the equation is simplified, you need to solve the equation. Here we solve for the root using addition.

\[
\frac{(9 + 9.2195445729289)}{2}
\]
\[
\frac{18.219544572929}{2}
\]
$$\text{root}_1 = 9.1097722864645$$

Now round to the nearest thousandth.

$$x = 9.11$$
Type in 9.11

B) \(1x^2 - 9x - 1 = 0\)

What is the value of the remaining root? (Round to the nearest thousandths if applicable, though the answer might not be a decimal.)

**Algebraic Expression:**

-0.11  
9.11  
9.11  
9.11  
-0.11  

**Hints:**

- Remember we used the **quadratic** formula to get to this point:

$$\frac{9 \pm 9.2195445729289}{2}$$

- Since we used addition on the previous root we must use subtraction here rather than addition.
- Now we will use subtraction to get the remaining root.

$$\left(9-9.2195445729289\right)$$

$$\frac{2}{}$$
-0.21954457292891

root 2= -0.109772228646445

Now round to the nearest thousandth.

x= -0.11

36) Problem #PRADCNY "PRADCNY - 43232 - Factoring polynomials (Quadratic Formula)"

A) Solve for the two roots of the following equation, (Round to the nearest thousandths if applicable, though the answer might not be a decimal.)

This problem is divided into two parts, you will first be asked for the one root then the other:

1x^2-7x-1 = 0

What is one root of this equation?

Algebraic Expression:

✓ 7.14
✓ -0.14
✓ 7.14
✓ -0.14
✓ 7.14

Hints:

- The polynomial does not factor easily so to find the roots of this equation, you can use the **quadratic** formula.

\[-\frac{b\pm\sqrt{b^2-4ac}}{2a}\]

- a, b, and c can be found here:

\[ax^2+ bx + c = 0\]

\[(1*x^2)-7x-1\]

a = 1
Now, you can just plug those terms into the \textit{quadratic} formula. 
Term \(A = 1\) \hspace{0.2cm} \text{Term} \(B = -7\) \hspace{0.2cm} \text{Term} \(C = -1\)

\[
\frac{-(-7) \pm \sqrt{((-7)^2 - 4(1*-1))}}{2*1}
\]

Regardless of which root we're solving for, we should simplify the expression.

\[
\frac{7 \pm \sqrt{(49+4)}}{2}
\]

\[
\frac{7 \pm \sqrt{53}}{2}
\]
Good! Now that the equation is simplified, you need to solve the equation. Here we solve for the root using addition.

\[ \frac{7 + 7.28010988928052}{2} = \frac{14.28010988928052}{2} \]

\[ \text{root}_1 = 7.14005494464026 \]

Now round to the nearest thousandth.

\[ x = 7.14 \]

Type in 7.14
B) \[ 1x^2 - 7x - 1 = 0 \]

What is the value of the \textbf{remaining} root: \textit{(Round to the nearest thousandths if applicable, though the answer might not be a decimal.)}

\textbf{Algebraic Expression:}

\begin{itemize}
  \item \checkmark -0.14
  \item \checkmark 7.14
  \item \checkmark 7.14
  \item \checkmark -0.14

\textbf{Hints:}
\begin{itemize}
  \item Remember we used the \textbf{quadratic} formula to get to this point:
  \[
  \frac{7\pm7.28010988928052}{2}
  \]
  \item Since we used addition on the previous root we must use \textbf{subtraction} here rather than addition.
  \item Now we will use subtraction to get the remaining root.
\end{itemize}

\[
\frac{(7-7.28010988928052)}{2}
\]

\[
\frac{-0.28010988928052}{2}
\]

\textbf{root} \(2\) = -0.14005494464026

Now round to the nearest thousandth.

\(x = -0.14\)
37) Problem #PRADCNZ "PRADCNZ - 43232 - Factoring polynomials (Quadratic Formula)"

A) Solve for the two roots of the following equation,
(Round to the nearest thousandths if applicable, though the answer might not be a decimal.)

This problem is divided into two parts, you will first be asked for the one root then the other:

\[ x^2 - 7x - 3 = 0 \]

What is one root of this equation?

**Algebraic Expression:**

- 7.405
- -0.405
- 7.405
- -0.405

**Hints:**

- The polynomial does not factor easily so to find the roots of this equation, you can use the quadratic formula.

\[ \frac{-b \pm \sqrt{b^2 - 4ac}}{2a} \]

- a, b, and c can be found here:

\[ ax^2 + bx + c = 0 \]

\[ (1x^2) - 7x - 3 \]

\[ a = 1 \]
\[ b = -7 \]
\[ c = -3 \]

- Now, you can just plug those terms into the quadratic formula.

Term A = 1  Term B = -7  Term C = -3

\[ \frac{-(-7) \pm \sqrt{(-7)^2 - 4(1*-3)}}{2*1} \]
Regardless of which root we're solving for, we should simplify the expression.

\[
\frac{-(-7)\pm\sqrt{((-7)^2-4(1*-3))}}{2*1}
\]

\[
\frac{-(-7)\pm\sqrt{((-7)^2-4(1*-3))}}{2*1}
\]

\[
\frac{7\pm\sqrt{(49+12)}}{2}
\]

\[
\frac{7\pm\sqrt{(60.9999999999999}}{2}
\]

\[
\frac{7\pm7.8102467590665}{2}
\]
Good! Now that the equation is simplified, you need to solve the equation. Here we solve for the root using addition.

\[
\frac{7+7.81024967590665}{2}
\]

\[
14.8102496759067
\]

\[
\frac{14.8102496759067}{2}
\]

\[
\text{root}_1 = 7.40512483795333
\]

Now round to the nearest thousandth.

\[
x = 7.405
\]

Type in 7.405

B) \(1x^2-7x-3 = 0\)

What is the value of the remaining root: (Round to the nearest thousandths if applicable, though the answer might not be a decimal.)

**Algebraic Expression:**

-0.405

\(7.405\)

\(7.405\)
Hints:
- Remember we used the quadratic formula to get to this point:

\[ \frac{7 \pm \sqrt{7.81024967590665}}{2} \]

- Since we used addition on the previous root we must use subtraction here rather than addition.
- Now we will use subtraction to get the remaining root.

\[
\frac{(7 - \sqrt{7.81024967590665})}{2} = \frac{-0.81024967590665}{2}
\]

Root 2 = -0.405124837953325

Now round to the nearest thousandth.

x = -0.405

---

38) Problem #PRADCN2 "PRADCN2 - 43232 - Factoring polynomials (Quadratic Formula)"

A) Solve for the two roots of the following equation, (Round to the nearest thousandths if applicable, though the answer might not be a decimal.)

This problem is divided into two parts, you will first be asked for the one root then the other:

\[ 3x^2 - 8x - 1 = 0 \]
What is one root of this equation?

**Algebraic Expression:**

1. 2.786
2. -0.12
3. 2.786
4. -0.12

**Hints:**

- The polynomial does not factor easily so to find the roots of this equation, you can use the **quadratic** formula.

\[
\frac{-b \pm \sqrt{b^2 - 4ac}}{2a}
\]

- \(a, b,\) and \(c\) can be found here:

\[ax^2 + bx + c = 0\]

\((3x^2) - 8x - 1\)

- \(a = 3\)
- \(b = -8\)
- \(c = -1\)

- Now, you can just plug those terms into the **quadratic** formula.

\((-8) \pm \sqrt{((-8)^2 - 4(3*-1))} \quad 2*3\)

- Regardless of which root we're solving for, we should simplify the expression.
\[
\frac{-(-8) \pm \sqrt{(-8)^2 - 4(3 \cdot -1)}}{2 \cdot 3}
\]

\[
\frac{8 \pm \sqrt{64 + 12}}{6}
\]

\[
\frac{8 \pm \sqrt{76}}{6}
\]

\[
\frac{8 \pm 8.71779788708135}{6}
\]

Good! Now that the equation is simplified, you need to solve the equation. Here we solve for the root using addition.
\[
\frac{8 + 8.71779788708135}{6}
\]
\[
16.7177978870813 \quad 6
\]

\[
\text{root}_1 = 2.78629964784689
\]

Now round to the nearest thousandth.

\[
x = 2.786
\]

Type in 2.786

B) \(3x^2 - 8x - 1 = 0\)

What is the value of the remaining root? (Round to the nearest thousandths if applicable, though the answer might not be a decimal.)

**Algebraic Expression:**

-0.12

2.786

2.786

-0.12

**Hints:**

- Remember we used the quadratic formula to get to this point:

\[
\frac{8 \pm 8.71779788708135}{6}
\]

- Since we used addition on the previous root we must use subtraction here rather than addition.
Now we will use subtraction to get the remaining root.

\[
6 - 0.71779788708135 = 5.28220211291865
\]

\[
\text{root 2} = -0.119632981180225
\]

Now round to the nearest thousandth.

\[x = -0.12\]

---

39) Problem #PRADCN3 "PRADCN3 - 43232 - Factoring polynomials (Quadratic Formula)"

A) Solve for the two roots of the following equation,

(Round to the nearest thousandths if applicable, though the answer might not be a decimal.)

This problem is divided into two parts, you will first be asked for the one root then the other:

\[x^2 - 9x - 2 = 0\]

What is one root of this equation?

Algebraic Expression:

- 9.217
- 0.217
9.217
-0.217
-0.217

Hints:
- The polynomial does not factor easily so to find the roots of this equation, you can use the quadratic formula.
\[ \frac{-b \pm \sqrt{b^2 - 4ac}}{2a} \]

- a, b, and c can be found here:

\[ ax^2 + bx + c = 0 \]

\[(1x^2) - 9x - 2\]

- a = 1
- b = -9
- c = -2

- Now, you can just plug those terms into the **quadratic** formula.

Term A = 1  Term B = -9  Term C = -2

\[ \frac{-(-9) \pm \sqrt{(-9)^2 - 4(1*-2)}}{2*1} \]

- Regardless of which root we're solving for, we should simplify the expression.

\[ 9 \pm \sqrt{81+8} \]
Good! Now that the equation is simplified, you need to solve the equation. Here we solve for the root using addition.
root1 = 9.2169905660283

Now round to the nearest thousandth.

\[ x = 9.217 \]
Type in 9.217

B) \( 1x^2 - 9x - 2 = 0 \)

What is the value of the remaining root: (Round to the nearest thousandths if applicable, though the answer might not be a decimal.)

**Algebraic Expression:**
- 0.217
- 9.217
- 9.217
- 0.217

**Hints:**
- Remember we used the quadratic formula to get to this point:
  \[
  \frac{9 \pm 9.4339811320566}{2}
  \]
- Since we used addition on the previous root we must use subtraction here rather than addition.
- Now we will use subtraction to get the remaining root.

\[
\frac{(9 - 9.4339811320566)}{2}
\]
root 2 = -0.2169905660283

Now round to the nearest thousandth.

x = -0.217

40) Problem #PRADCN4 "PRADCN4 - 43232 - Factoring polynomials (Quadratic Formula)"

A) Solve for the two roots of the following equation,

(Round to the nearest thousandths if applicable, though the answer might not be a decimal.)

This problem is divided into two parts, you will first be asked for the one root then the other:

\[ 3x^2 - 9x - 3 = 0 \]

What is one root of this equation?

**Algebraic Expression:**

✓ 3.303
✓ -0.303
✓ 3.303
✓ -0.303
✓ 3.303
✓ -0.303

**Hints:**

- The polynomial does not factor easily so to find the roots of this equation, you can use the **quadratic** formula.

\[
\frac{-b \pm \sqrt{b^2 - 4ac}}{2a}
\]

- a, b, and c can be found here:

\[ ax^2 + bx + c = 0 \]

\[ (3x^2) - 9x - 3 \]

a = 3
b = -9

c = -3

• Now, you can just plug those terms into the quadratic formula.

Term A = 3  Term B = -9  Term C = -3

\[-(-9) \pm \sqrt{((-9)^2 - 4(3*-3))} \]
\[2*3\]

•

Regardless of which root we're solving for, we should simplify the expression.

\[9 \pm \sqrt{(81+36)} \]
\[6\]

\[9 \pm \sqrt{(117.00000000000001)} \]
\[6\]
$9 \pm 10.816653826392$

$\frac{6}{6}$

Good! Now that the equation is simplified, you need to solve the equation. Here we solve for the root using addition.

$(9 + 10.816653826392)$

$\frac{6}{6}$

$19.816653826392$

$\frac{6}{6}$

root$_1$ = 3.302775637732

Now round to the nearest thousandth.

$x = 3.303$

Type in 3.303
B) \(3x^2 - 9x - 3 = 0\)

What is the value of the remaining root: (Round to the nearest thousandths if applicable, though the answer might not be a decimal.)

**Algebraic Expression:**

-0.303
3.303
3.303
-0.303

**Hints:**
- Remember we used the **quadratic** formula to get to this point:

\[
\frac{9 \pm \sqrt{9^2 - 4(-9)(-3)}}{2(-3)}
\]

- Since we used addition on the previous root we must use **subtraction** here rather than addition.
- Now we will use subtraction to get the remaining root.

\[
\frac{(9 - \sqrt{9^2 - 4(-9)(-3)})}{6}
\]

\[
\frac{-1.816653826392}{6}
\]

root 2 = -0.302775637732

Now round to the nearest thousandth.

\(x = -0.303\)
A) Solve for the two roots of the following equation, 
(Round to the nearest thousandths if applicable, though the answer might not be a decimal.)

This problem is divided into two parts, you will first be asked for the one root then the other:

\[ 2x^2 - 7x - 1 = 0 \]

What is one root of this equation?

**Algebraic Expression:**

1. 3.637
2. -0.137
3. 3.638
4. -0.138

**Hints:**

- The polynomial does not factor easily so to find the roots of this equation, you can use the quadratic formula.

\[ \frac{-b \pm \sqrt{b^2 - 4ac}}{2a} \]

- a, b, and c can be found here:

\[ ax^2 + bx + c = 0 \]

\[ (2x^2) - 7x - 1 \]

- \( a = 2 \)
- \( b = -7 \)
- \( c = -1 \)

- Now, you can just plug those terms into the quadratic formula.

Term A = 2  Term B = -7  Term C = -1

\[ \frac{-(-7) \pm \sqrt{(-7)^2 - 4(2*-1)}}{2*2} \]
Regardless of which root we're solving for, we should simplify the expression.

\[ \frac{-(-7) \pm \sqrt{((-7)^2 - 4(2*-1))}}{2*2} \]

\[ \frac{-(-7) \pm \sqrt{((-7)^2 - 4(2*-1))}}{2*2} \]

\[ \frac{7 \pm \sqrt{(49+8)}}{4} \]

\[ \frac{7 \pm \sqrt{57}}{4} \]

\[ 7 \pm \sqrt{57.54983443527075} \]
Good! Now that the equation is simplified, you need to solve the equation. Here we solve for the root using addition.

\[
\frac{7 + 7.54983443527075}{4}
\]

\[
14.54983443527075
\]

\[
\frac{4}{4}
\]

\[
\text{root}_1 = 3.63745860881769
\]

Now round to the nearest thousandth.

\[x = 3.637\]

Type in 3.637

B) \[2x^2 - 7x - 1 = 0\]

What is the value of the remaining root: (Round to the nearest thousandths if applicable, though the answer might not be a decimal.)

**Algebraic Expression:**

✓ -0.137

✓ 3.637

✓ 3.638
Hints:
- Remember we used the quadratic formula to get to this point:

\[ \frac{7 \pm 7.54983443527075}{4} \]

- Since we used addition on the previous root we must use subtraction here rather than addition.
- Now we will use subtraction to get the remaining root.

\[ \frac{(7 - 7.54983443527075)}{4} \]

\[ -0.54983443527075 \]

\[ \frac{-0.54983443527075}{4} \]

\[ \text{root } 2 = -0.137458608817687 \]

Now round to the nearest thousandth.

\[ x = -0.137 \]
What is one root of this equation?

**Algebraic Expression:**

✓ 8.123  
✓ -0.123  
✓ 8.123  
✓ -0.123

**Hints:**

- The polynomial does not factor easily so to find the roots of this equation, you can use the **quadratic** formula.

\[
-x \pm \sqrt{b^2 - 4ac} \\
2a
\]

- a, b, and c can be found here:

\[ax^2 + bx + c = 0\]

\[(1x^2) - 8x - 1\]

- \(a = 1\)  
- \(b = -8\)  
- \(c = -1\)

- Now, you can just plug those terms into the **quadratic** formula.  
  Term A = 1  Term B = -8  Term C = -1

\[-(-8) \pm \sqrt{(-8)^2 - 4(1*-1)} \\
2*1\]

- Regardless of which root we're solving for, we should simplify the expression.

\[-(-8) \pm \sqrt{(-8)^2 - 4(1*-1)}\]
\[
\frac{-(-8) \pm \sqrt{(-8)^2 - 4 \cdot 1 \cdot -1}}{2 \cdot 1}
\]

\[
\frac{8 \pm \sqrt{64 + 4}}{2}
\]

\[
\frac{8 \pm 8.24621125123532}{2}
\]

Good! Now that the equation is simplified, you need to solve the equation. Here we solve for the root using addition.
16.2462112512353
2

\[ \text{root}1 = 8.12310562561766 \]

Now round to the nearest thousandth.

\[ x= 8.123 \]
Type in 8.123

B) \[ 1x^2-8x-1 = 0 \]

What is the value of the remaining root: (Round to the nearest thousandths if applicable, though the answer might not be a decimal.)

Algebraic Expression:

-0.123
8.123
8.123
-0.123

Hints:

- Remember we used the quadratic formula to get to this point:

\[ \frac{8 \pm 8.24621125123532}{2} \]

- Since we used addition on the previous root we must use subtraction here rather than addition.

Now we will use subtraction to get the remaining root.

\[
\frac{(8-8.24621125123532)}{2} = -0.246211251235319
\]

\[
\frac{-0.246211251235319}{2} = \text{root } 2 = -0.12310562561766
\]

Now round to the nearest thousandth.

\[x = -0.123\]

43) Problem #PRADCN7 "PRADCN7 - 43232 - Factoring polynomials (Quadratic Formula)"

A) Solve for the two roots of the following equation,
(Round to the nearest thousandths if applicable, though the answer might not be a decimal.)

This problem is divided into two parts, you will first be asked for the one root then the other:

\[2x^2-6x-1 = 0\]

What is one root of this equation?

**Algebraic Expression:**

- 3.158  
- 0.158  
- 3.158  
- 0.158

**Hints:**

- The polynomial does not factor easily so to find the roots of this equation, you can use the quadratic formula.
\[-\frac{b \pm \sqrt{b^2 - 4ac}}{2a}\]

- a, b, and c can be found here:

\[ax^2 + bx + c = 0\]

\[(2x^2) - 6x - 1\]

a = 2  
b = -6  
c = -1

- Now, you can just plug those terms into the quadratic formula.  
  Term A = 2  Term B = -6 Term C = -1

\[-\frac{-6 \pm \sqrt{(-6)^2 - 4(2*-1)}}{2*2} \]

- Regardless of which root we're solving for, we should simplify the expression.

\[-\frac{-6 \pm \sqrt{(-6)^2 - 4(2*-1)}}{2*2} \]

\[-\frac{-6 \pm \sqrt{(-6)^2 - 4(2*-1)}}{2*2} \]

\[6 \pm \sqrt{36 + 8}\]
\[ 6 \pm \sqrt{44} \]

\[ \frac{4}{4} \]

\[ 6 \pm 6.6332495807108 \]

\[ \frac{4}{4} \]

Good! Now that the equation is simplified, you need to solve the equation. Here we solve for the root using addition.

\[ (6+6.6332495807108) \]

\[ \frac{4}{4} \]

\[ 12.6332495807108 \]

\[ \frac{4}{4} \]
\[
\text{root}_1 = 3.1583123951777
\]

Now round to the nearest thousandth.

\[
x = 3.158
\]

Type in \text{3.158}

\[\text{B) } 2x^2-6x-1 = 0\]

What is the value of the \textit{remaining} root: (Round to the nearest thousandths if applicable, though the answer might not be a decimal.)

\textbf{Algebraic Expression:}

\checkmark -0.158
\checkmark 3.158
\checkmark 3.158
\checkmark -0.158

\textbf{Hints:}

\begin{itemize}
  \item Remember we used the \textit{quadratic} formula to get to this point:
    \[
    \frac{6\pm\sqrt{6.6332495807108}}{4}
    \]
  \item Since we used addition on the previous root we must use \textit{subtraction} here rather than addition.
  \item Now we will use subtraction to get the remaining root.
\end{itemize}

\[
(6-6.6332495807108) \\
\hphantom{(6-6.6332495807108)} \frac{4}{4}
\]
Now round to the nearest thousandth.

\[ x = -0.158 \]

---

A) Solve for the two roots of the following equation, (Round to the nearest thousandths if applicable, though the answer might not be a decimal.)

This problem is divided into two parts, you will first be asked for the one root then the other:

\[ 2x^2 - 8x - 1 = 0 \]

What is one root of this equation?

**Algebraic Expression:**

- 4.121
- -0.121
- 4.121
- -0.121

**Hints:**
- The polynomial does not factor easily so to find the roots of this equation, you can use the **quadratic** formula.

\[
\frac{-b \pm \sqrt{b^2 - 4ac}}{2a}
\]

- a, b, and c can be found here:

\[ ax^2 + bx + c = 0 \]

\[ (2x^2) - 8x - 1 \]

\[ a = 2 \]
Now, you can just plug those terms into the **quadratic** formula. 
Term A = 2  Term B = -8  Term C = -1

\[-(8)\pm\sqrt{((-8)^2)-4*2*(-1))}
\[2*2\]

Regardless of which root we're solving for, we should simplify the expression.

\[-(8)\pm\sqrt{((-8)^2)-4*2*(-1))}
\[2*2\]

\[-(8)\pm\sqrt{((-8)^2)-4*2*(-1))}
\[2*2\]

\[8\pm\sqrt{(64+8)}
\[4\]

\[8\pm\sqrt{(72)}
\[4\]
\(8 \pm 8.48528137423857\)
\[
\frac{4}{4}
\]

Good! Now that the equation is simplified, you need to solve the equation. Here we solve for the root using addition.

\( (8 + 8.48528137423857) \)
\[
\frac{4}{4}
\]

\(16.4852813742386\)
\[
\frac{4}{4}
\]

\(\text{root1} = 4.12132034355964\)

Now round to the nearest thousandth.

\(x = 4.121\)

Type in 4.121
B) \(2x^2 - 8x - 1 = 0\)

What is the value of the remaining root: (Round to the nearest thousandths if applicable, though the answer might not be a decimal.)

**Algebraic Expression:**

\[
\begin{align*}
\checkmark & -0.121 \\
\checkmark & 4.121 \\
\checkmark & 4.121 \\
\checkmark & -0.121
\end{align*}
\]

**Hints:**
- Remember we used the *quadratic* formula to get to this point:

\[
\frac{8 \pm 8.48528137423857}{4}
\]
- Since we used addition on the previous root we must use *subtraction* here rather than addition.
- Now we will use subtraction to get the remaining root.

\[
\frac{(8 - 8.48528137423857)}{4}
\]

\[
-0.48528137423857
\]

\[
\frac{4}{4}
\]

\[
\text{root } 2 = -0.121320343559642
\]

Now round to the nearest thousandth.

\[
x = -0.121
\]
This problem is divided into two parts, you will first be asked for the one root then the other:

\[ 3x^2 - 7x - 3 = 0 \]

What is one root of this equation?

**Algebraic Expression:**

- ✓ 2.703
- ✓ -0.37
- ✓ 2.703
- ✓ -0.37

**Hints:**

- The polynomial does not factor easily so to find the roots of this equation, you can use the *quadratic* formula.

\[
\frac{-b \pm \sqrt{b^2 - 4ac}}{2a}
\]

- a, b, and c can be found here:

\[ ax^2 + bx + c = 0 \]

\[ (3x^2) - 7x - 3 \]

- \( a = 3 \)
- \( b = -7 \)
- \( c = -3 \)

- Now, you can just plug those terms into the *quadratic* formula.

Term \( A = 3 \)  Term \( B = -7 \)  Term \( C = -3 \)

\[
\frac{-( -7) \pm \sqrt{(-7)^2 - 4(3\times-3)}}{2\times3}
\]
Regardless of which root we're solving for, we should simplify the expression.

\[
\frac{-(-7) \pm \sqrt{((-7)^2-4(3*-3))}}{2*3}
\]

\[
\frac{-(-7) \pm \sqrt{((-7)^2-4(3*-3))}}{2*3}
\]

\[
\frac{7 \pm \sqrt{49+36}}{6}
\]

\[
\frac{7 \pm \sqrt{85.000000000001}}{6}
\]

\[
\frac{7 \pm 9.2195445729289}{6}
\]
Good! Now that the equation is simplified, you need to solve the equation. Here we solve for the root using addition.

\[(7 + 9.2195445729289)\]
\[ 6 \]

\[16.219544572929\]
\[ 6 \]

\[ \text{root1} = 2.70325740954882 \]

Now round to the nearest thousandth.

\[ x = 2.703 \]
Type in 2.703

B) \[ 3x^2 - 7x - 3 = 0 \]

What is the value of the remaining root: (Round to the nearest thousandths if applicable, though the answer might not be a decimal.)

**Algebraic Expression:**

-0.37
2.703
2.703
Hints:
- Remember we used the *quadratic* formula to get to this point:

\[
\frac{-b \pm \sqrt{b^2 - 4ac}}{2a}
\]

- Since we used addition on the previous root we must use *subtraction* here rather than addition.
- Now we will use subtraction to get the remaining root.

\[
\frac{7 \pm 9.2195445729289}{6}
\]

\[
\frac{7 - 9.2195445729289}{6}
\]

\[
-2.2195445729289
\]

\[
\frac{6}{6}
\]

root 2 = -0.369924076215482

Now round to the nearest thousandth.

x = -0.37

---

46) Problem #PRADCPA "PRADCPA - 43232 - Factoring polynomials (Quadratic Formula)"

A) Solve for the two roots of the following equation,

(Round to the nearest thousandths if applicable, though the answer might not be a decimal.)

This problem is divided into two parts, you will first be asked for the one root then the other:

\[3x^2 - 6x - 3 = 0\]
What is one root of this equation?

**Algebraic Expression:**
- 2.414
- -0.414
- 2.414
- -0.414

**Hints:**
- The polynomial does not factor easily so to find the roots of this equation, you can use the **quadratic** formula.

\[
-x = \frac{-b \pm \sqrt{b^2 - 4ac}}{2a}
\]

- a, b, and c can be found here:

\[ax^2 + bx + c = 0\]

\[(3x^2) - 6x - 3\]

- a = 3
- b = -6
- c = -3

- Now, you can just plug those terms into the **quadratic** formula.
  Term A = 3  Term B = -6  Term C = -3

\[
-x = \frac{-(-6) \pm \sqrt{(-6)^2 - 4(3\cdot-3)}}{2\cdot3}
\]

- Regardless of which root we're solving for, we should simplify the expression.
Good! Now that the equation is simplified, you need to solve the equation. Here we solve for the root using addition.
\[ (6 \pm 8.48528137423857) \]
\[ \frac{6}{6} \]

\[ 14.4852813742386 \]
\[ \frac{6}{6} \]

root1 = 2.41421356237309

Now round to the nearest thousandth.

\[ x = 2.414 \]
Type in 2.414

B) \[ 3x^2 - 6x - 3 = 0 \]

What is the value of the remaining root: (Round to the nearest thousandths if applicable, though the answer might not be a decimal.)

**Algebraic Expression:**
- \(-0.414\)
- \(2.414\)
- \(2.414\)
- \(2.414\)
- \(-0.414\)

**Hints:**
- Remember we used the **quadratic** formula to get to this point:
  \[ 6 \pm 8.48528137423857 \]
- \[ \frac{6}{6} \]
- Since we used addition on the previous root we must use **subtraction** here rather than addition.
Now we will use subtraction to get the remaining root.

\[
(6-8.48528137423857) \div 6
\]

\[
-2.48528137423857 \div 6
\]

Root 2 = -0.414213562373095

Now round to the nearest thousandth.

\[x = -0.414\]

A) Solve for the two roots of the following equation, (Round to the nearest thousandths if applicable, though the answer might not be a decimal.)

This problem is divided into two parts, you will first be asked for the one root then the other:

\[1x^2 - 7x - 2 = 0\]

What is one root of this equation?

**Algebraic Expression:**

- 7.275
- -0.275
- 7.275
- -0.275

**Hints:**

- The polynomial does not factor easily so to find the roots of this equation, you can use the quadratic formula.
\[ \frac{-b \pm \sqrt{b^2 - 4ac}}{2a} \]

- a, b, and c can be found here:

\[ ax^2 + bx + c = 0 \]

\[ (1x^2) - 7x - 2 \]

\[ a = 1 \]
\[ b = -7 \]
\[ c = -2 \]

- Now, you can just plug those terms into the **quadratic** formula.
  Term A = 1   Term B = -7   Term C = -2

\[ \frac{-(-7) \pm \sqrt{((-7)^2 - 4(1*-2))}}{2*1} \]

\[ \frac{-(-7) \pm \sqrt{((-7)^2 - 4(1*-2))}}{2*1} \]

- Regardless of which root we're solving for, we should simplify the expression.

\[ \frac{-(-7) \pm \sqrt{((-7)^2 - 4(1*-2))}}{2*1} \]

\[ \frac{-(-7) \pm \sqrt{((-7)^2 - 4(1*-2))}}{2*1} \]

\[ 7 \pm \sqrt{49+8} \]
Good! Now that the equation is simplified, you need to solve the equation. Here we solve for the root using addition.
root1 = 7.27491721763537

Now round to the nearest thousandth.

x = 7.275
Type in 7.275

B) \( x^2 - 7x - 2 = 0 \)

What is the value of the remaining root? (Round to the nearest thousandths if applicable, though the answer might not be a decimal.)

**Algebraic Expression:**

-0.275
7.275
7.275
7.275
-0.275

**Hints:**

- Remember we used the quadratic formula to get to this point:

\[
\frac{7 \pm \sqrt{7.54983443527075}}{2}
\]

- Since we used addition on the previous root we must use subtraction here rather than addition.
- Now we will use subtraction to get the remaining root:

\[
\frac{(7 - \sqrt{7.54983443527075})}{2}
\]
root 2 = -0.274917217635375

Now round to the nearest thousandth.

x = -0.275

48) Problem #PRADCPC "PRADCPC - 43232 - Factoring polynomials (Quadratic Formula)"

A) Solve for the two roots of the following equation,
(Round to the nearest thousandths if applicable, though the answer might not be a decimal.)

This problem is divided into two parts, you will first be asked for the one root then the other:

\[ 1x^2 - 7x - 1 = 0 \]

What is one root of this equation?

**Algebraic Expression:**

✓ 7.14
✓ -0.14
✓ 7.14
✓ -0.14

**Hints:**

- The polynomial does not factor easily so to find the roots of this equation, you can use the quadratic formula.

\[ \frac{-b \pm \sqrt{b^2 - 4ac}}{2a} \]

- a, b, and c can be found here:

\[ ax^2 + bx + c = 0 \]

\[ (1 \cdot x^2) - 7x - 1 \]

a = 1
\[b = -7\]
\[c = -1\]

- Now, you can just plug those terms into the quadratic formula.
  Term A = 1  Term B = -7  Term C = -1

\[-(7) \pm \sqrt{(-7)^2 - 4(1 \times -1)} \]
\[2 \times 1\]

- Regardless of which root we're solving for, we should simplify the expression.

\[-(7) \pm \sqrt{(-7)^2 - 4(1 \times -1)} \]
\[2 \times 1\]

\[-(7) \pm \sqrt{(-7)^2 - 4(1 \times -1)} \]
\[2 \times 1\]

\[7 \pm \sqrt{49 + 4} \]
\[2\]

\[7 \pm \sqrt{53} \]
\[2\]
$\frac{7 \pm 7.28010988928052}{2}$

Good! Now that the equation is simplified, you need to solve the equation. Here we solve for the root using addition.

$\frac{14.28010988928052}{2}$

$\text{root}1 = 7.14005494464026$

Now round to the nearest thousandth.

$x = 7.14$

Type in 7.14
B) \(1x^2-7x-1 = 0\)

What is the value of the remaining root? (Round to the nearest thousandths if applicable, though the answer might not be a decimal.)

**Algebraic Expression:**

\[\checkmark -0.14\]
\[\checkmark 7.14\]
\[\checkmark 7.14\]
\[\checkmark -0.14\]

**Hints:**
- Remember we used the *quadratic* formula to get to this point:
  \[
  \frac{7\pm 7.28010988928052}{2}
  \]
- Since we used addition on the previous root we must use *subtraction* here rather than addition.
- Now we will use subtraction to get the remaining root.

\[
\frac{(7-7.28010988928052)}{2}
\]

\[\frac{-0.28010988928052}{2}\]

\[\text{root } 2=-0.14005494464026\]

Now round to the nearest thousandth.

\[x=-0.14\]
49) Problem #PRADCPD "PRADCPD - 43232 - Factoring polynomials (Quadratic Formula)"

A) Solve for the two roots of the following equation,
(Round to the nearest thousandths if applicable, though the answer might not be a decimal.)

This problem is divided into two parts, you will first be asked for the one root then the other:

\[ 2x^2 - 9x - 1 = 0 \]

What is one root of this equation?

**Algebraic Expression:**

- 4.608
- -0.108
- 4.609
- -0.109

**Hints:**

- The polynomial does not factor easily so to find the roots of this equation, you can use the **quadratic** formula.

\[ \frac{-b \pm \sqrt{b^2 - 4ac}}{2a} \]

- a, b, and c can be found here:

\[ ax^2 + bx + c = 0 \]

\[ (2x^2) - 9x - 1 \]

a = 2
b = -9
c = -1

- Now, you can just plug those terms into the **quadratic** formula.

Term A = 2  Term B = -9  Term C = -1

\[ \frac{-(9) \pm \sqrt{(-9)^2 - 4(2*-1)}}{2*2} \]
Regardless of which root we're solving for, we should simplify the expression.

\[-9 \pm \sqrt{(-9)^2 - 4(2*-1)}\]
\[\frac{2}{2}\]

\[-9 \pm \sqrt{(-9)^2 - 4(2*-1)}\]
\[\frac{2}{2}\]

\[9 \pm \sqrt{(81+8)}\]
\[\frac{4}{4}\]

\[9 \pm \sqrt{(88,9999999999999)}\]
\[\frac{4}{4}\]

\[9 \pm 9.4339811320566\]
\[\frac{4}{4}\]
Good! Now that the equation is simplified, you need to solve the equation. Here we solve for the root using addition.

\[
\frac{(9 + 9.4339811320566)}{4} = 18.4339811320566
\]

\[
\frac{4}{4}
\]

\[
\text{root1} = 4.60849528301415
\]

Now round to the nearest thousandth.

\[
x = 4.608
\]

Type in 4.608

B) \(2x^2 - 9x - 1 = 0\)

What is the value of the remaining root: (Round to the nearest thousandths if applicable, though the answer might not be a decimal.)

**Algebraic Expression:**

-0.108

4.608

4.609
Hints:
- Remember we used the *quadratic* formula to get to this point:

\[
\frac{9 \pm 9.4339811320566}{4}
\]

- Since we used addition on the previous root we must use *subtraction* here rather than addition.
- Now we will use subtraction to get the remaining root.

\[
(9-9.4339811320566) \quad \frac{4}{4}
\]

\[
-0.4339811320566 \quad \frac{4}{4}
\]

root 2 = -0.10849528301415

Now round to the nearest thousandth.

x = -0.108

---

50) Problem #PRADCPE "PRADCPE - 43232 - Factoring polynomials (Quadratic Formula)"
A) Solve for the two roots of the following equation,
(Round to the nearest thousandths if applicable, though the answer might not be a decimal.)

This problem is divided into two parts, you will first be asked for the one root then the other:

\[
x^2 - 6x - 3 = 0
\]
What is one root of this equation?

Algebraic Expression:

√ 6.464
√ -0.464
√ 6.464
√ -0.464
√ -0.464

Hints:
- The polynomial does not factor easily so to find the roots of this equation, you can use the quadratic formula.

\[-b \pm \sqrt{b^2 - 4ac} \over 2a\]

- a, b, and c can be found here:

\[ax^2 + bx + c = 0\]

\[(1x^2) - 6x - 3\]

a = 1
b = -6
c = -3

- Now, you can just plug those terms into the quadratic formula. Term A = 1 Term B = -6 Term C = -3

\[-(-6) \pm \sqrt{(-6)^2 - 4(1*-3)} \over 2 * 1\]

- Regardless of which root we're solving for, we should simplify the expression.
Good! Now that the equation is simplified, you need to solve the equation. Here we solve for the root using addition.
(6 \pm 6.92820323027551) \over 2

12.9282032302755

\over 2

\text{root}_1 = 6.46410161513776

Now round to the nearest thousandth.

x = 6.464
Type in 6.464

B) \ 1x^2 - 6x - 3 = 0

What is the value of the \text{remaining} root: (Round to the nearest thousandths if applicable, though the answer might not be a decimal.)

\text{Algebraic Expression:}

✓ -0.464
✓ 6.464
✓ 6.464
✓ -0.464
✓ 6.464
	
\text{Hints:}

• Remember we used the \textbf{quadratic} formula to get to this point:

\[6 \pm 6.92820323027551 \over 2\]

• Since we used addition on the previous root we must use \textit{subtraction} here rather than addition.
Now we will use subtraction to get the remaining root.

\[
(6 - 6.92820323027551) \\
\frac{2}{2}
\]

\[-0.92820323027551 \\
\frac{2}{2}
\]

\[\text{root 2} = -0.464101615137755\]

Now round to the nearest thousandth.

\[x = -0.464\]

51) Problem #PRADCPF "PRADCPF - 43232 - Factoring polynomials (Quadratic Formula)"
A) Solve for the two roots of the following equation,
(Round to the nearest thousandths if applicable, though the answer might not be a decimal.)

This problem is divided into two parts, you will first be asked for one root then the other:

\[3x^2 + 6x - 2 = 0\]

What is one root of this equation?

**Algebraic Expression:**

- 0.291
- -2.291
- 0.291
- -2.291

**Hints:**
- The polynomial does not factor easily so to find the roots of this equation, you can use the quadratic formula.
\[-b \pm \sqrt{b^2 - 4ac}\]
\[\frac{2a}{2a}\]

- a, b, and c can be found here:

\[ax^2 + bx + c = 0\]

\[(3x^2) + 6x - 2\]

\[a = 3\]
\[b = 6\]
\[c = -2\]

- Now, you can just plug those terms into the \textit{quadratic} formula.
  Term A = 3  Term B = 6  Term C = -2

\[-6 \pm \sqrt{(6^2 - 4(3*-2))}\]
\[\frac{2*3}{2*3}\]

- Now lets simplify the expression.

\[-6 \pm \sqrt{(36 + 24)}\]
Good! Now that the equation is simplified, you need to solve the equation. Here we will solve for the first root using addition.
root1 = 0.29099448735805

Now round to the nearest thousandth.

x = 0.291
Type in 0.291

B) 3x^2 + 6x - 2 = 0

What is the value of the second root? (Round to the nearest thousandths if applicable, though the answer might not be a decimal.)

Algebraic Expression:
✓ -2.291
✓ 0.291
✓ 0.291
✓ 0.291
✓ -2.291

Hints:
- Remember we used the quadratic formula to get to this point:

\[-6 \pm 7.74596669241483\]
\[6\]

- Since we used addition on the previous root we must now use subtraction here.
- Now we will use subtraction to get the second root.

\[(-6 - 7.74596669241483)\]
\[6\]
Now round to the nearest thousandth.

x = -2.291
b = 6

c = -3

- Now, you can just plug those terms into the \textbf{quadratic} formula.

Term A = 3  Term B = 6  Term C = -3

\[-6 \pm \sqrt{(6^2 - 4(3 \times -3))} \over 2 \times 3\]

- Now lets simplify the expression.

\[-6 \pm \sqrt{(36 + 36)} \over 6\]
\(-6 \pm 8.48528137423857\)
\[ \frac{6}{6} \]

Good! Now that the equation is simplified, you need to solve the equation. Here we will solve for the first root using addition.

\((-6+8.48528137423857)\)
\[ \frac{6}{6} \]

\[ \frac{2.48528137423857}{6} \]

\[ \text{root1} = 0.414213562373095 \]

Now round to the nearest thousandth.

\[ x = 0.414 \]
\[ \text{Type in } 0.414 \]
B) \(3x^2+6x-3 = 0\)

What is the value of the second root? (Round to the nearest thousandths if applicable, though the answer might not be a decimal.)

**Algebraic Expression:**

-2.414

-2.414

0.414

0.414

0.414

**Hints:**

- Remember we used the *quadratic* formula to get to this point:

  \[
  \frac{-6 \pm 8.48528137423857}{6}
  \]

- Since we used addition on the previous root we must now use *subtraction* here.

- Now we will use subtraction to get the second root.

\[
\frac{-6-8.48528137423857}{6}
\]

-14.4852813742386

-14.4852813742386

**root 2 = -2.41421356237309**

Now round to the nearest thousandth.

**x = -2.414**
A) Solve for the two roots of the following equation,
(Round to the nearest thousandths if applicable, though the answer might not be a decimal.)

This problem is divided into two parts, you will first be asked for one root then the other:

\[ 3x^2 + 7x - 3 = 0 \]

What is one root of this equation?

**Algebraic Expression:**

- 0.37
- 2.703
- 0.37
- 2.703

**Hints:**
- The polynomial does not factor easily so to find the roots of this equation, you can use the **quadratic** formula.

\[
\frac{-b \pm \sqrt{b^2 - 4ac}}{2a}
\]

- a, b, and c can be found here:

\[ ax^2 + bx + c = 0 \]

\[ (3x^2) + 7x - 3 \]

- \( a = 3 \)
- \( b = 7 \)
- \( c = -3 \)

- Now, you can just plug those terms into the **quadratic** formula.

Term \( A = 3 \) Term \( B = 7 \) Term \( C = -3 \)

\[
\frac{-7 \pm \sqrt{7^2 - 4(3 \times -3)}}{2 \times 3}
\]
Now let's simplify the expression.

\[-7 \pm \sqrt{(7^2 - 4(3*-3))} \div 2*3\]

\[-7 \pm \sqrt{(7^2 - 4(3*-3))} \div 2*3\]

\[-7 \pm \sqrt{(49 + 36)} \div 6\]

\[-7 \pm \sqrt{(85,000,000,000,001)} \div 6\]

\[-7 \pm 9,219,544,457,292,89 \div 6\]
Good! Now that the equation is simplified, you need to solve the equation. Here we will solve for the first root using addition.

\((-7+9.2195445729289)\)

\[ \begin{array}{c}
\frac{2.2195445729289}{6} \\
\end{array} \]

\[ \text{root1} = 0.369924076215482 \]

Now round to the nearest thousandth.

\[ x = 0.37 \]

Type in 0.37

What is the value of the second root: (Round to the nearest thousandths if applicable, though the answer might not be a decimal.)

\[ \text{Algebraic Expression:} \]

\[ \sqrt[3]{2.703} \]

\[ \sqrt[3]{0.37} \]

\[ \sqrt[3]{0.37} \]

\[ 0.37 \]
-2.703

Hints:
- Remember we used the \textit{quadratic} formula to get to this point:

\[
\frac{-7\pm9.21954445729289}{6}
\]

- Since we used addition on the previous root we must now use \textit{subtraction} here.
- Now we will use subtraction to get the second root.

\[
\left(\frac{-7-9.21954445729289}{6}\right)
\]

\[
\frac{-16.2195444572929}{6}
\]

\[
\text{root 2} = -2.70325740954882
\]

Now round to the nearest thousandth.

\[
x = -2.703
\]

---

54) Problem #PRADCPJ "PRADCPJ - 43232 - Factoring polynomials (Quadratic Formula)"

A) Solve for the two \textit{roots} of the following equation,

(Round to the nearest thousandths if applicable, though the answer might not be a decimal.)

This problem is divided into two parts, you will first be asked for one root then the other:

\[
1x^2 + 9x - 2 = 0
\]
What is one root of this equation?

**Algebraic Expression:**

- 0.217
- -9.217
- 0.217
- -9.217

**Hints:**
- The polynomial does not factor easily so to find the roots of this equation, you can use the **quadratic** formula.

\[
\frac{-b \pm \sqrt{b^2 - 4ac}}{2a}
\]

- a, b, and c can be found here:

\[
a = 1 \\
b = 9 \\
c = -2
\]

- Now, you can just plug those terms into the **quadratic** formula. Term A = 1  Term B = 9  Term C = -2

\[
\frac{-9 \pm \sqrt{9^2 - 4(1\cdot-2)}}{2\cdot1}
\]

- Now lets simplify the expression.

\[
\frac{-9 \pm \sqrt{9^2 - 4(1\cdot-2)}}{2}
\]
Good! Now that the equation is simplified, you need to solve the equation. Here we will solve for the first root using addition.
(-9 + 9.4339811320566)
2

0.4339811320566
2

root1 = 0.2169905660283
Now round to the nearest thousandth.

x = 0.217
Type in 0.217

B) 1x^2 + 9x - 2 = 0

What is the value of the second root: (Round to the nearest thousandths if applicable, though the answer might not be a decimal.)

Algebraic Expression:

✓ -9.217
✓ 0.217
✓ 0.217
✓ -9.217
✓ -9.4339811320566
2

Hints:
- Remember we used the quadratic formula to get to this point:

-9 ± 9.4339811320566
2

• Since we used addition on the previous root we must now use subtraction here.
Now we will use subtraction to get the second root.

\[
\frac{-9-9.4339811320566}{2}
\]

\[
\frac{-18.4339811320566}{2}
\]

\[\text{root 2} = -9.2169905660283\]

Now round to the nearest thousandth.

\[x = -9.217\]
\[ -\frac{b \pm \sqrt{b^2 - 4ac}}{2a} \]

- a, b, and c can be found here:

\[ ax^2 + bx + c = 0 \]

\[ (3x^2) + 6x - 1 \]

\[
\begin{align*}
a &= 3 \\
b &= 6 \\
c &= -1
\end{align*}
\]

- Now, you can just plug those terms into the quadratic formula.
  Term A = 3   Term B = 6   Term C = -1

\[
-\frac{6 \pm \sqrt{(6^2 - 4(3*-1))}}{2*3}
\]

- Now lets simplify the expression.

\[
-\frac{6 \pm \sqrt{36 + 12}}{2*3}
\]

\[-\frac{6 \pm \sqrt{36 + 12}}{2*3}
\]
Good! Now that the equation is simplified, you need to solve the equation. Here we will solve for the first root using addition.

\[-6 \pm \sqrt{48}\]

\[-6 \pm 6.92820323027551\]
root1 = 0.154700538379252

Now round to the nearest thousandth.

x = 0.155
Type in 0.155

B) 3x^2 + 6x - 1 = 0

What is the value of the second root: (Round to the nearest thousandths if applicable, though the answer might not be a decimal.)

Algebraic Expression:
✓ -2.155
✓ 0.155
✓ 0.155
✓ 0.155
✓ -2.155

Hints:
- Remember we used the quadratic formula to get to this point:

\[-6 \pm 6.92820323027551\]

\[6\]

- Since we used addition on the previous root we must now use subtraction here.
- Now we will use subtraction to get the second root.

\[(-6 - 6.92820323027551)\]

\[6\]
root 2 = -2.15470053837925

Now round to the nearest thousandth.

x = -2.155

56) Problem #PRADCPM "PRADCPM - 43232 - Factoring polynomials (Quadratic Formula)"
A) Solve for the two roots of the following equation,
(Round to the nearest thousandths if applicable, though the answer might not be a decimal.)

This problem is divided into two parts, you will first be asked for one root then the other:

$$2x^2 + 9x - 2 = 0$$

What is one root of this equation?

**Algebraic Expression:**

- 0.212
- -4.712
- 0.212
- -4.712

**Hints:**

- The polynomial does not factor easily so to find the roots of this equation, you can use the **quadratic** formula.

$$\frac{-b \pm \sqrt{b^2 - 4ac}}{2a}$$

- a, b, and c can be found here:

$$ax^2 + bx + c = 0$$

$$(2x^2) + 9x - 2$$

$$a = 2$$
Now, you can just plug those terms into the **quadratic** formula. Term $A = 2$  Term $B = 9$  Term $C = -2$

\[-9 \pm \sqrt{(9^2 - 4(2*-2))} \]
\[\frac{2*2}{2*2}\]

Now let's simplify the expression.

\[-9 \pm \sqrt{(9^2 - 4(2*-2))} \]
\[\frac{2*2}{2*2}\]

\[-9 \pm \sqrt{(81+16)} \]
\[\frac{4}{4}\]

\[-9 \pm \sqrt{(96.999999999999999)} \]
\[\frac{4}{4}\]
Good! Now that the equation is simplified, you need to solve the equation. Here we will solve for the first root using addition.

\[ \frac{-9 \pm 9.8488578017961}{4} \]

Now round to the nearest thousandth.

\[ x = 0.212 \]

Type in 0.212
B) \(2x^2+9x-2 = 0\)

What is the value of the second root? (Round to the nearest thousandths if applicable, though the answer might not be a decimal.)

**Algebraic Expression:**

\[
\begin{align*}
\checkmark & -4.712 \\
\checkmark & 0.212 \\
\checkmark & 0.212 \\
\checkmark & -4.712 \\
\end{align*}
\]

**Hints:**

- Remember we used the *quadratic* formula to get to this point:

\[
\frac{-9 \pm \sqrt{9.8488578017961}}{4}
\]

- Since we used addition on the previous root we must now use *subtraction* here.
- Now we will use subtraction to get the second root.

\[
\begin{align*}
\frac{-9 - 9.8488578017961}{4} &= -18.8488578017961 \\
\frac{4}{4} &= -18.8488578017961 \\
\text{root } 2 &= -4.71221445044903 \\
\text{Now round to the nearest thousandth.}
\end{align*}
\]

\[x = -4.712\]
A) Solve for the two roots of the following equation,
(Round to the nearest thousandths if applicable, though the answer might not be a decimal.)

This problem is divided into two parts, you will first be asked for one root then the other:

$$3x^2 + 6x - 2 = 0$$

What is one root of this equation?

**Algebraic Expression:**

- 0.291
- -2.291
- 0.291
- -2.291

**Hints:**

- The polynomial does not factor easily so to find the roots of this equation, you can use the **quadratic** formula.

$$\frac{-b \pm \sqrt{b^2 - 4ac}}{2a}$$

- a, b, and c can be found here:

$$ax^2 + bx + c = 0$$

$$(3x^2) + 6x - 2$$

- a = 3
- b = 6
- c = -2

- Now, you can just plug those terms into the **quadratic** formula.
  Term A = 3  Term B = 6  Term C = -2

$$\frac{-6 \pm \sqrt{6^2 - 4(3*-2)}}{2*3}$$
Now let's simplify the expression.

\[-6 \pm \sqrt{(6^2 - 4(3-2))} \]
\[
\frac{2 \times 3}{2 \times 3}
\]

\[-6 \pm \sqrt{(6^2 - 4(3-2))} \]
\[
\frac{2 \times 3}{2 \times 3}
\]

\[-6 \pm \sqrt{(36 + 24)} \]
\[
\frac{6}{6}
\]

\[-6 \pm \sqrt{(59.9999999999999)} \]
\[
\frac{6}{6}
\]

\[-6 \pm 7.7456669241483 \]
\[
\frac{6}{6}
\]
Good! Now that the equation is simplified, you need to solve the equation. Here we will solve for the first root using addition.

\[-6 + 7.7459669241483\]
\[\quad 6\]

\[1.7459669241483\]
\[\quad 6\]

\[
\text{root}_1 = 0.290994448735805
\]

Now round to the nearest thousandth.

\[x = 0.291\]

Type in 0.291

B) \[3x^2 + 6x - 2 = 0\]

What is the value of the second root: (Round to the nearest thousandths if applicable, though the answer might not be a decimal.)

**Algebraic Expression:**

- 2.291
- 0.291

0.291
-2.291

Hints:
- Remember we used the quadratic formula to get to this point:
  \[ \frac{-6 \pm \sqrt{7.74596669241483}}{6} \]
- Since we used addition on the previous root we must now use subtraction here.
- Now we will use subtraction to get the second root.

\[ \frac{-6 - \sqrt{7.74596669241483}}{6} = \frac{-13.7459666924148}{6} \]

root 2 = -2.2909944487358

Now round to the nearest thousandth.

x = -2.291

---

58) Problem #PRADCPP "PRADCPP - 43232 - Factoring polynomials (Quadratic Formula)"

A) Solve for the two roots of the following equation,
(Round to the nearest thousandths if applicable, though the answer might not be a decimal.)

This problem is divided into two parts, you will first be asked for one root then the other:

\[ 3x^2+9x-3 = 0 \]
What is one root of this equation?

**Algebraic Expression:**
- 0.303
- -3.303
- 0.303
- -3.303

**Hints:**
- The polynomial does not factor easily so to find the roots of this equation, you can use the **quadratic** formula.

\[-\frac{b \pm \sqrt{b^2 - 4ac}}{2a}\]

- \(a, b,\) and \(c\) can be found here:

\[ax^2 + bx + c = 0\]

\[(3x^2) + 9x - 3\]

- \(a = 3\)
- \(b = 9\)
- \(c = -3\)

- Now, you can just plug those terms into the **quadratic** formula.
Term \(A = 3\)  Term \(B = 9\)  Term \(C = -3\)

\[-\frac{-9 \pm \sqrt{9^2 - 4(3*-3)}}{2*3}\]

- Now lets simplify the expression.

\[-9 \pm \sqrt{9^2 - 4(3*-3)}\]
\[
2 \times 3
\]

\[
-9 \pm \sqrt{(9^2 - 4(2 \times -3))}
\]

\[
2 \times 3
\]

\[
-9 \pm \sqrt{(81 + 36)}
\]

\[
6
\]

\[
-9 \pm \sqrt{117.000000000001}
\]

\[
6
\]

\[
-9 \pm 10.816653826392
\]

\[
6
\]

Good! Now that the equation is simplified, you need to solve the equation. Here we will solve for the first root using addition.
\[
\begin{align*}
(-9 &+ 10.816653826392) \\
&\div 6 \\
\end{align*}
\]

\[
\begin{align*}
1.816653826392 \\
&\div 6 \\
\end{align*}
\]

root1 = 0.302775637732

Now round to the nearest thousandth.

\[
\begin{align*}
x &= 0.303 \\
\text{Type in 0.303} \\
\end{align*}
\]

B) \( 3x^2 + 9x - 3 = 0 \)

What is the value of the second root: (Round to the nearest thousandths if applicable, though the answer might not be a decimal.)

**Algebraic Expression:**

\[
\begin{align*}
\checkmark -3.303 \\
\checkmark 0.303 \\
\checkmark 0.303 \\
\checkmark -3.303 \\
\end{align*}
\]

**Hints:**

- Remember we used the quadratic formula to get to this point:

\[
\begin{align*}
-9 &\pm 10.816653826392 \\
&\div 6 \\
\end{align*}
\]

- Since we used addition on the previous root we must now use subtraction here.
Now we will use subtraction to get the second root.

\[
\begin{align*}
(-9-10.816653826392) \\
6
\end{align*}
\]

\[
\begin{align*}
-19.816653826392 \\
6
\end{align*}
\]

root 2 = -3.302775637732

Now round to the nearest thousandth.

x = -3.303

☐ 59) Problem #PRADCPQ "PRADCPQ - 43232 - Factoring polynomials (Quadratic Formula)"

A) Solve for the two roots of the following equation, (Round to the nearest thousandths if applicable, though the answer might not be a decimal.)

This problem is divided into two parts, you will first be asked for one root then the other:

\[3x^2 + 6x - 3 = 0\]

What is one root of this equation?

**Algebraic Expression:**

- 0.414
- -2.414
- 0.414
- -2.414

**Hints:**

- The polynomial does not factor easily so to find the roots of this equation, you can use the quadratic formula.
\[ \frac{-b \pm \sqrt{b^2 - 4ac}}{2a} \]

- a, b, and c can be found here:

\[ ax^2 + bx + c = 0 \]

\[(3x^2) + 6x - 3\]

\[ a = 3 \]
\[ b = 6 \]
\[ c = -3 \]

- Now, you can just plug those terms into the quadratic formula.
  Term \( A = 3 \)  Term \( B = 6 \)  Term \( C = -3 \)

\[ \frac{-6 \pm \sqrt{(6^2 - 4(3*-3))}}{2*3} \]

- Now let's simplify the expression.

\[ \frac{-6 \pm \sqrt{(36 + 36)}}{2*3} \]

\[ \frac{-6 \pm \sqrt{72}}{2*3} \]

\[ \frac{-6 \pm 6}{2*3} \]

\[ -6 \pm 3 \]
Good! Now that the equation is simplified, you need to solve the equation. Here we will solve for the first root using addition.

\[-6 \pm \sqrt{72} \]

\[-6 \pm 8.48528137423857 \]

\[\frac{-6 \pm 8.48528137423857}{6} \]

\[\frac{-6}{6} \pm \frac{8.48528137423857}{6} \]

\[2.48528137423857 \]
root1 = 0.414213562373095

Now round to the nearest thousandth.

x = 0.414
Type in 0.414

B) \(3x^2 + 6x - 3 = 0\)

What is the value of the second root? (Round to the nearest thousandths if applicable, though the answer might not be a decimal.)

**Algebraic Expression:**

\[ \pm \frac{6 \pm 8.48528137423857}{6} \]

**Hints:**
- Remember we used the quadratic formula to get to this point:

\[ \frac{-6 \pm 8.48528137423857}{6} \]
- Since we used addition on the previous root we must now use subtraction here.
- Now we will use subtraction to get the second root.

\[ \frac{-6 - 8.48528137423857}{6} \]
Now round to the nearest thousandth.

\[ x = -2.414 \]

**Problem #PRADCPR - 43232 - Factoring polynomials (Quadratic Formula)**

**A)** Solve for the two roots of the following equation, (Round to the nearest thousandths if applicable, though the answer might not be a decimal.)

This problem is divided into two parts, you will first be asked for one root then the other:

\[ 2x^2 + 6x - 3 = 0 \]

What is one root of this equation?

**Algebraic Expression:**

- 0.436
- -3.436
- 0.437
- -3.437

**Hints:**

- The polynomial does not factor easily so to find the roots of this equation, you can use the quadratic formula.

\[ x = \frac{-b \pm \sqrt{b^2 - 4ac}}{2a} \]

- a, b, and c can be found here:

\[ ax^2 + bx + c = 0 \]

\[ (2x^2) + 6x - 3 \]

\[ a = 2 \]
b = 6
c = -3

- Now, you can just plug those terms into the quadratic formula. Term A = 2  Term B = 6  Term C = -3

\[-6 \pm \sqrt{(6^2 - 4(2*-3))}\]
\[2*2\]

- Now let's simplify the expression.

\[-6 \pm \sqrt{(6^2 - 4(2*-3))}\]
\[2*2\]

\[-6 \pm \sqrt{(36 + 24)}\]
\[4\]

\[-6 \pm \sqrt{(59.9999999999999)}\]
\[4\]
Good! Now that the equation is simplified, you need to solve the equation. Here we will solve for the first root using addition.

\[
\frac{-6 \pm \sqrt{7.74596669241483}}{4}
\]

1.74596669241483
\[
\frac{4}
\]

\[
root_1 = 0.436491673103707
\]

Now round to the nearest thousandth.

\[
x = 0.436
\]

Type in 0.436
B) \[ 2x^2 + 6x - 3 = 0 \]

What is the value of the second root?  
(Round to the nearest thousandths if applicable, though the answer might not be a decimal.)

**Algebraic Expression:**

-3.436

-0.436

0.437

0.437

-3.437

**Hints:**

- Remember we used the quadratic formula to get to this point:

\[-6 \pm 7.7459669241483 \over 4\]

- Since we used addition on the previous root we must now use subtraction here.
- Now we will use subtraction to get the second root.

\[ (-6 - 7.7459669241483) \over 4\]

\[\frac{-13.7459669241483}{4}\]

root 2 = -3.43649167310371

Now round to the nearest thousandth.

x = -3.436
A) Solve for the two roots of the following equation, (Round to the nearest thousandths if applicable, though the answer might not be a decimal.)

This problem is divided into two parts, you will first be asked for one root then the other:

\[ 3x^2 + 9x - 1 = 0 \]

What is one root of this equation?

**Algebraic Expression:**

- 0.107
- -3.107
- 0.107
- 0.107
- -3.107

**Hints:**

- The polynomial does not factor easily so to find the roots of this equation, you can use the quadratic formula.

\[ \frac{-b \pm \sqrt{b^2 - 4ac}}{2a} \]

- a, b, and c can be found here:

\[ ax^2 + bx + c = 0 \]

\[ (3x^2) + 9x - 1 \]

a = 3  
b = 9  
c = -1

- Now, you can just plug those terms into the quadratic formula.  
Term A = 3  Term B = 9  Term C = -1

\[ \frac{-9 \pm \sqrt{9^2 - 4(3 \times -1)}}{2 \times 3} \]
Now let's simplify the expression.

\[-9 \pm \sqrt{\left(9^2 - 4(3*-1)\right)} \div 2*3\]

\[-9 \pm \sqrt{\left(9^2 - 4(3*-1)\right)} \div 2*3\]

\[-9 \pm \sqrt{\left(81+12\right)} \div 6\]

\[-9 \pm \sqrt{\left(92.9999999999999\right)} \div 6\]

\[-9 \pm 9.64365076099295 \div 6\]
Good! Now that the equation is simplified, you need to solve the equation. Here we will solve for the first root using addition.

\((-9+9.64365076099295)\)
\[\frac{6}{6}\]

\[0.64365076099295\]
\[\frac{6}{6}\]

\[\text{root1} = 0.107275126832158\]

Now round to the nearest thousandth.

\[x = 0.107\]
Type in 0.107

B) \[3x^2+9x-1 = 0\]

What is the value of the second root: (Round to the nearest thousandths if applicable, though the answer might not be a decimal.)

**Algebraic Expression:**

-3.107
0.107
0.107
-3.107

Hints:
- Remember we used the quadratic formula to get to this point:
  \[-9 \pm 9.64365076099295 \]
  \[6\]
- Since we used addition on the previous root we must now use subtraction here.
- Now we will use subtraction to get the second root.

\[(-9 - 9.64365076099295)\]
\[6\]

\[-18.6436507609929 \]
\[6\]

\[\text{root } 2 = -3.10727512683216\]

Now round to the nearest thousandth.

\[x = -3.107\]
What is one root of this equation?

**Algebraic Expression:**

✓ 0.37  
✓ -2.703  
✓ 0.37  
✓ -2.703  

**Hints:**

- The polynomial does not factor easily so to find the roots of this equation, you can use the **quadratic** formula.

\[ \frac{-b \pm \sqrt{b^2 - 4ac}}{2a} \]

- a, b, and c can be found here:

\[ ax^2 + bx + c = 0 \]

\[ (3x^2) + 7x - 3 \]

\[ a = 3 \]
\[ b = 7 \]
\[ c = -3 \]

- Now, you can just plug those terms into the **quadratic** formula.

Term A = 3  Term B = 7  Term C = -3

\[ -7 \pm \sqrt{(7^2 - 4(3*-3))} \]
\[ 2*3 \]

Now lets simplify the expression.

\[ -7 \pm \sqrt{(7^2 - 4(3*-3))} \]
-7±\sqrt{(7^2-4(3*-3))}
\frac{-7±\sqrt{49+36}}{2*3}
6

-7±\sqrt{(85.0000000000001)}
\frac{-7±\sqrt{85.0000000000001}}{6}

-7±9.21954445729289
\frac{-7±9.21954445729289}{6}

Good! Now that the equation is simplified, you need to solve the equation. Here we will solve for the first root using addition.
(-7+9.21954445729289) 
6

2.21954445729289 
6

\[ \text{root1} = 0.369924076215482 \]

Now round to the nearest thousandth.

\[ x = 0.37 \]

Type in 0.37

B) \[ 3x^2+7x-3 = 0 \]

What is the value of the second root: (Round to the nearest thousandths if applicable, though the answer might not be a decimal.)

Algebraic Expression:

✓ -2.703
✓ 0.37
✓ 0.37
✓ -2.703

Hints:

- Remember we used the quadratic formula to get to this point:

\[ \frac{-7\pm9.21954445729289}{6} \]

Since we used addition on the previous root we must now use subtraction here.
Now we will use subtraction to get the second root.

\[
\begin{align*}
(7-9.21954445729289) \\
6
\end{align*}
\]

\[
\begin{align*}
-16.2195444572929 \\
6
\end{align*}
\]

\text{root 2} = -2.70325740954882

Now round to the nearest thousandth.

\[x = -2.703\]

---

63) Problem #PRADCPU "PRADCPU - 43232 - Factoring polynomials (Quadratic Formula)"

A) Solve for the two roots of the following equation,

(Round to the nearest thousandths if applicable, though the answer might not be a decimal.)

This problem is divided into two parts, you will first be asked for one root then the other:

\[2x^2 + 9x - 1 = 0\]

What is one root of this equation?

\textbf{Algebraic Expression:}

✓ 0.108
✓ -4.608
✓ 0.109
✓ -4.609

\textbf{Hints:}

• The polynomial does not factor easily so to find the roots of this equation, you can use the \textit{quadratic} formula.
\[-b \pm \sqrt{b^2 - 4ac}\]
\[
\quad \frac{2a}{2a}
\]
- a, b, and c can be found here:

\[ax^2 + bx + c = 0\]

\[(2x^2) + 9x - 1\]

\[
a = 2
\]
\[
b = 9
\]
\[
c = -1
\]

- Now, you can just plug those terms into the quadratic formula.  
  Term A = 2  Term B = 9  Term C = -1

\[-9 \pm \sqrt{9^2 - 4(2*-1)}\]
\[
\quad \frac{2*2}{2*2}
\]

- Now lets simplify the expression.

\[-9 \pm \sqrt{9^2 - 4(2*-1)}\]
\[
\quad \frac{2*2}{2*2}
\]

\[-9 \pm \sqrt{81 + 8}\]
\[-9 \pm \sqrt{88.9999999999999}
\]

\[-9 \pm 9.4339811320566
\]

Good! Now that the equation is simplified, you need to solve the equation. Here we will solve for the first root using addition.

\[(-9 + 9.4339811320566)\]

\[0.4339811320566
\]
root1 = 0.10849528301415

Now round to the nearest thousandth.

x = 0.108
Type in 0.108

B) \(2x^2 + 9x - 1 = 0\)

What is the value of the second root: (Round to the nearest thousandths if applicable, though the answer might not be a decimal.)

**Algebraic Expression:**

-4.608
0.108
0.109
-4.609

**Hints:**

- Remember we used the **quadratic** formula to get to this point:

\[
\frac{-9 \pm \sqrt{9^2 - 4 \cdot 2 \cdot (-1)}}{4}
\]

- Since we used addition on the previous root we must now use **subtraction** here.
- Now we will use subtraction to get the second root.

\[
(-9 - \sqrt{9^2 - 4 \cdot 2 \cdot (-1)}) / 4
\]
root 2 = -4.60849528301415

Now round to the nearest thousandth.

x = -4.608

64) Problem #PRADCPV "PRADCPV - 43232 - Factoring polynomials (Quadratic Formula)"

A) Solve for the two roots of the following equation,
(Round to the nearest thousandths if applicable, though the answer might not be a decimal.)

This problem is divided into two parts, you will first be asked for one root then the other:

\[ 2x^2 + 6x - 2 = 0 \]

What is one root of this equation?

**Algebraic Expression:**

- 0.303
- -3.303
- 0.303
- -3.303

**Hints:**

- The polynomial does not factor easily so to find the roots of this equation, you can use the **quadratic** formula.

\[ \frac{-b \pm \sqrt{b^2 - 4ac}}{2a} \]

- a, b, and c can be found here:

\[ ax^2 + bx + c = 0 \]

\[ (2x^2) + 6x - 2 \]

\[ a = 2 \]
b = 6
c = -2

- Now, you can just plug those terms into the \textbf{quadratic} formula. 
  Term A = 2  Term B = 6  Term C = --2

\[-6 \pm \sqrt{(6^2 - 4(2*-2))} \over 2*2\]

- Now let's simplify the expression.

\[-6 \pm \sqrt{(6^2 - 4(2*-2))} \over 2*2\]

\[-6 \pm \sqrt{(6^2 - 4(2*-2))} \over 2*2\]

\[-6 \pm \sqrt{(36 + 16)} \over 4\]

\[-6 \pm \sqrt{(52)} \over 4\]
-6±7.21110255092798
  4

Good! Now that the equation is simplified, you need to solve the equation. Here we will solve for the first root using addition.

\((-6+7.21110255092798)\)
  4

1.21110255092798
  4

\(\text{root1} = 0.302775637731995\)

Now round to the nearest thousandth.

\(x = 0.303\)
Type in 0.303
B) \(2x^2 + 6x - 2 = 0\)

What is the value of the second root: (Round to the nearest thousandths if applicable, though the answer might not be a decimal.)

**Algebraic Expression:**

-3.303
0.303
0.303
0.303
-3.303

**Hints:**

- Remember we used the **quadratic** formula to get to this point:

  \[-6 \pm \sqrt{7.21110255092798}\]
  \[4\]

- Since we used addition on the previous root we must now use **subtraction** here.

- Now we will use subtraction to get the second root.

\[-13.211102550928\]

\[4\]

\(\text{root 2} = -3.30277563773199\)

Now round to the nearest thousandth.

\(x = -3.303\)
65) Problem #PRADCPW "PRADCPW - 43232 - Factoring polynomials (Quadratic Formula)"

A) Solve for the two roots of the following equation,
(Round to the nearest thousandths if applicable, though the answer might not be a decimal.)

This problem is divided into two parts, you will first be asked for one root then the other:

\[ 1x^2+9x-1 = 0 \]

What is one root of this equation?

**Algebraic Expression:**

\[ \sqrt{0.11} \]
\[ -9.11 \]
\[ 0.11 \]
\[ -9.11 \]

**Hints:**

- The polynomial does not factor easily so to find the roots of this equation, you can use the quadratic formula.

\[
\frac{-b \pm \sqrt{b^2-4ac}}{2a}
\]

- a, b, and c can be found here:

\[ ax^2 + bx + c = 0 \]

\[ (1\times x^2)+9x-1 \]

\[ a = 1 \]
\[ b= 9 \]
\[ c= -1 \]

- Now, you can just plug those terms into the quadratic formula.

Term A = 1   Term B = 9   Term C = -1

\[
\frac{-9 \pm \sqrt{9^2-4(1*-1)}}{2\times1}
\]
Now lets simplify the expression.

\[-9 \pm \sqrt{(9^2 - 4)(1^*1))}
\]

\[-9 \pm \sqrt{(81+4)}
\]

\[-9 \pm \sqrt{(85.0000000000001)}
\]

\[-9 \pm 9.2195445729289
\]
Good! Now that the equation is simplified, you need to solve the equation. Here we will solve for the first root using addition.

\[
\frac{-9+9.2195445729289}{2}
\]

\[
0.21954457292891
\]

\[
\frac{0.21954457292891}{2}
\]

root1 = 0.109772228646445

Now round to the nearest thousandth.

\[x = 0.11\]

Type in 0.11

B) \[1x^2+9x-1 = 0\]

What is the value of the second root: (Round to the nearest thousandths if applicable, though the answer might not be a decimal.)

**Algebraic Expression:**

-9.11

0.11

0.11
Hints:

- Remember we used the **quadratic** formula to get to this point:

\[
\frac{-9 \pm \sqrt{9.2195445729289}}{2}
\]

- Since we used addition on the previous root we must now use **subtraction** here.
- Now we will use subtraction to get the second root.

\[
\frac{(-9 - \sqrt{9.2195445729289})}{2}
\]

\[
-18.219544572929
\]

\[
\frac{2}{2}
\]

\[
\text{root } 2 = -9.10977222864645
\]

Now round to the nearest thousandth.

\[
x = -9.11
\]

---

66) Problem #PRADCPX "PRADCPX - 43232 - Factoring polynomials (Quadratic Formula)"

A) Solve for the two roots of the following equation,
(Round to the nearest thousandths if applicable, though the answer might not be a decimal.)

This problem is divided into two parts, you will first be asked for one root then the other:

\[
3x^2 + 7x - 2 = 0
\]
What is one root of this equation?

Algebraic Expression:
✓ 0.257
✓ -2.591
✓ 0.257
✓ -2.591

Hints:
• The polynomial does not factor easily so to find the roots of this equation, you can use the quadratic formula.

\[-\frac{b \pm \sqrt{b^2 - 4ac}}{2a}\]

• a, b, and c can be found here:

\[ax^2 + bx + c = 0\]

\[\times^2 + 7x - 2\]

a = 3
b = 7
c = -2

• Now, you can just plug those terms into the quadratic formula. Term A = 3  Term B = 7  Term C = -2

\[-\frac{7 \pm \sqrt{7^2 - 4(3*-2)}}{2*3}\]

• Now let's simplify the expression.

\[-7 \pm \sqrt{7^2 - 4(3*-2)}\]
Good! Now that the equation is simplified, you need to solve the equation. Here we will solve for the first root using addition.
Now round to the nearest thousandth.

\[ x = 0.257 \]

Type in 0.257

**B)** \(3x^2 + 7x - 2 = 0\)

What is the value of the second root? (Round to the nearest thousandths if applicable, though the answer might not be a decimal.)

**Algebraic Expression:**

- \(-2.591\)
- \(0.257\)
- \(0.257\)
- \(-2.591\)

**Hints:**
- Remember we used the **quadratic** formula to get to this point:

\[
\frac{-7 \pm 8.54400374531753}{6}
\]

- Since we used addition on the previous root we must now use **subtraction** here.
Now we will use subtraction to get the second root.

\[
\begin{array}{c}
(-7-8.54400374531753)
\
6
\
\hline
-15.5440037453175
\
6
\end{array}
\]

Root 2 = -2.59066729088625

Now round to the nearest thousandth.

\[x = -2.591\]

67) Problem #PRADCPY "PRADCPY - 43232 - Factoring polynomials (Quadratic Formula)"
A) Solve for the two roots of the following equation,
(Round to the nearest thousandths if applicable, though the answer might not be a decimal.)

This problem is divided into two parts, you will first be asked for one root then the other:

\[2x^2 + 8x - 3 = 0\]

What is one root of this equation?

**Algebraic Expression:**

- 0.345
- -4.345
- 0.345
- -4.345

**Hints:**
- The polynomial does not factor easily so to find the roots of this equation, you can use the quadratic formula.
\[- \frac{b \pm \sqrt{(b^2 - 4ac)}}{2a}\]

- **a, b, and c** can be found here:

\[ax^2 + bx + c = 0\]

\[(2x^2) + 8x - 3\]

\[a = 2\]
\[b = 8\]
\[c = -3\]

- Now, you can just plug those terms into the **quadratic** formula.

Term A = 2  Term B = 8  Term C = -3

\[-8 \pm \sqrt{(8^2 - 4(2*-3))} \]
\[2*2\]

- Now let's simplify the expression.

\[-8 \pm \sqrt{(64 + 24)}\]

\[-8 \pm \sqrt{88}\]
Good! Now that the equation is simplified, you need to solve the equation. Here we will solve for the first root using addition.

$$\frac{-8 \pm \sqrt{88}}{4}$$

$$\frac{-8 \pm 9.38083151964686}{4}$$

$$\frac{1.38083151964686}{4}$$
\text{root1} = 0.345207879911715

Now round to the nearest thousandth.

\[ x = 0.345 \]
Type in 0.345

\text{B)} \quad 2x^2 + 8x - 3 = 0

What is the value of the second root: \text{(Round to the nearest thousandths if applicable, though the answer might not be a decimal.)} 

\textbf{Algebraic Expression:}

\begin{align*}
\sqrt[4]{-8 \pm 9.38083151964686} \\
\frac{4}{4}
\end{align*}

\text{Hints:}

\begin{itemize}
  \item Remember we used the \textit{quadratic} formula to get to this point:
  \begin{align*}
    -8 & \pm 9.38083151964686 \\
    & \frac{4}{4}
  \end{align*}
  \item Since we used addition on the previous root we must now use \textit{subtraction} here.
  \item Now we will use subtraction to get the second root.
\end{itemize}

\begin{align*}
\sqrt[4]{-8 - 9.38083151964686} \\
\frac{4}{4}
\end{align*}
root 2 = -4.34520787991172

Now round to the nearest thousandth.

\[ x = -4.345 \]

68) Problem #PRADCPZ "PRADCPZ - 43232 - Factoring polynomials (Quadratic Formula)"

A) Solve for the two roots of the following equation,
(Round to the nearest thousandths if applicable, though the answer might not be a decimal.)

This problem is divided into two parts, you will first be asked for one root then the other:

\[ 3x^2 + 6x - 2 = 0 \]

What is one root of this equation?

**Algebraic Expression:**

\[ \sqrt{0.291} \]
\[ -2.291 \]
\[ 0.291 \]
\[ -2.291 \]

**Hints:**

- The polynomial does not factor easily so to find the roots of this equation, you can use the quadratic formula.

\[ \frac{-b \pm \sqrt{b^2 - 4ac}}{2a} \]

- a, b, and c can be found here:

\[ ax^2 + bx + c = 0 \]

\[ (3x^2) + 6x - 2 \]

\[ a = 3 \]
b = 6  
c = -2

- Now, you can just plug those terms into the \textit{quadratic} formula. 
Term A = 3  Term B = 6  Term C = -2

\[-6 \pm \sqrt{(6^2 - 4(3*-2))} \]
\[2*3\]

- Now let's simplify the expression.

\[-6 \pm \sqrt{(6^2 - 4(3*-2))} \]
\[2*3\]

\[-6 \pm \sqrt{(6^2 - 4(3*-2))} \]
\[2*3\]

\[-6 \pm \sqrt{36+24} \]
\[6\]

\[-6 \pm \sqrt{59.99999999999999} \]
\[6\]
Good! Now that the equation is simplified, you need to solve the equation. Here we will solve for the first root using addition.

\[
\frac{-6\pm7.74596669241483}{6}
\]

\[
\frac{1.74596669241483}{6}
\]

\[
\text{root1} = 0.290994448735805
\]

Now round to the nearest thousandth.

\[
x = 0.291
\]

Type in 0.291
B) \[ 3x^2 + 6x - 2 = 0 \]

What is the value of the second root? (Round to the nearest thousandths if applicable, though the answer might not be a decimal.)

**Algebraic Expression:**

-2.291

**Hints:**
- Remember we used the *quadratic* formula to get to this point:

\[
-6 \pm \frac{7.7459669241483}{6}
\]

- Since we used addition on the previous root we must now use *subtraction* here.
- Now we will use subtraction to get the second root.

\[
(-6 - 7.7459669241483)
\]

\[
\frac{6}{6}
\]

\[
-13.745966924148
\]

\[
\frac{6}{6}
\]

**root 2** = -2.2909944487358

Now round to the nearest thousandth.

**x** = -2.291
A) Solve for the two roots of the following equation, (Round to the nearest thousandths if applicable, though the answer might not be a decimal.)

This problem is divided into two parts, you will first be asked for one root then the other:

\[ 2x^2 + 9x - 2 = 0 \]

What is one root of this equation?

**Algebraic Expression:**

- \(0.212\)
- \(-4.712\)
- \(0.212\)
- \(-4.712\)

**Hints:**
- The polynomial does not factor easily so to find the roots of this equation, you can use the quadratic formula.

\[-\frac{b \pm \sqrt{b^2 - 4ac}}{2a}\]
- \(a, b,\) and \(c\) can be found here:

\[ax^2 + bx + c = 0\]

\[(2x^2) + 9x - 2\]

\(a = 2\)
\(b = 9\)
\(c = -2\)

- Now, you can just plug those terms into the quadratic formula.

Term \(A = 2\)  Term \(B = 9\)  Term \(C = -2\)

\[-\frac{9 \pm \sqrt{(9^2 - 4(2^2 - 2))}}{2*2}\]
Now let's simplify the expression.

\[-9 \pm \sqrt{9^2 - 4(2*2)} \]
\[\frac{2*2}{2*2}\]

\[-9 \pm \sqrt{81+16} \]
\[\frac{4}{4}\]

\[-9 \pm \sqrt{96.9999999999999} \]
\[\frac{4}{4}\]

\[-9 \pm 9.8488578017961 \]
Good! Now that the equation is simplified, you need to solve the equation. Here we will solve for the first root using addition.

\[
\frac{-9+9.8488578017961}{4}
\]

\[
\frac{0.8488578017961}{4}
\]

\[
\text{root1} = 0.212214450449025
\]

Now round to the nearest thousandth.

\[x = 0.212\]

Type in 0.212

B) \[2x^2 + 9x - 2 = 0\]

What is the value of the second root: (Round to the nearest thousandths if applicable, though the answer might not be a decimal.)

Algebraic Expression:

-4.712

0.212

0.212
-4.712

Hints:
- Remember we used the quadratic formula to get to this point:

\[-9 \pm 9.8488578017961 \]

\[
\frac{4}{-9 - 9.8488578017961}
\]

- Since we used addition on the previous root we must now use subtraction here.
- Now we will use subtraction to get the second root.

\[
\frac{-9 - 9.8488578017961}{4}
\]

\[
-18.8488578017961
\]

\[
\frac{4}{-4.71221445044903}
\]

root 2 = -4.71221445044903

Now round to the nearest thousandth.

x = -4.712

70) Problem #PRADCP3 "PRADCP3 - 43232 - Factoring polynomials (Quadratic Formula)"

A) Solve for the two roots of the following equation,
(Round to the nearest thousandths if applicable, though the answer might not be a decimal.)

This problem is divided into two parts, you will first be asked for one root then the other:

\[3x^2 + 6x - 2 = 0\]
What is one root of this equation?

**Algebraic Expression:**

- 0.291
- -2.291
- 0.291
- -2.291

**Hints:**
- The polynomial does not factor easily so to find the roots of this equation, you can use the *quadratic* formula.

\[-\frac{b \pm \sqrt{b^2 - 4ac}}{2a}\]

- a, b, and c can be found here:

\[ax^2 + bx + c = 0\]

\[(3x^2) + 6x - 2\]

a = 3  
b = 6  
c = -2

- Now, you can just plug those terms into the *quadratic* formula.  
  Term A = 3  Term B = 6  Term C = -2

\[-\frac{6 \pm \sqrt{(6^2 - 4(3*-2))}}{2*3}\]

- Now let's simplify the expression.
Good! Now that the equation is simplified, you need to solve the equation. Here we will solve for the first root using addition.
(-6+\sqrt{7.74596669241483})
\frac{6}{6}

1.74596669241483
\frac{6}{6}

\text{root}_1 = 0.290994448735805

Now round to the nearest thousandth.

x = 0.291
Type in 0.291

B) \quad 3x^2+6x-2 = 0

What is the value of the second root: (Round to the nearest thousandths if applicable, though the answer might not be a decimal.)

\textbf{Algebraic Expression:}

-2.291
0.291
0.291
0.291
-2.291

\textbf{Hints:}

- Remember we used the \textit{quadratic} formula to get to this point:

\frac{-6\pm\sqrt{7.74596669241483}}{6}

- Since we used addition on the previous root we must now use \textit{subtraction} here.
Now we will use subtraction to get the second root.

\[
\begin{align*}
-6 - 7.74596669241483 &= 6 \\
-13.7459666924148 &= 6 \\
\text{root 2} &= -2.2909944487358 \\
\text{Now round to the nearest thousandth.} \\
x &= -2.291
\end{align*}
\]

71) Problem #PRADCP4 "PRADCP4 - 43232 - Factoring polynomials (Quadratic Formula)"

A) Solve for the two roots of the following equation,
(Round to the nearest thousandths if applicable, though the answer might not be a decimal.)

This problem is divided into two parts, you will first be asked for one root then the other:

\[2x^2 + 8x - 2 = 0\]

What is one root of this equation?

**Algebraic Expression:**

- ✓ 0.236
- ✓ -4.236
- ✓ 0.236
- ✓ -4.236

**Hints:**
- The polynomial does not factor easily so to find the roots of this equation, you can use the quadratic formula.
\[-b \pm \sqrt{b^2 - 4ac}\]
\[2a\]

- a, b, and c can be found here:

\[ax^2 + bx + c = 0\]

\[(2x^2) + 8x - 2\]

\[a = 2\]
\[b = 8\]
\[c = -2\]

- Now, you can just plug those terms into the **quadratic** formula.

Term \(A = 2\)  Term \(B = 8\)  Term \(C = -2\)

\[-8 \pm \sqrt{(64 + 16)}\]
\[2*2\]

- Now let's simplify the expression.
Good! Now that the equation is simplified, you need to solve the equation. Here we will solve for the first root using addition.

$$-8 \pm \sqrt{80}$$

$$\frac{0.94427190999916}{4}$$
\[ \text{root1} = 0.23606797749979 \]

Now round to the nearest thousandth.

\[ x = 0.236 \]

Type in \( 0.236 \)

B) \( 2x^2 + 8x - 2 = 0 \)

What is the value of the second root? (Round to the nearest thousandths if applicable, though the answer might not be a decimal.)

**Algebraic Expression:**

-4.236

0.236

0.236

0.236

-4.236

**Hints:**

- Remember we used the **quadratic** formula to get to this point:

\[
\frac{-8 \pm 8.94427190999916}{4}
\]

- Since we used addition on the previous root we must now use **subtraction** here.
- Now we will use subtraction to get the second root.

\[
\frac{(-8-8.94427190999916)}{4}
\]
root 2 = -4.236

Now round to the nearest thousandth.

x = -4.236

72) Problem #PRADCP5 "PRADCP5 - 43232 - Factoring polynomials (Quadratic Formula)"

A) Solve for the two roots of the following equation,
(Round to the nearest thousandths if applicable, though the answer might not be a decimal.)

This problem is divided into two parts, you will first be asked for one root then the other:

3x^2 + 7x - 1 = 0

What is one root of this equation?

**Algebraic Expression:**

- ✓ 0.135
- ✓ -2.468
- ✓ 0.135
- ✓ -2.468

**Hints:**

- The polynomial does not factor easily so to find the roots of this equation, you can use the quadratic formula.

\[-\frac{b \pm \sqrt{b^2 - 4ac}}{2a}\]

- a, b, and c can be found here:

\[ax^2 + bx + c = 0\]

\[(3x^2) + 7x - 1\]

a = 3
b = 7
c = -1

- Now, you can just plug those terms into the **quadratic** formula.
  Term A = 3  Term B = 7  Term C = -1

\[-7 \pm \sqrt{(7^2 - 4(3*-1))} \over 2*3\]

- Now lets simplify the expression.

\[-7 \pm \sqrt{(7^2 - 4(3*-1))} \over 2*3\]

\[-7 \pm \sqrt{(7^2 - 4(3*-1))} \over 2*3\]

\[-7 \pm \sqrt{(49 + 12)} \over 6\]

\[-7 \pm \sqrt{(60.9999999999999)} \over 6\]
Good! Now that the equation is simplified, you need to solve the equation. Here we will solve for the first root using addition.

\[-7 \pm 7.81024967590665 \div 6\]

\[ (\pm 7+7.81024967590665) \div 6 \]

\[ 0.81024967590665 \div 6 \]

\[ \text{root}_1 = 0.135041612651108 \]

Now round to the nearest thousandth.

\[ x = 0.135 \]

Type in 0.135
B) \(3x^2 + 7x - 1 = 0\)

What is the value of the second root: (Round to the nearest thousandths if applicable, though the answer might not be a decimal.)

**Algebraic Expression:**
-2.468
0.135
0.135
-2.468

**Hints:**
- Remember we used the *quadratic* formula to get to this point:
  \[
  \frac{-7 \pm \sqrt{7.81024967590665}}{6}
  \]
- Since we used addition on the previous root we must now use *subtraction* here.
- Now we will use subtraction to get the second root.

\[
\frac{-7 - \sqrt{7.81024967590665}}{6}
\]

-14.8102496759067
6

**root 2** = -2.46837494598444

Now round to the nearest thousandth.

\(x = -2.468\)
A) Solve for the two roots of the following equation,
(Round to the nearest thousandths if applicable, though the answer might not be a decimal.)

This problem is divided into two parts, you will first be asked for one root then the other:

$$3x^2 + 7x - 1 = 0$$

What is one root of this equation?

**Algebraic Expression:**

- $0.135$
- $-2.468$
- $0.135$
- $-2.468$

**Hints:**

- The polynomial does not factor easily so to find the roots of this equation, you can use the quadratic formula.

$$\frac{-b \pm \sqrt{b^2 - 4ac}}{2a}$$

- $a, b,$ and $c$ can be found here:

$$ax^2 + bx + c = 0$$

$$3x^2 + 7x - 1$$

$a = 3$

$b = 7$

$c = -1$

- Now, you can just plug those terms into the quadratic formula.

Term $A = 3$  Term $B = 7$  Term $C = -1$

$$\frac{-7 \pm \sqrt{7^2 - 4(3\cdot-1)}}{2\cdot3}$$
Now let's simplify the expression.

\[-7 \pm \sqrt{(7^2 - 4(3*-1))} \div 2*3\]

\[-7 \pm \sqrt{(7^2 - 4(3*-1))} \div 2*3\]

\[-7 \pm \sqrt{(49+12)} \div 6\]

\[-7 \pm \sqrt{(60.9999999999999)} \div 6\]

\[-7 \pm 7.81024967590665 \div 6\]
Good! Now that the equation is simplified, you need to solve the equation. Here we will solve for the first root using addition.

\((-7 + 7.81024967590665)\)
\[ = \frac{6}{6} \]

\[= 0.81024967590665\]
\[= 0.135041612651108\]

Now round to the nearest thousandth.

\[x = 0.135\]
Type in 0.135

B) \[3x^2 + 7x - 1 = 0\]

What is the value of the second root: \(\text{(Round to the nearest thousandths if applicable, though the answer might not be a decimal.)}\)

**Algebraic Expression:**

-2.468
0.135
0.135
Hints:

- Remember we used the **quadratic** formula to get to this point:

  \[-7 \pm \frac{7.81024967590665}{6}\]

- Since we used addition on the previous root we must now use **subtraction** here.

- Now we will use subtraction to get the second root.

\[
\frac{-7 - 7.81024967590665}{6} = -14.8102496759067\]

\[
\frac{-14.8102496759067}{6} = -2.46837494598444
\]

Now round to the nearest thousandth.

\[x = -2.468\]

---

74) Problem #PRADCP7 "PRADCP7 - 43232 - Factoring polynomials (Quadratic Formula)"

A) Solve for the two roots of the following equation, (Round to the nearest thousandths if applicable, though the answer might not be a decimal.)

This problem is divided into two parts, you will first be asked for one root then the other:

\[1x^2 + 8x - 2 = 0\]
What is one root of this equation?

**Algebraic Expression:**

- 0.243
- -8.243
- 0.243
- -8.243

**Hints:**
- The polynomial does not factor easily so to find the roots of this equation, you can use the **quadratic** formula.

\[
\frac{-b \pm \sqrt{b^2 - 4ac}}{2a}
\]

- a, b, and c can be found here:

\[
ax^2 + bx + c = 0
\]

\[
(1*x^2)+8x-2
\]

\[
a = 1 \\
b = 8 \\
c = -2
\]

- Now, you can just plug those terms into the **quadratic** formula.

\[
-8 \pm \sqrt{(8^2 - 4(1*-2))} \\
2 * 1
\]

- Now let's simplify the expression.

\[
-8 \pm \sqrt{(8^2 - 4(1*-2))}
\]
\[
-8 \pm \sqrt{(8^2 - 4(1*-2))} \\
\frac{2*1}{2}
\]

\[
-8 \pm \sqrt{(64 + 8)} \\
\frac{2}{2}
\]

\[
-8 \pm \sqrt{72} \\
\frac{2}{2}
\]

\[
-8 \pm 8.48528137423857 \\
\frac{2}{2}
\]

Good! Now that the equation is simplified, you need to solve the equation. Here we will solve for the first root using addition.
\[
\frac{-8 + 8.48528137423857}{2}
\]

\[
\frac{0.48528137423857}{2}
\]

\[\text{root}_1 = 0.242640687119285\]

Now round to the nearest thousandth.

\[x = 0.243\]

Type in 0.243

B) \(1x^2 + 8x - 2 = 0\)

What is the value of the second root: (Round to the nearest thousandths if applicable, though the answer might not be a decimal.)

**Algebraic Expression:**

-8.243

0.243

0.243

0.243

-8.243

**Hints:**

- Remember we used the \textit{quadratic} formula to get to this point:

\[
\frac{-8 \pm 8.48528137423857}{2}
\]

- Since we used addition on the previous root we must now use \textit{subtraction} here.
Now we will use subtraction to get the second root.

\[
\frac{-8 - 8.48528137423857}{2} = -8.24264068711928
\]

Now round to the nearest thousandth.

\[x = -8.243\]

75) Problem #PRADCP8 "PRADCP8 - 43232 - Factoring polynomials (Quadratic Formula)"

A) Solve for the two roots of the following equation, 
(Round to the nearest thousandths if applicable, though the answer might not be a decimal.)

This problem is divided into two parts, you will first be asked for one root then the other:

\[3x^2 + 6x - 1 = 0\]

What is one root of this equation?

Algebraic Expression:

✓ 0.155
✓ -2.155
✓ 0.155
✓ -2.155

Hints:

- The polynomial does not factor easily so to find the roots of this equation, you can use the quadratic formula.
\[ \frac{-b \pm \sqrt{b^2 - 4ac}}{2a} \]

- a, b, and c can be found here:

\[ ax^2 + bx + c = 0 \]

\[ (3x^2) + 6x - 1 \]

\[ a = 3 \]
\[ b = 6 \]
\[ c = -1 \]

- Now, you can just plug those terms into the \textit{quadratic} formula.

Term \( A = 3 \)  Term \( B = 6 \)  Term \( C = -1 \)

\[ \frac{-6 \pm \sqrt{(6^2 - 4(3*-1))}}{2*3} \]

- Now lets simplify the expression.

\[ \frac{-6 \pm \sqrt{(36 + 12)}}{2*3} \]

\[ \frac{-6 \pm \sqrt{48}}{2*3} \]

\[ \frac{-6 \pm 4.898979} {6} \]
\(-6 \pm \sqrt{48}\)

\(-6 \pm 6.92820323027551\)

Good! Now that the equation is simplified, you need to solve the equation. Here we will solve for the first root using addition.

\((-6 + 6.92820323027551)\)

\(0.92820323027551\)
\[ \text{root} 1 = 0.154700538379252 \]

Now round to the nearest thousandth.

\[ x = 0.155 \]

Type in 0.155

B) \[ 3x^2 + 6x - 1 = 0 \]

What is the value of the second root? (Round to the nearest thousandths if applicable, though the answer might not be a decimal.)

**Algebraic Expression:**

-2.155
0.155
0.155
0.155
-2.155

**Hints:**

- Remember we used the **quadratic** formula to get to this point:

\[
-6 \pm 6.92820323027551 \]

\[
\frac{6}{6}
\]

- Since we used addition on the previous root we must now use subtraction here.

- Now we will use subtraction to get the second root.

\[
(-6 - 6.92820323027551) \]

\[
\frac{6}{6}
\]
Root 2 = -2.15470053837925

Now round to the nearest thousandth.

x = -2.155

---

76) Problem #PRADCP9 "PRADCP9 - 43232 - Factoring polynomials (Quadratic Formula)"

A) Solve for the two roots of the following equation,
(Round to the nearest thousandths if applicable, though the answer might not be a decimal.)

This problem is divided into two parts, you will first be asked for one root then the other:

-3x^2 + 9x + 2 = 0

What is one of the roots of this equation?

**Algebraic Expression:**

- 3.208
- -0.208
- -0.208
- 3.208

**Hints:**
- The polynomial does not factor easily so to find the roots of this equation, you can use the quadratic formula.

$$\frac{-b \pm \sqrt{(b^2-4ac)}}{2a}$$

- a, b, and c can be found here:

$$ax^2 + bx + c = 0$$

$$(-3x^2 + 9x + 2)$$

$$a = -3$$
b = 9 
c = 2

- Now, you can just plug those terms into the **quadratic** formula.
  - Term A = -3  Term B = 9  Term C = 2

\[-9 \pm \sqrt{9^2 - 4(-3 \times 2)} \over 2 \times -3\]

- Now lets simplify the expression.

\[-9 \pm \sqrt{9^2 - 4(-3 \times 2)} \over 2 \times -3\]

\[-9 \pm \sqrt{81 + 24} \over -6\]

\[-9 \pm \sqrt{105} \over -6\]
Good! Now that the equation is simplified, you need to solve the equation. Here, we will solve for a root using subtraction.

\[-9 \pm 10.2469507659596\]
\[-6\]

\[(-9 - 10.2469507659596)\]
\[-6\]

\[-19.2469507659596\]
\[-6\]

\[\text{root1} = 3.20782512765993\]

Now round to the nearest thousandth.

\[x = 3.208\]
Type in 3.208

\(B)\quad -3x^2 + 9x + 2 = 0\)
What is the value of the one remaining root: (Round to the nearest thousandths if applicable, though the answer might not be a decimal.)

**Algebraic Expression:**

-0.208
3.208
-0.208
3.208

**Hints:**
- Remember we used the quadratic formula to get to this point:

\[-9 \pm \sqrt{10.2469507659596} \]
-6

- Since we used subtraction to find the previous root, we must use addition for the second.
- Now we will use addition to get the second root.

\[(-9 + \sqrt{10.2469507659596}) \]
-6

\[1.2469507659596 \]
-6

root 2 = -0.207825127659933

Now round to the nearest thousandth.

x = -0.208
This problem is divided into two parts, you will first be asked for one root then the other:

\[-1x^2+9x+2 = 0\]

What is **one** of the roots of this equation?

**Algebraic Expression:**

- 9.217
- -0.217
- -0.217
- 9.217
- 9.217

**Hints:**

- The polynomial does not factor easily so to find the roots of this equation, you can use the **quadratic** formula.

\[
-\frac{b\pm\sqrt{b^2-4ac}}{2a}
\]

- a, b, and c can be found here:

\[ax^2 + bx + c = 0\]

\[(-1*x^2)+9x+2\]

\[a = -1\]
\[b = 9\]
\[c = 2\]

- Now, you can just plug those terms into the **quadratic** formula.

\[-\frac{9\pm\sqrt{9^2-4(-1*2))}}{2*-1}\]

- Now lets simplify the expression.
\[
\frac{-9 \pm \sqrt{(9^2 - 4(-1*2))}}{2*-1}
\]

\[
\frac{-9 \pm \sqrt{(9^2 - 4(-1*2))}}{2*-1}
\]

\[
\frac{-9 \pm \sqrt{(81+8)}}{-2}
\]

\[
\frac{-9 \pm \sqrt{(88.9999999999999)}}{-2}
\]

\[
\frac{-9 \pm 9.4339811320566}{-2}
\]

Good! Now that the equation is simplified, you need to solve the equation. Here, we will solve for a root using subtraction.
\((-9 - 9.4339811320566)\)
\(-2\)

\(-18.4339811320566\)
\(-2\)

\(\sqrt{1} = 9.2169905660283\)

Now round to the nearest thousandth.

\(x = 9.217\)
Type in 9.217

B) \(-1x^2 + 9x + 2 = 0\)

What is the value of the one remaining root: \(\text{(Round to the nearest thousandths if applicable if applicable, though the answer might not be a decimal.}\)\)

**Algebraic Expression:**

✓ -0.217
✓ 9.217
✓ -0.217
✓ 9.217
✓ 9.217

**Hints:**

- Remember we used the **quadratic** formula to get to this point:

\(-9 \pm 9.4339811320566\)
\(-2\)
Since we used subtraction to find the previous root, we must use addition for the second.

- Now we will use addition to get the second root.

\[ (-9 + 9.4339811320566) \]
\[ -2 \]

\[ 0.4339811320566 \]
\[ -2 \]

\text{root 2} = -0.2169905660283

Now round to the nearest thousandth.

\[ x = -0.217 \]

78) Problem #PRADCQB "PRADCQB - 43232 - Factoring polynomials (Quadratic Formula)"

A) Solve for the two roots of the following equation,
(Round to the nearest thousandths if applicable, though the answer might not be a decimal.)

This problem is divided into two parts, you will first be asked for one root then the other:

\[ -3x^2 + 7x + 2 = 0 \]

What is one of the roots of this equation?

\textbf{Algebraic Expression:}

\checkmark \ 2.591
\checkmark \ -0.257
\checkmark \ -0.257
\checkmark \ 2.591

\textbf{Hints:}

- The polynomial does not factor easily so to find the roots of this equation, you can use the
quadratic formula.

\[ \frac{-b \pm \sqrt{b^2 - 4ac}}{2a} \]

- a, b, and c can be found here:

\[ ax^2 + bx + c = 0 \]

\[ (-3*x^2)+7x+2 \]

\[ a = -3 \]
\[ b = 7 \]
\[ c = 2 \]

- Now, you can just plug those terms into the quadratic formula. Term A = -3 Term B = 7 Term C = 2

\[ \frac{-7 \pm \sqrt{49 - 4(-3*2)}}{2*-3} \]

- Now let's simplify the expression.

\[ \frac{-7 \pm \sqrt{49 + 24}}{-6} \]
\[-7 \pm \sqrt{73}\]
\[-6\]

\[-7 \pm 8.54400374531753\]
\[-6\]

Good! Now that the equation is simplified, you need to solve the equation. Here, we will solve for a root using subtraction.

\[(-7 - 8.54400374531753)\]
\[-6\]

\[-15.5440037453175\]
\[-6\]

\[\text{root}_1 = 2.59066729088625\]
Now round to the nearest thousandth.

\[ x = 2.591 \]
Type in 2.591

B) \(-3x^2 + 7x + 2 = 0\)

What is the value of the one remaining root? (Round to the nearest thousandths if applicable, though the answer might not be a decimal.)

Algebraic Expression:

\[ -0.257 \]
\[ 2.591 \]
\[ -0.257 \]
\[ 2.591 \]

Hints:
- Remember we used the quadratic formula to get to this point:

\[ \frac{-7 \pm 8.54400374531753}{-6} \]
- Since we used subtraction to find the previous root, we must use addition for the second.
- Now we will use addition to get the second root.

\[ \frac{-7 + 8.54400374531753}{-6} \]
\[ 1.54400374531753 \]
\[ -6 \]
root 2 = -0.257333957552922

Now round to the nearest thousandth.

x = -0.257

---

79) Problem #PRADCQC "PRADCQC - 43232 - Factoring polynomials (Quadratic Formula)"
A) Solve for the two roots of the following equation, 
(Round to the nearest thousandths if applicable, though the answer might not be a decimal.)

This problem is divided into two parts, you will first be asked for one root then the other:

\[-2x^2 + 6x + 2 = 0\]

What is one of the roots of this equation?

**Algebraic Expression:**

✓ 3.303
✓ -0.303
✓ -0.303
✓ -0.303
✓ 3.303

**Hints:**

- The polynomial does not factor easily so to find the roots of this equation, you can use the quadratic formula.

\[-\frac{b \pm \sqrt{b^2 - 4ac}}{2a}\]

- a, b, and c can be found here:

\[ax^2 + bx + c = 0\]

\[(-2 * x^2) + 6x + 2\]

a = -2
b = 6
c = 2

- Now, you can just plug those terms into the **quadratic** formula.
- Term A = -2  Term B = 6  Term C = 2

\[-6 \pm \sqrt{(6^2 - 4(-2*2))} \]
\[2*-2\]

- Now let's simplify the expression.

\[-6 \pm \sqrt{(36 + 16)} \]
\[4\]
Good! Now that the equation is simplified, you need to solve the equation. Here, we will solve for a root using subtraction.

\[
-6 \pm 7.21110255092798
\]
\[
-4
\]

\[
(-6 - 7.21110255092798) - 4
\]

\[
-13.211102550928
\]
\[
-4
\]

\[
\text{root}1 = 3.30277563773199
\]

Now round to the nearest thousandth.

\[
x = 3.303
\]

Type in 3.303

B) \(-2x^2 + 6x + 2 = 0\)
What is the value of the one remaining root? (Round to the nearest thousandths if applicable, though the answer might not be a decimal.)

**Algebraic Expression:**

|  ✓-0.303 |
|  ✓3.303 |
|  ✓-0.303 |
|  ✓3.303 |

**Hints:**

- Remember we used the quadratic formula to get to this point:

  \[
  \frac{-6 \pm \sqrt{7.2110255092798}}{-4}
  \]

- Since we used subtraction to find the previous root, we must use addition for the second.

- Now we will use addition to get the second root.

\[
(-6+\sqrt{7.2110255092798}) \div -4
\]

\[
1.2110255092798 \div -4
\]

\[
\text{root } 2 = -0.302775637731995
\]

Now round to the nearest thousandth.

\[
x = -0.303
\]
This problem is divided into two parts, you will first be asked for one root then the other:

\[-3x^2+9x+2 = 0\]

What is one of the roots of this equation?

**Algebraic Expression:**

-✓ 3.208
-✓ -0.208
-✓ -0.208
-✓ 3.208

**Hints:**

- The polynomial does not factor easily so to find the roots of this equation, you can use the quadratic formula.

\[
\frac{-b\pm\sqrt{b^2-4ac}}{2a}
\]

- a, b, and c can be found here:

\[ax^2 + bx + c = 0\]

\[(-3x^2)+9x+2\]

a = -3
b= 9
c= 2

- Now, you can just plug those terms into the quadratic formula. Term A = -3  Term B = 9  Term C = 2

\[
\frac{-9\pm\sqrt{9^2-4(-3*2)}}{2\times-3}
\]

- Now lets simplify the expression.
Good! Now that the equation is simplified, you need to solve the equation. Here, we will solve for a root using subtraction.
\((-9-10.2469507659596)\)
\[\frac{-9}{-6}\]

\((-19.2469507659596)\)
\[\frac{-9}{-6}\]

\(\text{root1} = 3.20782512765993\)

Now round to the nearest thousandth.

\(x = 3.208\)
Type in 3.208

B) \(-3x^2+9x+2 = 0\)

What is the value of the one remaining root: (Round to the nearest thousandths if applicable, though the answer might not be a decimal.)

Algebraic Expression:

\[\checkmark -0.208\]
\[\checkmark 3.208\]
\[\checkmark -0.208\]
\[\checkmark 3.208\]

Hints:

- Remember we used the \textbf{quadratic} formula to get to this point:

\[\frac{-9\pm10.2469507659596}{-6}\]
Since we used subtraction to find the previous root, we must use addition for the second.

Now we will use addition to get the second root.

\[-9 + 10.2469507659596\]
\[= -6\]

\[1.2469507659596\]
\[= -6\]

\[\text{root 2} = -0.207825127659933\]

Now round to the nearest thousandth.

\[x = -0.208\]

---

81) Problem #PRADCQE "PRADCQE - 43232 - Factoring polynomials (Quadratic Formula)"

A) Solve for the two roots of the following equation, (Round to the nearest thousandths if applicable, though the answer might not be a decimal.)

This problem is divided into two parts, you will first be asked for one root then the other:

\[-2x^2 + 6x + 3 = 0\]

What is one of the roots of this equation?

**Algebraic Expression:**

- 3.436
- -0.436
- -0.437
- 3.437

**Hints:**
- The polynomial does not factor easily so to find the roots of this equation, you can use the
quadratic formula.

\[-b \pm \sqrt{b^2 - 4ac} \over 2a\]

- a, b, and c can be found here:

\[ax^2 + bx + c = 0\]

\[(-2x^2) + 6x + 3\]

\[a = -2\]
\[b = 6\]
\[c = 3\]

- Now, you can just plug those terms into the quadratic formula.

Term A = -2   Term B = 6   Term C = 3

\[-6 \pm \sqrt{(6^2 - 4(-2*3))} \over 2*2\]

Now lets simplify the expression.

\[-6 \pm \sqrt{(36 + 24)} \over -4\]
-6±\sqrt{59.99999999999999}
-4

-6±7.74596669241483
-4

Good! Now that the equation is simplified, you need to solve the equation. Here, we will solve for a root using subtraction.

(-6-7.74596669241483)
-4

-13.7459666924148
-4

\text{root1}= 3.43649167310371
Now round to the nearest thousandth.

\[ x = 3.436 \]
Type in 3.436

B) \[-2x^2+6x+3 = 0\]

What is the value of the one remaining root? (Round to the nearest thousandths if applicable, though the answer might not be a decimal.)

**Algebraic Expression:**

-0.436
3.436
-0.437
3.437

**Hints:**
- Remember we used the *quadratic* formula to get to this point:

\[
\begin{align*}
-6 & \pm 7.74596669241483 \\
& \div 4
\end{align*}
\]

- Since we used subtraction to find the previous root, we must use addition for the second.
- Now we will use addition to get the second root.

\[
\begin{align*}
(-6+7.74596669241483) & \div 4 \\
1.74596669241483 & \div 4
\end{align*}
\]
root 2 = -0.436491673103707

Now round to the nearest thousandth.

x = -0.436

82) Problem #PRADCQF "PRADCQF - 43232 - Factoring polynomials (Quadratic Formula)"

A) Solve for the two roots of the following equation,
(Round to the nearest thousandths if applicable, though the answer might not be a decimal.)

This problem is divided into two parts, you will first be asked for one root then the other:

\[-3x^2 + 8x + 2 = 0\]

What is one of the roots of this equation?

**Algebraic Expression:**

- 2.897
- -0.23
- -0.23
- 2.897

**Hints:**

- The polynomial does not factor easily so to find the roots of this equation, you can use the quadratic formula.

\[\frac{-b\pm\sqrt{b^2-4ac}}{2a}\]

- a, b, and c can be found here:

\[ax^2 + bx + c = 0\]

\[(-3x^2) + 8x + 2\]

\[a = -3\]
\[b = 8\]
Now, you can just plug those terms into the **quadratic** formula. 
Term \( A = -3 \)  \hspace{1em}  \text{Term} \hspace{0.5em} B = 8 \hspace{1em} \text{Term} \hspace{0.5em} C = 2

\[
-\frac{8 \pm \sqrt{(8^2 - 4(-3 \times 2))}}{2 \times -3}
\]

Now let's simplify the expression.

\[
-\frac{8 \pm \sqrt{(64 + 24)}}{-6}
\]

\[
-\frac{8 \pm \sqrt{88}}{-6}
\]
Good! Now that the equation is simplified, you need to solve the equation. Here, we will solve for a root using \textit{subtraction}.

\[
-8 \pm 9.38083151964686
\]
\[
-6
\]

\[
(-8 - 9.38083151964686)
\]
\[
-6
\]

\[
-17.3808315196469
\]
\[
-6
\]

\text{root}1 = 2.89680525327448

Now round to the nearest thousandth.

\[x = 2.897\]

Type in \textit{2.897}

B) \[-3x^2 + 8x + 2 = 0\]
What is the value of the **one remaining** root:  (Round to the nearest thousandths if applicable, though the answer might not be a decimal.)

**Algebraic Expression:**
-0.23
2.897
-0.23
2.897

**Hints:**
- Remember we used the **quadratic** formula to get to this point:

\[-8 \pm 9.38083151964686\]

-6

- Since we used subtraction to find the previous root, we must use addition for the second.
- Now we will use addition to get the second root.

\[(-8+9.38083151964686)\]

-6

1.38083151964686
-6

**root 2** = -0.23013858660781

Now round to the nearest thousandth.

**x = -0.23**
Problem Set "Finding the Mean, Median, Mode, or Range 6.SP.B.5c" id:[PSAHK8]

☐ Select All

☐ 1) Problem #PRABZ52 "PRABZ52 - Median: Odd Number of Values"
Below is a list of numbers.

[37, 3, 95, 38, 3, 12, 59, 49, 20, 37, 14, 61, 30]

What is the median number in this list?

Algebraic Expression:

✔ 37

Hints:

The first step to solve is to put the numbers in order from least to greatest.

[3, 3, 12, 14, 20, 30, 37, 37, 38, 49, 59, 61, 95]
The last step is to identify the middle number in the list.

Type in 37

2) Problem #PRABZ7B "PRABZ7B - Median: Even Number of Values"
Below is a list of numbers.

[37, 95, 38, 3, 12, 59, 49, 20, 37, 14, 61, 30]

What is the median number in this list?

Algebraic Expression:
✓ 37

Hints:
The first step is to put the numbers in order from least to greatest.

[3, 12, 14, 20, 30, 37, 37, 38, 49, 59, 61, 95]

The second step is to identify the two middle numbers.

37 and 37
The last step is to find the mean of the two middle numbers.

\[ 37 + 37 = 74 \]
\[ 74 \div 2 = 37 \]

Type in 37

3) Problem #PRAB2MJ "PRAB2MJ - Median: Even Number of Values"
Below is a list of numbers.

[3, 8, 43, 9, 3, 26, 5, 72, 42, 4, 82, 9]

What is the median number in this list?

**Algebraic Expression:**

\[ 9 \]

**Hints:**
The first step is to put the numbers in order from least to greatest.

\[3, 3, 4, 5, 8, 9, 9, 26, 42, 43, 72, 82\]

The second step is to identify the two middle numbers.

9 and 9
The last step is to find the mean of the two middle numbers.

\[ 9 + 9 = 18 \]
\[ 18 \div 2 = 9 \]

Type in 9

4) Problem #PRAB2KM "PRAB2KM - Mean"
Calculate the mean of the following numbers:

12, 6, 19, 12, 8, 10

(round to the nearest tenths place)

Algebraic Expression:

\[ \text{Mean} = 11.2 \]

Hints:
- This is how to solve a problem similar to your problem.
- The first step is to add up the values.

Find the mean of the following group of numbers: 3, 8, 4, 9

\[ 3 + 8 + 4 + 9 = 24 \]
\[ 24 \div 4 = 6 \]
The last step is to divide 67 by the number of values you have, which is 6.

\[ 67 \div 6 = 11.1666666666667 \]
\[ 11.1666666666667 = 11.2 \text{ (rounded)} \]

Type in 11.2

5) Problem #PRABZ43 "PRABZ43 - Mean 2"
Calculate the mean of the following numbers:

6, 3, 14, 2, 12, 4

(round to the nearest tenths place)

Algebraic Expression:

✓ 6.8

Hints:
- This is how to solve a problem similar to your problem.

Find the mean of the following group of numbers: 3, 8, 4, 9

\[ 3 + 8 + 4 + 9 = 24 \]
\[ 24 \div 4 = 6 \]
- The first step is to add up the values.

\[ 6 + 3 + 14 + 2 + 12 + 4 = 41 \]
- The last step is to divide 41 by the number of values you have, which is 6.

\[ 41 \div 6 = 6.83333333333333 \]
\[ 6.83333333333333 = 6.8 \text{ (rounded)} \]

Type in 6.8

6) Problem #PRAB2KX "PRAB2KX - Median: Odd Number of Values"
Below is a list of numbers.

[37, 3, 95, 38, 3, 12, 59, 49, 20, 37, 14, 61, 30]

What is the median number in this list?

Algebraic Expression:

✓ 37

Hints:
The first step to solve is to put the numbers in order from least to greatest.

[3, 3, 12, 14, 20, 30, 37, 37, 38, 49, 59, 61, 95]

The last step is to identify the middle number in the list.

Type in 37

7) Problem #PRAB24H "PRAB24H - Range"
Calculate the range of the following numbers:

67, 29, 22, 106, 82, 138

Algebraic Expression:

116

Hints:

The range is the difference between the largest value number and the smallest value number.
From this list, the largest value number is 138, and the smallest value number is 22.

138 - 22 = 116

Type in 116

8) Problem #PRABZ44 "PRABZ44 - Mean 3"
Calculate the mean of the following numbers:
Find the mean of the following group of numbers: 3, 8, 4, 9

3 + 8 + 4 + 9 = 24
24 ÷ 4 = 6

The first step is to add up the values.

18 + 12 + 7 + 16 + 6 + 7 = 66

The last step is to divide 66 by the number of values you have, which is 6.

66 ÷ 6 = 11
11 = 11 (rounded)

Type in 11

Calculate the range of the following numbers:

54, 42, 19, 118, 78, 134

Algebraic Expression:

✓ 115

Hints:
The **range** is the difference between the **largest value** number and the **smallest value** number.

From this list, the **largest value** number is **134**, and the **smallest value** number is **19**.
10) Problem #PRABZ7R "PRABZ7R - Median: Even Number of Values"

Below is a list of numbers.

[70, 22, 13, 42, 91, 12, 66, 60, 21, 40, 38, 10]

What is the median number in this list?

**Algebraic Expression:**

39

**Hints:**

- The first step is to put the numbers in order from least to greatest.

[10, 12, 13, 21, 22, 38, 40, 42, 60, 66, 70, 91]

- The second step is to identify the two middle numbers.

38 and 40

- The last step is to find the mean of the two middle numbers.

38 + 40 = 78
78 ÷ 2 = 39

Type in 39
11) Problem #PRABZ5E "PRABZ5E - Mean 4"
Calculate the mean of the following numbers:

8, 17, 5, 7, 14, 21

(round to the nearest tenths place)

Algebraic Expression:
12

Hints:
- This is how to solve a problem similar to your problem.

Find the mean of the following group of numbers: 3, 8, 4, 9

3 + 8 + 4 + 9 = 24
24 ÷ 4 = 6
- The first step is to add up the values.

8 + 17 + 5 + 7 + 14 + 21 = 72
- The last step is to divide 72 by the number of values you have, which is 6.

72 ÷ 6 = 12
12 = 12 (rounded)

Type in 12

12) Problem #PRAB2KN "PRAB2KN - Mean 5"
Calculate the mean of the following numbers:

18, 3, 19, 12, 18, 8

(round to the nearest tenths place)

Algebraic Expression:
13

Hints:
- This is how to solve a problem similar to your problem.

Find the mean of the following group of numbers: 3, 8, 4, 9
3 + 8 + 4 + 9 = 24
24 ÷ 4 = 6
- The first step is to add up the values.

18 + 3 + 19 + 12 + 18 + 8 = 78
- The last step is to divide 78 by the number of values you have, which is 6.

78 ÷ 6 = 13
13 = 13 (rounded)

Type in 13

13) Problem #PRABZ6V "PRABZ6V - Median: Odd Number of Values"
Below is a list of numbers.

[74, 73, 99, 28, 85, 74, 35, 68, 32, 1, 56, 5, 3]

What is the median number in this list?
Algebraic Expression:

✓ 56

Hints:
- The first step to solve is to put the numbers in order from least to greatest.

[1, 3, 5, 28, 32, 35, 56, 68, 73, 74, 74, 85, 99]
- The last step is to identify the middle number in the list.

Type in 56

14) Problem #PRABZ59 "PRABZ59 - Median: Odd Number of Values"
Below is a list of numbers.

[1, 48, 76, 84, 23, 45, 21, 24, 34, 65, 36, 41, 56]

What is the median number in this list?
Algebraic Expression:

✓ 41

Hints:
- The first step to solve is to put the numbers in order from least to greatest.

[1, 21, 23, 24, 34, 36, 41, 45, 48, 56, 65, 76, 84]
- The last step is to identify the middle number in the list.

Type in 41
15) Problem #PRABZ7P "PRABZ7P - Median: Even Number of Values"

Below is a list of numbers.

[3, 29, 53, 21, 80, 44, 21, 33, 57, 2, 78, 12]

What is the **median** number in this list?

**Algebraic Expression:**

31

**Hints:**
- The first step is to put the numbers in order from least to greatest.

[2, 3, 12, 21, 21, 29, 33, 44, 53, 57, 78, 80]
- The second step is to identify the two middle numbers.

29 and 33
- The last step is to find the **mean** of the two middle numbers.

29 + 33 = 62
62 ÷ 2 = 31

Type in 31

---

16) Problem #PRAB25M "PRAB25M - Range"

Calculate the **range** of the following numbers:

62, 34, 6, 122, 85, 141

**Algebraic Expression:**

31

**Hints:**
- The **range** is the difference between the **largest value** number and the **smallest value** number.

62, 34, 6, 122, 85, 141
- From this list, the **largest value** number is 141, and the **smallest value** number is 6.

141 - 6 = 135

Type in 135
17) Problem #PRAB25R "PRAB25R - Range"
Calculate the range of the following numbers:

\[62, \ 42, \ 8, \ 121, \ 80, \ 126\]

**Algebraic Expression:**

\[\text{Range} = 118\]

**Hints:**

- The range is the difference between the largest value number and the smallest value number.

- \(62, \ 42, \ 8, \ 121, \ 80, \ 126\)

From this list, the largest value number is 126, and the smallest value number is 8.

- \(126 - 8 = 118\)

Type in 118

18) Problem #PRAB2MD "PRAB2MD - Median: Even Number of Values"
Below is a list of numbers.

\([81, \ 56, \ 77, \ 38, \ 88, \ 67, \ 99, \ 21, \ 32, \ 36, \ 47, \ 51]\)

What is the median number in this list?

**Algebraic Expression:**

\[\text{Median} = 53.5\]

**Hints:**

- The first step is to put the numbers in order from least to greatest.

\([21, \ 32, \ 36, \ 38, \ 47, \ 51, \ 56, \ 67, \ 77, \ 81, \ 88, \ 99]\)

- The second step is to identify the two middle numbers.

51 and 56

- The last step is to find the mean of the two middle numbers.

\[51 + 56 = 107\]
\[107 \div 2 = 53.5\]
19) Problem #PRABZ5H "PRABZ5H - Mean"
Calculate the mean of the following numbers:

18, 7, 21, 19, 14, 18

(round to the nearest tenths place)

Algebraic Expression:

16.2

Hints:
- This is how to solve a problem similar to your problem.

Find the mean of the following group of numbers: 3, 8, 4, 9

3 + 8 + 4 + 9 = 24
24 ÷ 4 = 6
- The first step is to add up the values.

18 + 7 + 21 + 19 + 14 + 18 = 97
- The last step is to divide 97 by the number of values you have, which is 6.

97 ÷ 6 = 16.1666666666667
16.1666666666667 = 16.2 (rounded)

Type in 16.2

20) Problem #PRABZ7Q "PRABZ7Q - Median: Even Number of Values"
Below is a list of numbers.

[83, 12, 10, 28, 86, 42, 9, 28, 34, 84, 3, 9]

What is the median number in this list?

Algebraic Expression:

28

Hints:
- The first step is to put the numbers in order from least to greatest.
The second step is to identify the two middle numbers.

28 and 28

The last step is to find the mean of the two middle numbers.

28 + 28 = 56
56 ÷ 2 = 28

Type in 28

21) Problem #PRAB24Q "PRAB24Q - Range"

Calculate the range of the following numbers:

70, 46, 22, 107, 92, 128

Algebraic Expression:

✓ 106

Hints:

• The range is the difference between the largest value number and the smallest value number.

• 70, 46, 22, 107, 92, 128

From this list, the largest value number is 128, and the smallest value number is 22.

• 128 - 22 = 106

Type in 106

22) Problem #PRAB2MA "PRAB2MA - Median: Even Number of Values"

Below is a list of numbers.

[3, 29, 53, 21, 80, 44, 21, 33, 57, 2, 78, 12]

What is the median number in this list?

Algebraic Expression:

✓ 31

Hints:
The first step is to put the numbers in order from least to greatest.

\[2, 3, 12, 21, 21, 29, 33, 44, 53, 57, 78, 80\]

The second step is to identify the two middle numbers.

29 and 33

The last step is to find the mean of the two middle numbers.

\[29 + 33 = 62\]
\[62 ÷ 2 = 31\]

Type in 31

---

23) Problem #PRABZ7Y "PRABZ7Y - Median: Even Number of Values"

Below is a list of numbers.

\[37, 95, 38, 3, 12, 59, 49, 20, 37, 14, 61, 30\]

What is the median number in this list?

**Algebraic Expression:**

\(\sqrt{37}\)

**Hints:**

- The first step is to put the numbers in order from least to greatest.

\[3, 12, 14, 20, 30, 37, 37, 38, 49, 59, 61, 95\]

- The second step is to identify the two middle numbers.

37 and 37

- The last step is to find the mean of the two middle numbers.

\[37 + 37 = 74\]
\[74 ÷ 2 = 37\]

Type in 37

---

24) Problem #PRABZ6F "PRABZ6F - Median: Odd Number of Values"

Below is a list of numbers.

\[70, 22, 13, 42, 91, 3, 12, 66, 60, 21, 40, 38, 10\]

What is the median number in this list?

**Algebraic Expression:**
**Hints:**

- The first step to solve is to put the numbers in order from least to greatest.

\[3, 10, 12, 13, 21, 22, 38, 40, 42, 60, 66, 70, 91\]

- The last step is to identify the middle number in the list.

Type in 38

---

25) Problem #PRAB25D "PRAB25D - Range"

Calculate the range of the following numbers:

73, 38, 13, 105, 81, 146

**Algebraic Expression:**

\[133\]

**Hints:**

- The range is the difference between the largest value number and the smallest value number.

73, 38, 13, 105, 81, 146

From this list, the largest value number is 146, and the smallest value number is 13.

- 146 - 13 = 133

Type in 133

---

26) Problem #PRABZ5Q "PRABZ5Q - Mean"

Calculate the mean of the following numbers:

19, 16, 2, 18, 2, 13

(round to the nearest tenths place)

**Algebraic Expression:**

\[11.7\]

**Hints:**

- This is how to solve a problem similar to your problem.
Find the mean of the following group of numbers: 3, 8, 4, 9

\[ 3 + 8 + 4 + 9 = 24 \]
\[ 24 ÷ 4 = 6 \]

- The first step is to add up the values.

\[ 19 + 16 + 2 + 18 + 2 + 13 = 70 \]

- The last step is to divide 70 by the number of values you have, which is 6.

\[ 70 ÷ 6 = 11.6666666666667 \]
\[ 11.6666666666667 = 11.7 \text{ (rounded)} \]

Type in 11.7

27) Problem #PRABZ7K "PRABZ7K - Median: Even Number of Values"

Below is a list of numbers.

[28, 95, 46, 43, 83, 29, 54, 72, 28, 5, 54, 8]

What is the median number in this list?

Algebraic Expression:

\[ 44.5 \]

Hints:

- The first step is to put the numbers in order from least to greatest.

[5, 8, 28, 28, 29, 43, 46, 54, 54, 72, 83, 95]

- The second step is to identify the two middle numbers.

43 and 46

- The last step is to find the mean of the two middle numbers.

\[ 43 + 46 = 89 \]
\[ 89 ÷ 2 = 44.5 \]

Type in 44.5

28) Problem #PRABZ6Z "PRABZ6Z - Median: Odd Number of Values"

Below is a list of numbers.

[37, 3, 95, 38, 3, 12, 59, 49, 20, 37, 14, 61, 30]

What is the median number in this list?
29) Problem #PRABZ6A "PRABZ6A - Median: Odd Number of Values"
Below is a list of numbers.

[28, 95, 46, 43, 3, 83, 29, 54, 72, 28, 5, 54, 8]

What is the median number in this list?

**Algebraic Expression:**

✓ 43

**Hints:**

- The first step to solve is to put the numbers in order from least to greatest.

[3, 5, 8, 28, 28, 29, 43, 46, 54, 54, 72, 83, 95]
- The last step is to identify the middle number in the list.

Type in 43

30) Problem #PRAB2KV "PRAB2KV - Mean"
Calculate the mean of the following numbers:

12, 14, 16, 9, 14, 19

(round to the nearest tenths place)

**Algebraic Expression:**

✓ 14

**Hints:**

- This is how to solve a problem similar to your problem.

Find the mean of the following group of numbers: 3, 8, 4, 9
3 + 8 + 4 + 9 = 24
24 ÷ 4 = 6
- The first step is to add up the values.

12 + 14 + 16 + 9 + 14 + 19 = 84
- The last step is to divide 84 by the number of values you have, which is 6.

84 ÷ 6 = 14
14 = 14 (rounded)

Type in 14

31) Problem #PRAB2MG "PRAB2MG - Median: Even Number of Values"
Below is a list of numbers.

[48, 76, 84, 23, 45, 21, 24, 34, 65, 36, 41, 56]

What is the median number in this list?

Algebraic Expression:
✓ 43

Hints:
- The first step is to put the numbers in order from least to greatest.

[21, 23, 24, 34, 36, 41, 45, 48, 56, 65, 76, 84]
- The second step is to identify the two middle numbers.

41 and 45
- The last step is to find the mean of the two middle numbers.

41 + 45 = 86
86 ÷ 2 = 43

Type in 43

32) Problem #PRAB2KW "PRAB2KW - Mean"
Calculate the mean of the following numbers:

8, 6, 16, 16, 3, 14

(round to the nearest tenths place)
Algebraic Expression:

✓ 10.5

Hints:

• This is how to solve a problem similar to your problem.

Find the mean of the following group of numbers: 3, 8, 4, 9

3 + 8 + 4 + 9 = 24
24 ÷ 4 = 6

• The first step is to add up the values.

8 + 6 + 16 + 16 + 3 + 14 = 63

• The last step is to divide 63 by the number of values you have, which is 6.

63 ÷ 6 = 10.5
10.5 = 10.5 (rounded)

Type in 10.5

☐ 33) Problem #PRAB245 "PRAB245 - Range"
Calculate the range of the following numbers:

62, 27, 19, 111, 76, 147

Algebraic Expression:

✓ 128

Hints:

• The range is the difference between the largest value number and the smallest value number.

• 62, 27, 19, 111, 76, 147

From this list, the largest value number is 147, and the smallest value number is 19.

• 147 - 19 = 128

Type in 128

☐ 34) Problem #PRABZ7U "PRABZ7U - Median: Even Number of Values"
Below is a list of numbers.
What is the median number in this list?

**Algebraic Expression:**

- **Hints:**
  - The first step is to put the numbers in order from least to greatest.
  - The second step is to identify the two middle numbers.
  - The last step is to find the mean of the two middle numbers.

- $[3, 5, 28, 32, 35, 56, 68, 73, 74, 74, 85, 99]$
  - 56 and 68
  - $56 + 68 = 124$
  - $124 ÷ 2 = 62$

Type in 62

35) Problem #PRABZ5U "PRABZ5U - Mean"

Calculate the mean of the following numbers:

4, 2, 18, 4, 12, 4

(round to the nearest tenths place)

**Algebraic Expression:**

- **Hints:**
  - This is how to solve a problem similar to your problem.

- Find the mean of the following group of numbers: 3, 8, 4, 9

  - $3 + 8 + 4 + 9 = 24$
  - $24 ÷ 4 = 6$
  - The first step is to add up the values.

  - $4 + 2 + 18 + 4 + 12 + 4 = 44$
  - The last step is to divide 44 by the number of values you have, which is 6.
36) Problem #PRAB248 "PRAB248 - Range"

Calculate the range of the following numbers:

63, 49, 16, 118, 76, 132

**Algebraic Expression:**

116

**Hints:**

- The range is the difference between the largest value number and the smallest value number.
- 63, 49, 16, 118, 76, 132

From this list, the largest value number is 132, and the smallest value number is 16.

- 132 - 16 = 116

Type in 116

37) Problem #PRABZ7J "PRABZ7J - Median: Even Number of Values"

Below is a list of numbers.

[48, 76, 84, 23, 45, 21, 24, 34, 65, 36, 41, 56]

What is the median number in this list?

**Algebraic Expression:**

43

**Hints:**

- The first step is to put the numbers in order from least to greatest.

[21, 23, 24, 34, 36, 41, 45, 48, 56, 65, 76, 84]
- The second step is to identify the two middle numbers.

41 and 45
• The last step is to find the mean of the two middle numbers.

\[ 41 + 45 = 86 \]
\[ 86 \div 2 = 43 \]

Type in 43

38) Problem #PRAB25J "PRAB25J - Range"
Calculate the range of the following numbers:

63, 49, 14, 106, 84, 144

Algebraic Expression:
✓ 130

Hints:
• The range is the difference between the largest value number and the smallest value number.

63, 49, 14, 106, 84, 144

From this list, the largest value number is 144, and the smallest value number is 14.

• 144 - 14 = 130

Type in 130

39) Problem #PRAB24P "PRAB24P - Range"
Calculate the range of the following numbers:

55, 37, 12, 121, 92, 142

Algebraic Expression:
✓ 130

Hints:
• The range is the difference between the largest value number and the smallest value number.

55, 37, 12, 121, 92, 142

From this list, the largest value number is 142, and the smallest value number is 12.

• 142 - 12 = 130
40) Problem #PRABZ7Z "PRABZ7Z - Median: Even Number of Values"
Below is a list of numbers.

[3, 29, 53, 21, 80, 44, 21, 33, 57, 2, 78, 12]

What is the median number in this list?

**Algebraic Expression:**

31

**Hints:**

- The first step is to put the numbers in order from least to greatest.

[2, 3, 12, 21, 21, 29, 33, 44, 53, 57, 78, 80]

- The second step is to identify the two middle numbers.

29 and 33

- The last step is to find the mean of the two middle numbers.

29 + 33 = 62

62 ÷ 2 = 31

Type in 31

41) Problem #PRAB2K9 "PRAB2K9 - Median: Even Number of Values"
Below is a list of numbers.

[37, 95, 38, 3, 12, 59, 49, 20, 37, 14, 61, 30]

What is the median number in this list?

**Algebraic Expression:**

37

**Hints:**

- The first step is to put the numbers in order from least to greatest.

[3, 12, 14, 20, 30, 37, 37, 38, 49, 59, 61, 95]

- The second step is to identify the two middle numbers.
37 and 37
- The last step is to find the mean of the two middle numbers.

\[
\frac{37 + 37}{2} = 37
\]

Type in 37

42) Problem #PRAB24V "PRAB24V - Range"
Calculate the range of the following numbers:

\[66, 27, 1, 124, 91, 134\]

Algebraic Expression:

\[
\text{133}
\]

Hints:
- The range is the difference between the largest value number and the smallest value number.

\[66, 27, 1, 124, 91, 134\]

From this list, the largest value number is 134, and the smallest value number is 1.

\[134 - 1 = 133\]

Type in 133

43) Problem #PRABZ54 "PRABZ54 - Median: Odd Number of Values"
Below is a list of numbers.

\[83, 128, 10, 28, 86, 42, 9, 28, 34, 2, 84, 3, 9\]

What is the median number in this list?

Algebraic Expression:

\[
\text{28}
\]

Hints:
- The first step to solve is to put the numbers in order from least to greatest.

\[2, 3, 9, 9, 10, 12, 28, 28, 34, 42, 83, 84, 86\]
- The last step is to identify the middle number in the list.

Type in 28
44) Problem #PRABZ7V "PRABZ7V - Median: Even Number of Values"
Below is a list of numbers.

[48, 76, 84, 23, 45, 21, 24, 34, 65, 36, 41, 56]

What is the **median** number in this list?

**Algebraic Expression:**

✓ 43

**Hints:**

- The first step is to put the numbers in order from least to greatest.

[21, 23, 24, 34, 36, 41, 45, 48, 56, 65, 76, 84]

- The second step is to identify the two middle numbers.

41 and 45

- The last step is to find the **mean** of the two middle numbers.

41 + 45 = 86
86 ÷ 2 = 43

Type in 43

45) Problem #PRABZ6G "PRABZ6G - Median: Odd Number of Values"
Below is a list of numbers.

[81, 56, 77, 38, 88, 67, 99, 21, 32, 36, 9, 47, 51]

What is the **median** number in this list?

**Algebraic Expression:**

✓ 51

**Hints:**

- The first step to solve is to put the numbers in order from least to greatest.

[9, 21, 32, 36, 38, 47, 51, 56, 67, 77, 81, 88, 99]

- The last step is to identify the middle number in the list.

Type in 51

46) Problem #PRAB2K4 "PRAB2K4 - Median: Odd Number of Values"
Below is a list of numbers.
What is the **median** number in this list?

**Algebraic Expression:**

47

**Hints:**
- The first step to solve is to put the numbers in order from least to greatest.

21, 26, 30, 38, 40, 43, 47, 50, 53, 55, 77, 85, 91
- The last step is to identify the middle number in the list.

Type in 47

---

47) **Problem #PRAB2KS "PRAB2KS - Mean"**

Calculate the **mean** of the following numbers:

11, 4, 15, 12, 11, 13

(round to the nearest tenths place)

**Algebraic Expression:**

11

**Hints:**
- This is how to solve a problem similar to your problem.

Find the mean of the following group of numbers: 3, 8, 4, 9

3 + 8 + 4 + 9 = 24
24 ÷ 4 = 6
- The first step is to add up the values.

11 + 4 + 15 + 12 + 11 + 13 = 66
- The last step is to divide 66 by the number of values you have, which is 6.

66 ÷ 6 = 11
11 = 11 (rounded)

Type in 11

---

48) **Problem #PRABZ62 "PRABZ62 - Median: Odd Number of Values"**

Below is a list of numbers.

[26, 53, 38, 50, 21, 85, 77, 43, 30, 91, 47, 55, 40]
What is the median number in this list?

**Algebraic Expression:**

✓ 29

**Hints:**
- The first step to solve is to put the numbers in order from least to greatest.

[1, 2, 3, 12, 21, 21, 29, 33, 44, 53, 57, 78, 80]
- The last step is to identify the middle number in the list.

Type in 29

49) Problem #PRABZ6R "PRABZ6R - Median: Odd Number of Values"

Below is a list of numbers.

[83, 128, 10, 28, 86, 42, 9, 28, 34, 2, 84, 3, 9]

What is the median number in this list?

**Algebraic Expression:**

✓ 28

**Hints:**
- The first step to solve is to put the numbers in order from least to greatest.

[2, 3, 9, 9, 10, 12, 28, 28, 34, 42, 83, 84, 86]
- The last step is to identify the middle number in the list.

Type in 28

50) Problem #PRABZ64 "PRABZ64 - Median: Odd Number of Values"

Below is a list of numbers.

[70, 22, 13, 42, 91, 3, 12, 66, 60, 21, 40, 38, 10]

What is the median number in this list?

**Algebraic Expression:**

✓ 38

**Hints:**
- The first step to solve is to put the numbers in order from least to greatest.

[3, 10, 12, 13, 21, 22, 38, 40, 42, 60, 66, 70, 91]
- The last step is to identify the middle number in the list.
51) Problem #PRABZ6H "PRABZ6H - Median: Odd Number of Values"

Below is a list of numbers.

[26, 53, 38, 50, 21, 85, 77, 43, 30, 91, 47, 55, 40]

What is the median number in this list?

**Algebraic Expression:**

✓ 47

**Hints:**

- The first step to solve is to put the numbers in order from least to greatest.

[21, 26, 30, 38, 40, 43, 47, 50, 53, 55, 77, 85, 91]

- The last step is to identify the middle number in the list.

Type in 47

52) Problem #PRABZ7T "PRABZ7T - Median: Even Number of Values"

Below is a list of numbers.

[26, 53, 38, 50, 85, 77, 43, 30, 91, 47, 55, 40]

What is the median number in this list?

**Algebraic Expression:**

✓ 48.5

**Hints:**

- The first step is to put the numbers in order from least to greatest.

[26, 30, 38, 40, 43, 47, 50, 53, 55, 77, 85, 91]

- The second step is to identify the two middle numbers.

47 and 50

- The last step is to find the mean of the two middle numbers.

47 + 50 = 97
97 ÷ 2 = 48.5

Type in 48.5
53) Problem #PRABZ6X "PRABZ6X - Median: Odd Number of Values"
Below is a list of numbers.

[28, 95, 46, 43, 3, 83, 29, 54, 72, 28, 5, 54, 8]

What is the median number in this list?

**Algebraic Expression:**

✓ 43

**Hints:**

- The first step to solve is to put the numbers in order from least to greatest.

[3, 5, 8, 28, 28, 29, 43, 46, 54, 54, 72, 83, 95]

- The last step is to identify the middle number in the list.

Type in 43

54) Problem #PRABZ7F "PRABZ7F - Median: Even Number of Values"
Below is a list of numbers.

[81, 56, 77, 38, 88, 67, 99, 21, 32, 36, 47, 51]

What is the median number in this list?

**Algebraic Expression:**

✓ 53.5

**Hints:**

- The first step is to put the numbers in order from least to greatest.

[21, 32, 36, 38, 47, 51, 56, 67, 77, 81, 88, 99]

- The second step is to identify the two middle numbers.

51 and 56

- The last step is to find the mean of the two middle numbers.

51 + 56 = 107
107 ÷ 2 = 53.5

Type in 53.5

55) Problem #PRABZ7S "PRABZ7S - Median: Even Number of Values"
Below is a list of numbers.
What is the median number in this list?

**Algebraic Expression:**

✓ 53.5

**Hints:**

- The first step is to put the numbers in order from least to greatest.

[21, 32, 36, 38, 47, 51, 56, 67, 77, 81, 88, 99]

- The second step is to identify the two middle numbers.

51 and 56

- The last step is to find the mean of the two middle numbers.

51 + 56 = 107
107 ÷ 2 = 53.5

Type in 53.5

---

56) Problem #PRAB24X "PRAB24X - Range"

Calculate the range of the following numbers:

63, 36, 17, 118, 92, 147

**Algebraic Expression:**

✓ 130

**Hints:**

- The range is the difference between the largest value number and the smallest value number.

- From this list, the largest value number is 147, and the smallest value number is 17.

147 - 17 = 130

Type in 130

---

57) Problem #PRABZ75 "PRABZ75 - Median: Even Number of Values"

Below is a list of numbers.
What is the **median** number in this list?

**Algebraic Expression:**

✓ 48.5

**Hints:**
- The first step is to put the numbers in order from least to greatest.

[26, 30, 38, 40, 43, 47, 50, 53, 55, 77, 85, 91]
- The second step is to identify the two middle numbers.

47 and 50
- The last step is to find the **mean** of the two middle numbers.

47 + 50 = 97
97 ÷ 2 = 48.5

Type in 48.5

---

58) Problem #PRAB24N "PRAB24N - Range"

Calculate the **range** of the following numbers:

57, 31, 23, 110, 85, 131

**Algebraic Expression:**

✓ 108

**Hints:**
- The **range** is the difference between the **largest value** number and the **smallest value** number.

57, 31, 23, 110, 85, 131
- From this list, the **largest value** number is 131, and the **smallest value** number is 23.

131 - 23 = 108

Type in 108

---

59) Problem #PRABZ5K "PRABZ5K - Mean"
Calculate the mean of the following numbers:

2, 12, 17, 16, 2, 13

(round to the nearest tenths place)

Algebraic Expression:

10.3

Hints:

- This is how to solve a problem similar to your problem.

Find the mean of the following group of numbers: 3, 8, 4, 9

3 + 8 + 4 + 9 = 24
24 ÷ 4 = 6

- The first step is to add up the values.

2 + 12 + 17 + 16 + 2 + 13 = 62

- The last step is to divide 62 by the number of values you have, which is 6.

62 ÷ 6 = 10.3333333333333
10.3333333333333 = 10.3 (rounded)

Type in 10.3

☐ 60) Problem #PRABZ5T "PRABZ5T - Mean"
Calculate the mean of the following numbers:

11, 19, 2, 4, 9, 17

(round to the nearest tenths place)

Algebraic Expression:

10.3

Hints:

- This is how to solve a problem similar to your problem.

Find the mean of the following group of numbers: 3, 8, 4, 9

3 + 8 + 4 + 9 = 24
24 ÷ 4 = 6
• The first step is to add up the values.

\[11 + 19 + 2 + 4 + 9 + 17 = 62\]

• The last step is to divide 62 by the number of values you have, which is 6.

\[62 \div 6 = 10.3333333333333\]
\[10.3333333333333 = 10.3 \text{ (rounded)}\]

Type in 10.3

61) Problem #PRAB24R "PRAB24R - Range"
Calculate the range of the following numbers:

57, 27, 9, 112, 96, 130

Algebraic Expression:

\[121\]

Hints:

• The range is the difference between the largest value number and the smallest value number.

\[57, 27, 9, 112, 96, 130\]

From this list, the largest value number is 130, and the smallest value number is 9.

• \[130 - 9 = 121\]

Type in 121

62) Problem #PRAB2K7 "PRAB2K7 - Median: Odd Number of Values"
Below is a list of numbers.

[28, 95, 46, 43, 3, 83, 29, 54, 72, 28, 5, 54, 8]

What is the median number in this list?

Algebraic Expression:

\[43\]

Hints:

• The first step to solve is to put the numbers in order from least to greatest.

\[3, 5, 8, 28, 28, 29, 43, 46, 54, 54, 72, 83, 95\]

• The last step is to identify the middle number in the list.
63) Problem #PRABZ55 "PRABZ55 - Median: Odd Number of Values"
Below is a list of numbers.

[70, 22, 13, 42, 91, 3, 12, 66, 60, 21, 40, 38, 10]

What is the **median** number in this list?

**Algebraic Expression:**

✓ 38

**Hints:**

- The first step to solve is to put the numbers in order from least to greatest.

[3, 10, 12, 13, 21, 22, 38, 40, 42, 60, 66, 70, 91]
- The last step is to identify the middle number in the list.

Type in 38

64) Problem #PRAB2MC "PRAB2MC - Median: Even Number of Values"
Below is a list of numbers.

[70, 22, 13, 42, 91, 12, 66, 60, 21, 40, 38, 10]

What is the **median** number in this list?

**Algebraic Expression:**

✓ 39

**Hints:**

- The first step is to put the numbers in order from least to greatest.

[10, 12, 13, 21, 22, 38, 40, 42, 60, 66, 70, 91]
- The second step is to identify the two middle numbers.

38 and 40
- The last step is to find the **mean** of the two middle numbers.

\[38 + 40 = 78\]
\[78 \div 2 = 39\]

Type in 39
65) Problem #PRABZ57 "PRABZ57 - Median: Odd Number of Values"

Below is a list of numbers.

[26, 53, 38, 50, 21, 85, 77, 43, 30, 91, 47, 55, 40]

What is the median number in this list?

**Algebraic Expression:**

✓ 47

**Hints:**

- The first step to solve is to put the numbers in order from least to greatest.

[21, 26, 30, 38, 40, 43, 47, 50, 53, 55, 77, 85, 91]

- The last step is to identify the middle number in the list.

Type in 47

66) Problem #PRAB24K "PRAB24K - Range"

Calculate the range of the following numbers:

72, 41, 19, 114, 89, 137

**Algebraic Expression:**

✓ 118

**Hints:**

- The range is the difference between the largest value number and the smallest value number.

- 72, 41, 19, 114, 89, 137

From this list, the largest value number is 137, and the smallest value number is 19.

- 137 - 19 = 118

Type in 118

67) Problem #PRABZ6K "PRABZ6K - Median: Odd Number of Values"

Below is a list of numbers.

[1, 48, 76, 84, 23, 45, 21, 24, 34, 65, 36, 41, 56]

What is the median number in this list?

**Algebraic Expression:**
**Hints:**
- The first step to solve is to put the numbers in order from least to greatest.
- The last step is to identify the middle number in the list.

Type in 41

---

68) Problem #PRAB25G "PRAB25G - Range"
Calculate the range of the following numbers:

73, 26, 5, 105, 95, 132

**Algebraic Expression:**

- 127

**Hints:**
- The range is the difference between the largest value number and the smallest value number.
- 73, 26, 5, 105, 95, 132

From this list, the largest value number is 132, and the smallest value number is 5.

- 132 - 5 = 127

Type in 127

---

69) Problem #PRAB25S "PRAB25S - Range"
Calculate the range of the following numbers:

54, 43, 7, 104, 81, 143

**Algebraic Expression:**

- 136

**Hints:**
- The range is the difference between the largest value number and the smallest value number.
- 54, 43, 7, 104, 81, 143
From this list, the largest value number is 143, and the smallest value number is 7.

- 143 - 7 = 136

Type in 136

70) Problem #PRAB243 "PRAB243 - Range"
Calculate the range of the following numbers:

69, 28, 10, 119, 97, 149

Algebraic Expression:
✓ 139

Hints:
- The range is the difference between the largest value number and the smallest value number.
- 69, 28, 10, 119, 97, 149

From this list, the largest value number is 149, and the smallest value number is 10.

- 149 - 10 = 139

Type in 139

71) Problem #PRABZ6Y "PRABZ6Y - Median: Odd Number of Values"
Below is a list of numbers.

[3, 8, 43, 9, 3, 26, 5, 72, 1, 42, 4, 82, 9]

What is the median number in this list?

Algebraic Expression:
✓ 9

Hints:
- The first step to solve is to put the numbers in order from least to greatest.
- [1, 3, 3, 4, 5, 8, 9, 9, 26, 42, 43, 72, 82]
- The last step is to identify the middle number in the list.

Type in 9

72) Problem #PRABZ6E "PRABZ6E - Median: Odd Number of Values"
Below is a list of numbers.

[83, 128, 10, 28, 86, 42, 9, 28, 34, 2, 84, 3, 9]

What is the **median** number in this list?

**Algebraic Expression:**

✓ 28

**Hints:**

- The first step to solve is to put the numbers in order from least to greatest.

[2, 3, 9, 9, 10, 12, 28, 28, 34, 42, 83, 84, 86]

- The last step is to identify the middle number in the list.

Type in 28

---

74) Problem #PRABZ6N "PRABZ6N - Median: Odd Number of Values"

Below is a list of numbers.

[3, 8, 43, 9, 3, 26, 5, 72, 1, 42, 4, 82, 9]
What is the **median** number in this list?

**Algebraic Expression:**

![Correct Answer](true) 9

**Hints:**

- The first step to solve is to put the numbers in order from least to greatest.

[1, 3, 3, 4, 5, 8, 9, 9, 26, 42, 43, 72, 82]

- The last step is to identify the middle number in the list.

*Type in 9*

---

75) Problem #PRABz6c "PRABz6c - Median: Odd Number of Values"

Below is a list of numbers.

[37, 3, 95, 38, 3, 12, 59, 49, 20, 37, 14, 61, 30]

What is the **median** number in this list?

**Algebraic Expression:**

![Correct Answer](true) 37

**Hints:**

- The first step to solve is to put the numbers in order from least to greatest.

[3, 3, 12, 14, 20, 30, 37, 37, 38, 49, 59, 61, 95]

- The last step is to identify the middle number in the list.

*Type in 37*

---

76) Problem #PRAB25K "PRAB25K - Range"

Calculate the **range** of the following numbers:

60, 29, 13, 103, 84, 126

**Algebraic Expression:**

![Correct Answer](true) 113

**Hints:**

- The **range** is the difference between the largest **value** number and the smallest **value** number.

60, 29, 13, 103, 84, 126
From this list, the largest value number is 126, and the smallest value number is 13.

- $126 - 13 = 113$

Type in 113

77) Problem #PRAB25C "PRAB25C - Range"
Calculate the range of the following numbers:

$58, \ 33, \ 19, \ 115, \ 89, \ 129$

**Algebraic Expression:**

✓ 110

**Hints:**

- The range is the difference between the largest value number and the smallest value number.

- $58, \ 33, \ 19, \ 115, \ 89, \ 129$

From this list, the largest value number is 129, and the smallest value number is 19.

- $129 - 19 = 110$

Type in 110

78) Problem #PRABZ46 "PRABZ46 - Mean"
Calculate the mean of the following numbers:

$4, \ 16, \ 6, \ 3, \ 3, \ 8$

(round to the nearest tenths place)

**Algebraic Expression:**

✓ 6.7

**Hints:**

- This is how to solve a problem similar to your problem.

Find the mean of the following group of numbers: 3, 8, 4, 9

$3 + 8 + 4 + 9 = 24$
$24 \div 4 = 6$
The first step is to add up the values.

\[ 4 + 16 + 6 + 3 + 3 + 8 = 40 \]

The last step is to divide 40 by the number of values you have, which is 6.

\[ 40 \div 6 = 6.66666666666667 \]
\[ 6.66666666666667 = 6.7 \text{ (rounded)} \]

Type in 6.7

79) Problem #PRABZ5Z "PRABZ5Z - Mean"
Calculate the **mean** of the following numbers:

14, 3, 9, 16, 21, 17

(round to the nearest tenths place)

**Algebraic Expression:**

✓ 13.3

**Hints:**

* This is how to solve a problem similar to your problem.

Find the mean of the following group of numbers: 3, 8, 4, 9

\[ 3 + 8 + 4 + 9 = 24 \]
\[ 24 \div 4 = 6 \]

The first step is to add up the values.

\[ 14 + 3 + 9 + 16 + 21 + 17 = 80 \]

The last step is to divide 80 by the number of values you have, which is 6.

\[ 80 \div 6 = 13.33333333333333 \]
\[ 13.33333333333333 = 13.3 \text{ (rounded)} \]

Type in 13.3

80) Problem #PRABZ5X "PRABZ5X - Mean"
Calculate the **mean** of the following numbers:

17, 10, 4, 18, 18, 4

(round to the nearest tenths place)
Algebraic Expression:

11.8

Hints:

This is how to solve a problem similar to your problem.

Find the mean of the following group of numbers: 3, 8, 4, 9

3 + 8 + 4 + 9 = 24
24 ÷ 4 = 6

The first step is to add up the values.

17 + 10 + 4 + 18 + 18 + 4 = 71

The last step is to divide 71 by the number of values you have, which is 6.

71 ÷ 6 = 11.8333333333333
11.8333333333333 = 11.8 (rounded)

Type in 11.8

81) Problem #PRAB2ME "PRAB2ME - Median: Even Number of Values"

Below is a list of numbers.

[26, 53, 38, 50, 85, 77, 43, 30, 91, 47, 55, 40]

What is the median number in this list?

Algebraic Expression:

48.5

Hints:

The first step is to put the numbers in order from least to greatest.

[26, 30, 38, 40, 43, 47, 50, 53, 55, 77, 85, 91]

The second step is to identify the two middle numbers.

47 and 50

The last step is to find the mean of the two middle numbers.

47 + 50 = 97
97 ÷ 2 = 48.5
Calculate the range of the following numbers:

68, 38, 16, 102, 97, 132

Algebraic Expression:

116

Hints:

- The range is the difference between the largest value number and the smallest value number.

- 68, 38, 16, 102, 97, 132

From this list, the largest value number is 132, and the smallest value number is 16.

- 132 - 16 = 116

Type in 116

Below is a list of numbers.

[1, 48, 76, 84, 23, 45, 21, 24, 34, 65, 36, 41, 56]

What is the median number in this list?

Algebraic Expression:

41

Hints:

- The first step to solve is to put the numbers in order from least to greatest.

[1, 21, 23, 24, 34, 36, 41, 45, 48, 56, 65, 76, 84]

- The last step is to identify the middle number in the list.

Type in 41

Calculate the mean of the following numbers:
11, 3, 17, 14, 13, 7

(round to the nearest tenths place)

**Algebraic Expression:**

- 10.8

**Hints:**

- This is how to solve a problem similar to your problem.

Find the mean of the following group of numbers: 3, 8, 4, 9

\[3 + 8 + 4 + 9 = 24\]
\[24 ÷ 4 = 6\]

- The first step is to add up the values.

\[11 + 3 + 17 + 14 + 13 + 7 = 65\]

- The last step is to divide 65 by the number of values you have, which is 6.

\[65 ÷ 6 = 10.8333333333333\]
\[10.8333333333333 = 10.8\] (rounded)

Type in 10.8

---

85) Problem #PRABZ69 "PRABZ69 - Median: Odd Number of Values"

Below is a list of numbers.

[28, 95, 46, 43, 3, 83, 29, 54, 72, 28, 5, 54, 8]

What is the **median** number in this list?

**Algebraic Expression:**

- 43

**Hints:**

- The first step to solve is to put the numbers in order from least to greatest.

[3, 5, 8, 28, 28, 29, 43, 46, 54, 54, 72, 83, 95]

- The last step is to identify the middle number in the list.

Type in 43

---

86) Problem #PRAB25H "PRAB25H - Range"

Calculate the **range** of the following numbers:
Algebraic Expression:

✓ 145

Hints:

- The range is the difference between the largest value number and the smallest value number.

- 70, 41, 4, 123, 87, 149

From this list, the largest value number is 149, and the smallest value number is 4.

- 149 - 4 = 145

Type in 145

---

87) Problem #PRABZ6Q "PRABZ6Q - Median: Odd Number of Values"

Below is a list of numbers.

[1, 3, 29, 53, 21, 80, 44, 21, 33, 57, 2, 78, 12]

What is the median number in this list?

Algebraic Expression:

✓ 29

Hints:

- The first step to solve is to put the numbers in order from least to greatest.

[1, 2, 3, 12, 21, 21, 29, 33, 44, 53, 57, 78, 80]

- The last step is to identify the middle number in the list.

Type in 29

---

88) Problem #PRABZ5G "PRABZ5G - Mean"

Calculate the mean of the following numbers:

15, 10, 20, 3, 17, 9

(round to the nearest tenths place)

Algebraic Expression:

✓ 12.3
Hints:
- This is how to solve a problem similar to your problem.

Find the mean of the following group of numbers: 3, 8, 4, 9

\[ 3 + 8 + 4 + 9 = 24 \]
\[ 24 \div 4 = 6 \]

- The first step is to add up the values.

\[ 15 + 10 + 20 + 3 + 17 + 9 = 74 \]

- The last step is to divide 74 by the number of values you have, which is 6.

\[ 74 \div 6 = 12.3333333333333 \]
\[ 12.3333333333333 = 12.3 \text{ (rounded)} \]

Type in 12.3

89) Problem #PRAB24Y "PRAB24Y - Range"
Calculate the range of the following numbers:

71, 40, 7, 105, 78, 130

Algebraic Expression:

\[ \sqrt[2]{123} \]

Hints:
- The range is the difference between the largest value number and the smallest value number.

- 71, 40, 7, 105, 78, 130

From this list, the largest value number is 130, and the smallest value number is 7.

- 130 - 7 = 123

Type in 123

90) Problem #PRABZ7E "PRABZ7E - Median: Even Number of Values"
Below is a list of numbers.

[70, 22, 13, 42, 91, 12, 66, 60, 21, 40, 38, 10]
What is the **median** number in this list?

**Algebraic Expression:**

✅ 39

**Hints:**

- The first step is to put the numbers in order from least to greatest.

[10, 12, 13, 21, 22, 38, 40, 42, 60, 66, 70, 91]

- The second step is to identify the two middle numbers.

38 and 40

- The last step is to find the **mean** of the two middle numbers.

38 + 40 = 78
78 ÷ 2 = 39

Type in 39

---

91) Problem #PRABZ5S "PRABZ5S - Mean"

Calculate the **mean** of the following numbers:

9, 14, 21, 11, 9, 12

(round to the nearest tenths place)

**Algebraic Expression:**

✅ 12.7

**Hints:**

- This is how to solve a problem similar to your problem.

Find the mean of the following group of numbers: 3, 8, 4, 9

3 + 8 + 4 + 9 = 24
24 ÷ 4 = 6

- The first step is to add up the values.

9 + 14 + 21 + 11 + 9 + 12 = 76

- The last step is to divide 76 by the number of values you have, which is 6.

76 ÷ 6 = 12.666666666667
12.666666666667 = 12.7 (rounded)
Type in 12.7

92) Problem #PRABZ79 "PRABZ79 - Median: Even Number of Values"

Below is a list of numbers.

[3, 8, 43, 9, 3, 26, 5, 72, 42, 4, 82, 9]

What is the median number in this list?

Algebraic Expression:

✓ 9

Hints:

- The first step is to put the numbers in order from least to greatest.

[3, 3, 4, 5, 8, 9, 9, 26, 42, 43, 72, 82]

- The second step is to identify the two middle numbers.

9 and 9

- The last step is to find the mean of the two middle numbers.

\[
\begin{align*}
9 + 9 &= 18 \\
18 \div 2 &= 9 \\
\end{align*}
\]

Type in 9

93) Problem #PRABZ49 "PRABZ49 - Mean"

Calculate the mean of the following numbers:

19, 6, 21, 2, 21, 12

(round to the nearest tenths place)

Algebraic Expression:

✓ 13.5

Hints:

- This is how to solve a problem similar to your problem.

Find the mean of the following group of numbers: 3, 8, 4, 9
3 + 8 + 4 + 9 = 24
24 ÷ 4 = 6
- The first step is to add up the values.

19 + 6 + 21 + 2 + 21 + 12 = 81
- The last step is to divide 81 by the number of values you have, which is 6.

81 ÷ 6 = 13.5
13.5 = 13.5 (rounded)

Type in 13.5

94) Problem #PRABZ6U "PRABZ6U - Median: Odd Number of Values"
Below is a list of numbers.

[26, 53, 38, 50, 21, 85, 77, 43, 30, 91, 47, 55, 40]

What is the median number in this list?
**Algebraic Expression:**

✓ 47

**Hints:**
- The first step to solve is to put the numbers in order from least to greatest.

[21, 26, 30, 38, 40, 43, 47, 50, 53, 55, 77, 85, 91]
- The last step is to identify the middle number in the list.

Type in 47

95) Problem #PRABZ56 "PRABZ56 - Median: Odd Number of Values"
Below is a list of numbers.

[81, 56, 77, 38, 88, 67, 99, 21, 32, 36, 9, 47, 51]

What is the median number in this list?
**Algebraic Expression:**

✓ 51

**Hints:**
- The first step to solve is to put the numbers in order from least to greatest.

[9, 21, 32, 36, 38, 47, 51, 56, 67, 77, 81, 88, 99]
- The last step is to identify the middle number in the list.

Type in 51
96) Problem #PRABZ7N "PRABZ7N - Median: Even Number of Values"
Below is a list of numbers.

[37, 95, 38, 3, 12, 59, 49, 20, 37, 14, 61, 30]

What is the median number in this list?

**Algebraic Expression:**

✓ 37

**Hints:**
- The first step is to put the numbers in order from least to greatest.

[3, 12, 14, 20, 30, 37, 37, 38, 49, 59, 61, 95]
- The second step is to identify the two middle numbers.

37 and 37
- The last step is to find the mean of the two middle numbers.

37 + 37 = 74
74 ÷ 2 = 37

Type in 37

97) Problem #PRAB2K8 "PRAB2K8 - Median: Odd Number of Values"
Below is a list of numbers.

[3, 8, 43, 9, 3, 26, 5, 72, 1, 42, 4, 82, 9]

What is the median number in this list?

**Algebraic Expression:**

✓ 9

**Hints:**
- The first step to solve is to put the numbers in order from least to greatest.

[1, 3, 3, 4, 5, 8, 9, 9, 26, 42, 43, 72, 82]
- The last step is to identify the middle number in the list.

Type in 9

98) Problem #PRABZ7W "PRABZ7W - Median: Even Number of Values"
Below is a list of numbers.

[ ]
What is the median number in this list?

**Algebraic Expression:**

✓ 44.5

**Hints:**

- The first step is to put the numbers in order from least to greatest.

[5, 8, 28, 28, 29, 43, 46, 54, 54, 72, 83, 95]

- The second step is to identify the two middle numbers.

43 and 46

- The last step is to find the mean of the two middle numbers.

43 + 46 = 89

89 ÷ 2 = 44.5

Type in 44.5

99) Problem #PRAB2KR "PRAB2KR - Mean"

Calculate the mean of the following numbers:

18, 7, 9, 5, 10, 5

(round to the nearest tenths place)

**Algebraic Expression:**

✓ 9

**Hints:**

- This is how to solve a problem similar to your problem.

Find the mean of the following group of numbers: 3, 8, 4, 9

3 + 8 + 4 + 9 = 24

24 ÷ 4 = 6

- The first step is to add up the values.

18 + 7 + 9 + 5 + 10 + 5 = 54

- The last step is to divide 54 by the number of values you have, which is 6.
54 ÷ 6 = 9
9 = 9 (rounded)

Type in 9

100) Problem #PRABZ5F "PRABZ5F - Mean"
Calculate the **mean** of the following numbers:

11, 4, 11, 21, 21, 8

(round to the nearest tenths place)

**Algebraic Expression:**

12.7

**Hints:**
- This is how to solve a problem similar to your problem.

Find the mean of the following group of numbers: 3, 8, 4, 9

3 + 8 + 4 + 9 = 24
24 ÷ 4 = 6
- The first step is to add up the values.

11 + 4 + 11 + 21 + 21 + 8 = 76
- The last step is to divide 76 by the number of values you have, which is 6.

76 ÷ 6 = 12.6666666666667
12.6666666666667 = 12.7 (rounded)

Type in 12.7

101) Problem #PRAB244 "PRAB244 - Range"
Calculate the **range** of the following numbers:

62, 34, 22, 116, 82, 128

**Algebraic Expression:**

106

**Hints:**
- The **range** is the difference between the **largest value** number and the **smallest value** number.
From this list, the largest value number is **128**, and the smallest value number is **22**.

- **128 - 22 = 106**

Type in 106

102) Problem #PRAB2K6 "PRAB2K6 - Median: Odd Number of Values"
Below is a list of numbers.

[1, 48, 76, 84, 23, 45, 21, 24, 34, 65, 36, 41, 56]

What is the **median** number in this list?

**Algebraic Expression:**

✓ 41

**Hints:**

- The first step to solve is to put the numbers in order from least to greatest.

[1, 21, 23, 24, 34, 36, 41, 45, 48, 56, 65, 76, 84]
- The last step is to identify the middle number in the list.

Type in 41

103) Problem #PRABZ5P "PRABZ5P - Mean"
Calculate the **mean** of the following numbers:

5, 15, 17, 16, 10, 16

(round to the nearest tenths place)

**Algebraic Expression:**

✓ 13.2

**Hints:**

- This is how to solve a problem similar to your problem.

Find the mean of the following group of numbers: 3, 8, 4, 9

3 + 8 + 4 + 9 = 24
24 ÷ 4 = 6
The first step is to add up the values.

\[ 5 + 15 + 17 + 16 + 10 + 16 = 79 \]

The last step is to divide 79 by the number of values you have, which is 6.

\[ 79 \div 6 = 13.1666666666667 \]

13.1666666666667 = 13.2 (rounded)

Type in 13.2

104) Problem #PRAB2K3 "PRAB2K3 - Median: Odd Number of Values"
Below is a list of numbers.

[81, 56, 77, 38, 88, 67, 99, 21, 32, 36, 9, 47, 51]

What is the median number in this list?

**Algebraic Expression:**

\[ 51 \]

**Hints:**

- The first step to solve is to put the numbers in order from least to greatest.

[9, 21, 32, 36, 38, 47, 51, 56, 67, 77, 81, 88, 99]

- The last step is to identify the middle number in the list.

Type in 51

105) Problem #PRAB24W "PRAB24W - Range"
Calculate the range of the following numbers:

67, 38, 7, 108, 82, 147

**Algebraic Expression:**

\[ 140 \]

**Hints:**

- The range is the difference between the largest value number and the smallest value number.

- 67, 38, 7, 108, 82, 147

From this list, the largest value number is 147, and the smallest value number is 7.

- 147 - 7 = 140
106) Problem #PRAB2MB "PRAB2MB - Median: Even Number of Values"
Below is a list of numbers.

[83, 12, 10, 28, 86, 42, 9, 28, 34, 84, 3, 9]

What is the median number in this list?

Algebraic Expression:

✓ 28

Hints:

- The first step is to put the numbers in order from least to greatest.

[3, 9, 9, 10, 12, 28, 28, 34, 42, 83, 84, 86]
- The second step is to identify the two middle numbers.

28 and 28
- The last step is to find the mean of the two middle numbers.

28 + 28 = 56
56 ÷ 2 = 28

Type in 28

107) Problem #PRABZ7M "PRABZ7M - Median: Even Number of Values"
Below is a list of numbers.

[3, 8, 43, 9, 3, 26, 5, 72, 42, 4, 82, 9]

What is the median number in this list?

Algebraic Expression:

✓ 9

Hints:

- The first step is to put the numbers in order from least to greatest.

[3, 3, 4, 5, 8, 9, 9, 26, 42, 43, 72, 82]
- The second step is to identify the two middle numbers.
9 and 9
- The last step is to find the mean of the two middle numbers.

9 + 9 = 18
18 ÷ 2 = 9

Type in 9

108) Problem #PRABZ72 "PRABZ72 - Median: Even Number of Values"
Below is a list of numbers.

[83, 12, 10, 28, 86, 42, 9, 28, 34, 84, 3, 9]

What is the median number in this list?

**Algebraic Expression:**

✓ 28

**Hints:**
- The first step is to put the numbers in order from least to greatest.

[3, 9, 9, 10, 12, 28, 28, 34, 42, 83, 84, 86]
- The second step is to identify the two middle numbers.

28 and 28
- The last step is to find the mean of the two middle numbers.

28 + 28 = 56
56 ÷ 2 = 28

Type in 28

109) Problem #PRABZ5V "PRABZ5V - Mean"
Calculate the mean of the following numbers:

12, 21, 12, 17, 13, 7

(round to the nearest tenths place)

**Algebraic Expression:**

✓ 13.7
Hints:
- This is how to solve a problem similar to your problem.

Find the mean of the following group of numbers: 3, 8, 4, 9

$$3 + 8 + 4 + 9 = 24$$
$$24 \div 4 = 6$$
- The first step is to add up the values.

$$12 + 21 + 12 + 17 + 13 + 7 = 82$$
- The last step is to divide 82 by the number of values you have, which is 6.

$$82 \div 6 = 13.6666666666667$$
$$13.6666666666667 = 13.7$$ (rounded)

Type in 13.7

110) Problem #PRAB24M "PRAB24M - Range"
Calculate the range of the following numbers:

71, 47, 21, 109, 94, 132

Algebraic Expression:

111

Hints:
- The range is the difference between the largest value number and the smallest value number.

71, 47, 21, 109, 94, 132

From this list, the largest value number is 132, and the smallest value number is 21.

132 - 21 = 111

Type in 111

111) Problem #PRAB2MF "PRAB2MF - Median: Even Number of Values"
Below is a list of numbers.

[74, 73, 99, 28, 85, 74, 35, 68, 32, 56, 5, 3]
What is the **median** number in this list?

**Algebraic Expression:**

✅ 62

**Hints:**

- The first step is to put the numbers in order from least to greatest.

[3, 5, 28, 32, 35, 56, 68, 73, 74, 74, 85, 99]

- The second step is to identify the two middle numbers.

56 and 68

- The last step is to find the **mean** of the two middle numbers.

56 + 68 = 124

124 ÷ 2 = 62

Type in 62

---

112) Problem #PRABZ68 "PRABZ68 - Median: Odd Number of Values"

Below is a list of numbers.

[1, 48, 76, 84, 23, 45, 21, 24, 34, 65, 36, 41, 56]

What is the **median** number in this list?

**Algebraic Expression:**

✅ 41

**Hints:**

- The first step to solve is to put the numbers in order from least to greatest.

[1, 21, 23, 24, 34, 36, 41, 45, 48, 56, 65, 76, 84]

- The last step is to identify the middle number in the list.

Type in 41

---

113) Problem #PRAB247 "PRAB247 - Range"

Calculate the **range** of the following numbers:

74, 40, 4, 110, 85, 144

**Algebraic Expression:**

✅ 140

**Hints:**
• The **range** is the difference between the **largest value** number and the **smallest value** number.

74, 40, 4, 110, 85, 144

From this list, the **largest value** number is **144**, and the **smallest value** number is 4.

• 144 - 4 = 140

Type in 140

114) Problem #PRABZ5R "PRABZ5R - Mean"
Calculate the **mean** of the following numbers:

20, 20, 14, 20, 15, 9

(roll to the nearest tenths place)

**Algebraic Expression:**

16.3

**Hints:**

• This is how to solve a problem similar to your problem.

Find the mean of the following group of numbers: 3, 8, 4, 9

3 + 8 + 4 + 9 = 24
24 ÷ 4 = 6

• The first step is to add up the values.

20 + 20 + 14 + 20 + 15 + 9 = 98

• The last step is to divide 98 by the number of values you have, which is 6.

98 ÷ 6 = 16.3333333333333
16.3333333333333 = 16.3 (rounded)

Type in 16.3

115) Problem #PRABZ66 "PRABZ66 - Median: Odd Number of Values"
Below is a list of numbers.

[26, 53, 38, 50, 21, 85, 77, 43, 30, 91, 47, 55, 40]

What is the **median** number in this list?
Algebraic Expression:

\[
47
\]

Hints:

- The first step to solve is to put the numbers in order from least to greatest.

\[
21, 26, 30, 38, 40, 43, 47, 50, 53, 55, 77, 85, 91
\]

- The last step is to identify the middle number in the list.

Type in 47

116) Problem #PRAB2MH "PRAB2MH - Median: Even Number of Values"

Below is a list of numbers.

\[
28, 95, 46, 43, 83, 29, 54, 72, 28, 5, 54, 8
\]

What is the \textbf{median} number in this list?

Algebraic Expression:

\[
44.5
\]

Hints:

- The first step is to put the numbers in order from least to greatest.

\[
5, 8, 28, 28, 29, 43, 46, 54, 54, 72, 83, 95
\]

- The second step is to identify the two middle numbers.

43 and 46

- The last step is to find the \textbf{mean} of the two middle numbers.

\[
43 + 46 = 89 \\
89 ÷ 2 = 44.5
\]

Type in 44.5

117) Problem #PRAB2KP "PRAB2KP - Mean"

Calculate the \textbf{mean} of the following numbers:

\[
15, 14, 11, 15, 5, 13
\]

(round to the nearest tenths place)
Algebraic Expression:
✓ 12.2

Hints:
- This is how to solve a problem similar to your problem.

Find the mean of the following group of numbers: 3, 8, 4, 9

\[ 3 + 8 + 4 + 9 = 24 \]
\[ 24 ÷ 4 = 6 \]
- The first step is to add up the values.

\[ 15 + 14 + 11 + 15 + 5 + 13 = 73 \]
- The last step is to divide 73 by the number of values you have, which is 6.

\[ 73 ÷ 6 = 12.1666666666667 \]
\[ 12.1666666666667 = 12.2 \text{ (rounded)} \]

Type in \( 12.2 \)

☐ 118) Problem #PRABZ53 "PRABZ53 - Median: Odd Number of Values"
Below is a list of numbers.

[1, 3, 29, 53, 21, 80, 44, 21, 33, 57, 2, 78, 12]

What is the median number in this list?

Algebraic Expression:
✓ 29

Hints:
- The first step to solve is to put the numbers in order from least to greatest.

[1, 2, 3, 12, 21, 21, 29, 33, 44, 53, 57, 78, 80]
- The last step is to identify the middle number in the list.

Type in \( 29 \)

☐ 119) Problem #PRAB24S "PRAB24S - Range"
Calculate the range of the following numbers:

68, 28, 22, 114, 97, 127

Algebraic Expression:
✓ 105
Hints:
- The range is the difference between the largest value number and the smallest value number.

68, 28, 22, 114, 97, 127

From this list, the largest value number is 127, and the smallest value number is 22.

127 - 22 = 105

Type in 105

120) Problem #PRABZ74 "PRABZ74 - Median: Even Number of Values"
Below is a list of numbers.

[81, 56, 77, 38, 88, 67, 99, 21, 32, 36, 47, 51]

What is the median number in this list?

Algebraic Expression:

53.5

Hints:
- The first step is to put the numbers in order from least to greatest.

[21, 32, 36, 38, 47, 51, 56, 67, 77, 81, 88, 99]
- The second step is to identify the two middle numbers.

51 and 56
- The last step is to find the mean of the two middle numbers.

51 + 56 = 107
107 ÷ 2 = 53.5

Type in 53.5

121) Problem #PRABZ7G "PRABZ7G - Median: Even Number of Values"
Below is a list of numbers.

[26, 53, 38, 50, 85, 77, 43, 30, 91, 47, 55, 40]
What is the **median** number in this list?

**Algebraic Expression:**

✓ 48.5

**Hints:**

- The first step is to put the numbers in order from least to greatest.

[26, 30, 38, 40, 43, 47, 50, 53, 55, 77, 85, 91]

- The second step is to identify the two middle numbers.

47 and 50

- The last step is to find the **mean** of the two middle numbers.

\[
47 + 50 = 97 \\
97 \div 2 = 48.5
\]

Type in 48.5

---

122) Problem #PRAB2K5 "PRAB2K5 - Median: Odd Number of Values"

Below is a list of numbers.

[74, 73, 99, 28, 85, 74, 35, 68, 32, 1, 56, 5, 3]

What is the **median** number in this list?

**Algebraic Expression:**

✓ 56

**Hints:**

- The first step to solve is to put the numbers in order from least to greatest.

[1, 3, 5, 28, 32, 35, 56, 68, 73, 74, 74, 85, 99]

- The last step is to identify the middle number in the list.

Type in 56

---

123) Problem #PRABZ63 "PRABZ63 - Median: Odd Number of Values"

Below is a list of numbers.

[83, 128, 10, 28, 86, 42, 9, 28, 34, 2, 84, 3, 9]

What is the **median** number in this list?

**Algebraic Expression:**

✓ 28

**Hints:**
The first step to solve is to put the numbers in order from least to greatest.

[2, 3, 9, 9, 10, 12, 28, 28, 34, 42, 83, 84, 86]

The last step is to identify the middle number in the list.

Type in 28

---

124) Problem #PRB249 "PRAB249 - Range"
Calculate the range of the following numbers:

73, 39, 2, 110, 90, 137

Algebraic Expression:

135

Hints:

- The range is the difference between the largest value number and the smallest value number.

73, 39, 2, 110, 90, 137

From this list, the largest value number is 137, and the smallest value number is 2.

- 137 - 2 = 135

Type in 135

---

125) Problem #PRBZ47 "PRABZ47 - Mean"
Calculate the mean of the following numbers:

10, 14, 10, 8, 7, 19

(round to the nearest tenths place)

Algebraic Expression:

11.3

Hints:

- This is how to solve a problem similar to your problem.

Find the mean of the following group of numbers: 3, 8, 4, 9
3 + 8 + 4 + 9 = 24
24 ÷ 4 = 6
- The first step is to add up the values.

10 + 14 + 10 + 8 + 7 + 19 = 68
- The last step is to divide 68 by the number of values you have, which is 6.

68 ÷ 6 = 11.3333333333333
11.3333333333333 = 11.3 (rounded)

Type in 11.3

126) Problem #PRABZ6T "PRABZ6T - Median: Odd Number of Values"
Below is a list of numbers.
[81, 56, 77, 38, 88, 67, 99, 21, 32, 36, 9, 47, 51]

What is the median number in this list?
Algebraic Expression:
✓ 51

Hints:
- The first step to solve is to put the numbers in order from least to greatest.

[9, 21, 32, 36, 38, 47, 51, 56, 67, 77, 81, 88, 99]
- The last step is to identify the middle number in the list.

Type in 51
Problem Set "Unit Conversion within a System - English and Metric 5.MD.A.1" id:[PSAKQC]

Select All

1) Problem #PRACGG4 "PRACGG4 - 60292 - Conversion: x hr to day"

How many days are 1320 hours?

Algebraic Expression:

✓ 55

Scaffold:

Here is a complete explanation:

Typical conversion factors for measurement of time is given in the table below.

<table>
<thead>
<tr>
<th>Time</th>
<th>Notes</th>
</tr>
</thead>
<tbody>
<tr>
<td>60 s = 1 min</td>
<td></td>
</tr>
<tr>
<td>60 min = 1 hr</td>
<td></td>
</tr>
<tr>
<td>24 hr = 1 day</td>
<td>Since the earth's rotation defines a day and the second is based on an atomic process, this number is not exact. It was defined to be exact at one point in time, however.</td>
</tr>
<tr>
<td>7 days = 1 week</td>
<td>This is based on the usual average of the number of days in a month in the modern solar calander. This is not an exact number, and the actual revolution time for the moon, the original definition of a month, is about 27.3 days.</td>
</tr>
<tr>
<td>30 days = 1 month</td>
<td>Actually, it is closer to 1 year = 365.24 days - it measures the length of time for earth's revolution around the sun.</td>
</tr>
<tr>
<td>365 days = 1 year</td>
<td></td>
</tr>
</tbody>
</table>

The conversion rate of interest is: 1 day = 24 hours.

You are going from hours to days, so the number of days will be smaller than 1320 by a factor of 24.

Multiply the number given by the conversion formula.

\[
\frac{1 \text{ day}}{24 \text{ hr}} \times 1320 \text{ hr} = 55 \text{ days}
\]

Multiple Choice:

✓ Ok. I have studied this example and am ready to get a new problem.

Hints:

•
The conversion rate of interest is: 1 day = 24 hours.
You are going from hours to days, so the number of days will be smaller than 1320 by a factor of 24.

Multiply the number given by the conversion formula.

\[
\frac{1 \text{ day}}{24 \text{ hr}} \times 1320 \text{ hr} = 55 \text{ days}
\]

2) Problem #PRACF9K "PRACF9K - 60274 - Conversion: x L to mL"
How many milliliters are in 4 liters?

Algebraic Expression:
Hints:

The metric system is based on powers of ten. This can be visualized with the following stair-step pattern:

- $kL = 1000 \text{ L}$
- $hL = 100 \text{ L}$
- $daL = 10 \text{ L}$
- $L = 1 \text{ L}$
- $dL = 0.1 \text{ L}$
- $cL = 0.01 \text{ L}$
- $mL = 0.001 \text{ L}$

The number of steps you go down equals the power of 10 you multiply the original number by. The number of steps you go up equals the power of 10 you divide by.
From L to mL is three steps down, so the number of milliliters is 1000 or $10^3$ times the number of liters.

Multiply the number given by 1000 or $10^3$.

When multiplying by powers of ten, move the decimal point to the right (→) a number of places equal to the power of ten. Since here you need 3 powers of ten, move the decimal point over 3 places to the right.

$4 \text{ L} = 4000 \text{ mL}$

**Scaffold:**

*Here is a complete explanation:*
The metric system is based on powers of ten. This can be visualized with the following stair-step pattern:

\[
\begin{align*}
\text{kL} &= 1000 \ \text{L} \\
\text{hL} &= 100 \ \text{L} \\
\text{daL} &= 10 \ \text{L} \\
\text{L} &= 1 \ \text{L} \\
\text{dL} &= 0.1 \ \text{L} \\
\text{cL} &= 0.01 \ \text{L} \\
\text{mL} &= 0.001 \ \text{L}
\end{align*}
\]

The number of steps you go down equals the power of 10 you multiply the original number by. The number of steps you go up equals the power of 10 you divide by.

In general the prefixes determine the power of 10 the base unit is multiplied by to get the size of the new unit. The prefixes are listed on the table below.

The power indicates the number of times to multiply by 10 where negative powers indicate division instead of multiplication.

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</tr>
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</tr>
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<td>ten</td>
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<td>(10^{0})</td>
<td>one</td>
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<td>deci-</td>
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From L to mL is three steps down, so the number of milliliters is 1000 or \(10^3\) times the number of liters.

Multiply the number given by 1000 or \(10^3\).
When multiplying by powers of ten, move the decimal point to the right (→) a number of places equal to the power of ten. Since here you need 3 powers of ten, move the decimal point over 3 places to the right.

4 L = 4000 mL

Multiple Choice:

✓ Ok. I have studied this example and am ready to get a new problem.

3) Problem #PRACFY9 "PRACFY9 - 60281 - Conversion: x mm to m"

How many meters are 7955 millimeters?

Algebraic Expression:

✓ 7.955

Hints:

The metric system is based on powers of ten. This can be visualized with the following stair-step pattern:

- km = 1000 m |
- hm = 100 m |
- dam = 10 m |
- m = 1 m |
- dm = 0.1 m |
- cm = 0.01 m |
- mm = 0.001 m |

The number of steps you go down equals the power of 10 you multiply the original number by. The number of steps you go up equals the power of 10 you divide by.
From mm to m is three steps up, so the number of meters is $\frac{1}{1000}$, 0.001 or $10^{-3}$ times the number of millimeters.

Divide the number given by 1000 or multiply it by $10^{-3} = \frac{1}{10^3}$.

When dividing by powers of ten, move the decimal point to the left ($\leftarrow$) a number of places equal to the power of ten. Since here you need $-3$ powers of ten, move the decimal point over 3 places to the left.
7955 mm = 7.955 m

**Scaffold:**

**Here is a complete explanation:**

The metric system is based on powers of ten. This can be visualized with the following stair-step pattern:

\[
\begin{align*}
\text{km} &= 1000 \text{ m} \\
\text{hm} &= 100 \text{ m} \\
\text{dam} &= 10 \text{ m} \\
\text{m} &= 1 \text{ m} \\
\text{dm} &= 0.1 \text{ m} \\
\text{cm} &= 0.01 \text{ m} \\
\text{mm} &= 0.001 \text{ m}
\end{align*}
\]

The number of steps you go down equals the power of 10 you multiply the original number by. The number of steps you go up equals the power of 10 you divide by.

In general the prefixes determine the power of 10 the base unit is multiplied by to get the size of the new unit. The prefixes are listed on the table below.

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</table>
From mm to m is three steps up, so the number of meters is $1/1000, 0.001$ or $10^{-3}$ times the number of millimeters.

Divide the number given by 1000 or multiply it by $10^{-3} = 1/10^3$.

When dividing by powers of ten, move the decimal point to the left a number of places equal to the power of ten. Since here you need $-3$ powers of ten, move the decimal point over 3 places to the left.

$7955 \text{ mm} = 7.955 \text{ m}$

Multiple Choice:

✓ Ok. I have studied this example and am ready to get a new problem.

---

4) Problem #PRACGFV "PRACGFV - 60285 - Conversion: x min to s"

How many seconds are in 13 minutes?

**Algebraic Expression:**

✓ $780$

**Scaffold:**

Here is a complete explanation:

Typical conversion factors for measurement of time is given in the table below.

<table>
<thead>
<tr>
<th>Time</th>
<th>Notes</th>
</tr>
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<tbody>
<tr>
<td>$60 \text{ s} = 1 \text{ min}$</td>
<td></td>
</tr>
<tr>
<td>$60 \text{ min} = 1 \text{ hr}$</td>
<td>Since the earth's rotation defines a day and the second is based on an atomic process, this number is not exact. It was defined to be exact at one point in time, however.</td>
</tr>
<tr>
<td>$24 \text{ hr} = 1 \text{ day}$</td>
<td>This is based on the usual average of the number of days in a month in the modern solar calendar. This is not an exact number, and the actual revolution time for the moon, the original definition of a month, is about 27.3 days.</td>
</tr>
<tr>
<td>$7 \text{ days} = 1 \text{ week}$</td>
<td>Actually, it is closer to 1 year = 365.24 days - it measures the length of time for earth's revolution around the sun.</td>
</tr>
<tr>
<td>$30 \text{ days} = 1 \text{ month}$</td>
<td></td>
</tr>
<tr>
<td>$365 \text{ days} = 1 \text{ year}$</td>
<td></td>
</tr>
</tbody>
</table>

The conversion rate of interest is: $1 \text{ min} = 60 \text{ s}$.

You are going from minutes to seconds, so the number of seconds will be larger than 13 by a factor of 60.

Multiply the number given by the conversion formula.

\[
\frac{s}{\text{min}} = 13 \text{ min} \times \frac{60 \text{ s}}{1 \text{ min}} = 780 \text{ s}
\]

Multiple Choice:
Ok. I have studied this example and am ready to get a new problem.

5) Problem #PRACGBT "PRACGBT - 60283 - Conversion: x mL to L"
How many liters are 10146 milliliters?

Algebraic Expression:

Scaffold:

Here is a complete explanation:

The metric system is based on powers of ten. This can be visualized with the following stair-step pattern:

\[
\begin{align*}
\text{kL} &= 1000 \text{ L} | \\
\text{hL} &= 100 \text{ L} | \\
\text{daL} &= 10 \text{ L} | \\
\underline{\text{L}} &= 1 \text{ L} | \\
\text{dL} &= 0.1 \text{ L} | \\
\text{cL} &= 0.01 \text{ L} | \\
\underline{\text{mL}} &= 0.001 \text{ L} \\
\end{align*}
\]

The number of steps you go down equals the power of 10 you multiply the original number by. The number of steps you go up equals the power of 10 you divide by.

In general the prefixes determine the power of 10 the base unit is multiplied by to get the size of the new unit. The prefixes are listed on the table below.

The power indicates the number of times to multiply by 10 where negative powers indicate division instead of multiplication.

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</table>
micro- $\mu$ 10^{-6} millionth
nano- n 10^{-9} billionth
pico- p 10^{-12} trillionth

From mL to L is three steps up, so the number of liters is 1/1000, 0.001 or 10^{-3} times the number of milliliters.

Divide the number given by 1000 or multiply it by $10^{-3} = 1/10^3$.

When dividing by powers of ten, move the decimal point to the left (←) a number of places equal to the power of ten. Since here you need -3 powers of ten, move the decimal point over 3 places to the left.

10146 mL = 10.146 L

Multiple Choice:

Ok. I have studied this example and am ready to get a new problem.

6) Problem #PRACF47 "PRACF47 - 60282 - Conversion: x g to kg"
How many kilograms are 3835 grams?

Algebraic Expression:

3.835

Scaffold:

Here is a complete explanation:

The metric system is based on powers of ten. This can be visualized with the following stair-step pattern:

$\text{kg} = 1000 \ g$ |
$\text{hg} = 100 \ g$ |
$\text{dag} = 10 \ g$ |
$\text{g} = 1 \ g$ |
$\text{dg} = 0.1 \ g$ |
$\text{cg} = 0.01 \ g$ |
$\text{mg} = 0.001 \ g$ |

The number of steps you go down equals the power of 10 you multiply the original number by. The number of steps you go up equals the power of 10 you divide by.

In general the prefixes determine the power of 10 the base unit is multiplied by to get the size of the new unit. The prefixes are listed on the table below.

The power indicates the number of times to multiply by 10 where negative powers indicate division instead of multiplication.
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<tr>
<td>pico-</td>
<td>p</td>
<td>$10^{-12}$</td>
<td>trillionth</td>
</tr>
</tbody>
</table>

From g to kg is three steps up, so the number of kilograms is $1/1000$, 0.001 or $10^{-3}$ times the number of grams.

Divide the number given by 1000 or multiply it by $10^{-3} = 1/10^3$.

When dividing by powers of ten, move the decimal point to the left ($\leftarrow$) a number of places equal to the power of ten. Since here you need -3 powers of ten, move the decimal point over 3 places to the left.

$3835 \text{ g} = 3.835 \text{ kg}$

Multiple Choice:

✔ Ok. I have studied this example and am ready to get a new problem.

7) Problem #PRACGF5 "PRACGF5 - 60291 - Conversion: x min to hr"
How many hours are 360 minutes?

Algebraic Expression:

✔ 6

Scaffold:

Here is a complete explanation:

Typical conversion factors for measurement of time is given in the table below.

<table>
<thead>
<tr>
<th>Time</th>
<th>Notes</th>
</tr>
</thead>
</table>
60 s = 1 min
60 min = 1 hr

Since the earth's rotation defines a day and the second is based on an atomic process, this number is not exact. It was defined to be exact at one point in time, however.

24 hr = 1 day

This is based on the usual average of the number of days in a month in the modern solar calendar. This is not an exact number, and the actual revolution time for the moon, the original definition of a month, is about 27.3 days.

7 days = 1 week

30 days = 1 month

Actually, it is closer to 1 year = 365.24 days - it measures the length of time for earth's revolution around the sun.

365 days = 1 year

Actually, it is closer to 1 year = 365.24 days - it measures the length of time for earth's revolution around the sun.

The conversion rate of interest is: \( 1 \text{ hr} = 60 \text{ min} \).

You are going from minutes to hours, so the number of hours will be smaller than 360 by a factor of 60.

Multiply the number given by the conversion formula.

\[
\frac{1 \text{ hr}}{360 \text{ min}} = \frac{60 \text{ min}}{60 \text{ min}} = 6 \text{ hr}
\]

Multiple Choice:

\( \checkmark \) Ok. I have studied this example and am ready to get a new problem.

8) Problem #PRACGGK "PRACGGK - 60286 - Conversion: x hr to min"

How many minutes are in 15 hours?

Algebraic Expression:

\( 900 \)

Scaffold:

Here is a complete explanation:

Typical conversion factors for measurement of time is given in the table below.

<table>
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<tr>
<td>60 s = 1 min</td>
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<td>60 min = 1 hr</td>
<td>Since the earth's rotation defines a day and the second is based on an atomic process, this number is not exact. It was defined to be exact at one point in time, however.</td>
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365 days = 1 year  
Actually, it is closer to 1 year = 365.24 days - it measures the length of time for earth's revolution around the sun.

The conversion rate of interest is: 1 hr = 60 min.

You are going from **hours** to **minutes**, so the number of minutes will be larger than 15 by a factor of 60.

Multiply the number given by the conversion formula.

\[ \text{min} \]
\[ 15 \text{ hr} = 15 \text{ hr} \times 60 \frac{\text{min}}{\text{hr}} = 900 \text{ min} \]

**Multiple Choice:**

✔ Ok. I have studied this example and am ready to get a new problem.

---

9) Problem #PRACF94 "PRACF94 - 60275 - Conversion: x L to cm^3"
How many cubic centimeters are in 15 liters?

**Algebraic Expression:**

✔ 15000

**Scaffold:**

Here is a complete explanation:

**Cubic centimeters:**

It is worth noting that cm\(^3\) is in fact a unit of volume like L and mL are. This is because a volume is three lengths multiplied together multiplied by some number with no units. 1 cm\(^3\) = 1 cm \times 1 cm \times 1 cm, called a centimeter cubed or a cubic centimeter, is equal to the volume of a cube with sides of length 1 cm. Another abreviation used for this unit is cc.

The important aspect here, however, is that 1 cm\(^3\) = 1 mL.

**Metric system:**

The metric system is based on powers of ten. This can be visualized with the following stair-step pattern:

\[
\begin{align*}
\text{kL} &= 1000 \text{ L} \\
\text{hL} &= 100 \text{ L} \\
\text{daL} &= 10 \text{ L} \\
\text{L} &= 1 \text{ L} \\
\text{dL} &= 0.1 \text{ L} \\
\text{cL} &= 0.01 \text{ L} \\
\text{mL} &= 0.001 \text{ L}
\end{align*}
\]

The number of steps you go down equals the power of 10 you multiply the original number by. The number of steps you go up equals the power of 10 you divide by.
In general the prefixes determine the power of 10 the base unit is multiplied by to get the size of the new unit. The prefixes are listed on the table below.

The power indicates the number of times to multiply by 10 where negative powers indicate division instead of multiplication.

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<td>pico-</td>
<td>p</td>
<td>$10^{-12}$</td>
<td>trillionth</td>
</tr>
</tbody>
</table>

Solving the problem:

From L to mL is three steps down, so number of milliliters is 1000 or $10^3$ times the number of liters. Since 1 mL = 1 cm$^3$, the unit mL can be replaced by the unit cm$^3$ and the number of cubic centimeters is 1000 or $10^3$ times the number of liters.

Multiply the number given by 1000 or $10^3$.

When multiplying by powers of ten, move the decimal point to the right (→) a number of places equal to the power of ten. Since here you need 3 powers of ten, move the decimal point over 3 places to the right.

$15 \ L = 15000 \ cm^3$

Multiple Choice:
✓ Ok. I have studied this example and am ready to get a new problem.

10) Problem #PRACGG6 "PRACGG6 - 60292 - Conversion: x hr to day"
How many days are 1500 hours?
Algebraic Expression:

62.5

Scaffold:

Here is a complete explanation:

Typical conversion factors for measurement of time is given in the table below.

<table>
<thead>
<tr>
<th>Time</th>
<th>Notes</th>
</tr>
</thead>
<tbody>
<tr>
<td>60 s = 1 min</td>
<td></td>
</tr>
<tr>
<td>60 min = 1 hr</td>
<td></td>
</tr>
<tr>
<td>24 hr = 1 day</td>
<td>Since the earth's rotation defines a day and the second is based on an atomic process, this number is not exact. It was defined to be exact at one point in time, however.</td>
</tr>
<tr>
<td>7 days = 1 week</td>
<td>This is based on the usual average of the number of days in a month in the modern solar calendar. This is not an exact number, and the actual revolution time for the moon, the original definition of a month, is about 27.3 days.</td>
</tr>
<tr>
<td>30 days = 1 month</td>
<td></td>
</tr>
<tr>
<td>365 days = 1 year</td>
<td>Actually, it is closer to 1 year = 365.24 days - it measures the length of time for earth's revolution around the sun.</td>
</tr>
</tbody>
</table>

The conversion rate of interest is: 1 day = 24 hours.

You are going from hours to days, so the number of days will be smaller than 1500 by a factor of 24.

Multiply the number given by the conversion formula.

\[
\frac{1 \text{ day}}{24 \text{ hr}} \times 1500 \text{ hr} = 62.5 \text{ days}
\]

Multiple Choice:

✓ Ok. I have studied this example and am ready to get a new problem.

11) Problem #PRACGF2 "PRACGF2 - 60285 - Conversion: x min to s"

How many seconds are in 3 minutes?

Algebraic Expression:

✓ 180

Scaffold:

Here is a complete explanation:

Typical conversion factors for measurement of time is given in the table below.

<table>
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<tr>
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<th>Notes</th>
</tr>
</thead>
<tbody>
<tr>
<td>60 s = 1 min</td>
<td></td>
</tr>
</tbody>
</table>
60 min = 1 hr

Since the earth's rotation defines a day and the second is based on an atomic process, this number is not exact. It was defined to be exact at one point in time, however.

24 hr = 1 day

This is based on the usual average of the number of days in a month in the modern solar calendar. This is not an exact number, and the actual revolution time for the moon, the original definition of a month, is about 27.3 days.

7 days = 1 week

30 days = 1 month

Actually, it is closer to 1 year = 365.24 days - it measures the length of time for earth's revolution around the sun.

365 days = 1 year

The conversion rate of interest is: 1 min = 60 s.

You are going from minutes to seconds, so the number of seconds will be larger than 3 by a factor of 60.

Multiply the number given by the conversion formula.

\[
\begin{align*}
3 \text{ min} &= 3 \text{ min} \times 60 \frac{\text{s}}{\text{min}} = 180 \text{ s}
\end{align*}
\]

Multiple Choice:

✓ Ok. I have studied this example and am ready to get a new problem.

12) Problem #PRACFZQ "PRACFZQ - 60270 - Conversion: x m to cm"

How many centimeters are in 16 meters?

Algebraic Expression:

✓ 1600

Scaffold:

Here is a complete explanation:

The metric system is based on powers of ten. This can be visualized with the following stair-step pattern:

\[
\begin{align*}
\text{km} &= 1000 \text{ m} \\
\text{hm} &= 100 \text{ m} \\
\text{dam} &= 10 \text{ m} \\
\text{m} &= 1 \text{ m} \\
\text{dm} &= 0.1 \text{ m} \\
\text{cm} &= 0.01 \text{ m} \\
\text{mm} &= 0.001 \text{ m}
\end{align*}
\]

The number of steps you go down equals the power of 10 you multiply the original number by. The number of steps you go up equals the power of 10 you divide by.
In general the prefixes determine the power of 10 the base unit is multiplied by to get the size of the new unit. The prefixes are listed on the table below.

The power indicates the number of times to multiply by 10 where negative powers indicate division instead of multiplication.

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</tr>
</tbody>
</table>

From m to cm is two steps down, so the number of centimeters is 100 or $10^2$ times larger than the number of meters.

Multiply the number given by 100 or $10^2$.

When multiplying by powers of ten, move the decimal point to the right (→) a number of places equal to the power of ten. Since here you need 2 powers of ten, move the decimal point over 2 places to the right.

16 m = 1600 cm

Multiple Choice:

✔️ Ok. I have studied this example and am ready to get a new problem.

13) Problem #PRACF2G "PRACF2G - 60272 - Conversion: x m to mm"

How many millimeters are in 13 meters?

Algebraic Expression:

✔️ 13000

Scaffold:
Here is a complete explanation:

The metric system is based on powers of ten. This can be visualized with the following stair-step pattern:

\[
\begin{align*}
    \text{km} &= 1000 \text{ m} \\
    \text{hm} &= 100 \text{ m} \\
    \text{dam} &= 10 \text{ m} \\
    \text{m} &= 1 \text{ m} \\
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    \text{cm} &= 0.01 \text{ m} \\
    \text{mm} &= 0.001 \text{ m}
\end{align*}
\]

The number of steps you go down equals the power of 10 you multiply the original number by. The number of steps you go up equals the power of 10 you divide by.

In general the prefixes determine the power of 10 the base unit is multiplied by to get the size of the new unit. The prefixes are listed on the table below.

The power indicates the number of times to multiply by 10 where negative powers indicate division instead of multiplication.

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</tbody>
</table>

From m to mm is three steps down, so the number of millimeters is 1000 or 10^3 times the number of meters.
Multiply the number given by 1000 or $10^3$.

When multiplying by powers of ten, move the decimal point to the right (→) a number of places equal to the power of ten. Since here you need 3 powers of ten, move the decimal point over 3 places to the right.

13 m = 13000 mm

Multiple Choice:

✓ Ok. I have studied this example and am ready to get a new problem.

14) Problem #PRACFS7 "PRACFS7 - 60265 - Conversion: x Oz to Cup"

How many cups are in 72 ounces?

Algebraic Expression:

✓ 9

Scaffold:

Here is a complete explanation:

The typical conversion formulae used in modern times for the old English system of measurement are:

<table>
<thead>
<tr>
<th>Distance</th>
<th>Mass</th>
<th>Volume</th>
</tr>
</thead>
<tbody>
<tr>
<td>12 in = 1 ft</td>
<td>16 oz. = 1 lb.</td>
<td>3 tsp. = 1 tbsp.</td>
</tr>
<tr>
<td>3 ft = 1 yd</td>
<td>2 tbsp. = 1 oz.</td>
<td>8 oz. = 1 cup</td>
</tr>
<tr>
<td>5280 ft. = 1 mi.</td>
<td>2 cup = 1 pint</td>
<td>2 pint = 1 quart</td>
</tr>
<tr>
<td></td>
<td></td>
<td>4 quarts = 1 gallon</td>
</tr>
</tbody>
</table>

The conversion rate of interest is 8 oz = 1 cup.

Since you are going from ounces to cups, the number of cups is smaller than 72 by a factor of 8.

Multiply the given number by the conversion formula.

$$\frac{1 \text{ cup}}{8 \text{ oz}} \times 72 \text{ oz} = 9 \text{ cups}$$

Multiple Choice:

✓ Ok. I have studied this example and am ready to get a new problem.
15) Problem #PRACFVA "PRACFVA - 60268 - Conversion: x Quart to Gallon"

How many gallons are 72 quarts?

**Algebraic Expression:**

18

**Scaffold:**

**Here is a complete explanation:**

The typical conversion formulae used in modern times for the old English system of measurement are:

<table>
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<td></td>
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</tr>
</tbody>
</table>

The conversion rate of interest is $4 \text{ quart} = 1 \text{ gallon}$.

You are going from quarts to gallons, so the number of gallons is smaller than 72 by a factor of 4.

Multiply the given number by the conversion formula.

$$\frac{1 \text{ gallon}}{4 \text{ quarts}} = \frac{72 \text{ quarts} \times 18 \text{ gallons}}{4 \text{ quarts}}$$

**Multiple Choice:**

Ok. I have studied this example and am ready to get a new problem.

16) Problem #PRACF96 "PRACF96 - 60275 - Conversion: x L to cm^3"

How many cubic centimeters are in 9 liters?

**Algebraic Expression:**

9000

**Scaffold:**

**Here is a complete explanation:**

Cubic centimeters:

It is worth noting that cm$^3$ is in fact a unit of volume like L and mL are. This is because a volume is three lengths multiplied together multiplied by some number with no units. 1 cm$^3$ = 1 cm$^1$ * 1 cm$^1$ * 1 cm, called a centimeter cubed or a cubic centimeter, is equal to the volume of a cube with sides of
length 1 cm. Another abbreviation used for this unit is cc.

The important aspect here, however, is that 1 cm³ = 1 mL.

**Metric system:**
The metric system is based on powers of ten. This can be visualized with the following stair-step pattern:

\[
\begin{align*}
1 \text{ kL} &= 1000 \text{ L} \\
1 \text{ hL} &= 100 \text{ L} \\
1 \text{ daL} &= 10 \text{ L} \\
1 \text{ L} &= 1 \text{ L} \\
1 \text{ dL} &= 0.1 \text{ L} \\
1 \text{ cL} &= 0.01 \text{ L} \\
1 \text{ mL} &= 0.001 \text{ L} \\
\end{align*}
\]

The number of steps you go down equals the power of 10 you multiply the original number by. The number of steps you go up equals the power of 10 you divide by.

In general the prefixes determine the power of 10 the base unit is multiplied by to get the size of the new unit. The prefixes are listed on the table below.

The power indicates the number of times to multiply by 10 where negative powers indicate division instead of multiplication.

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</tr>
</tbody>
</table>
Solving the problem:
From L to mL is three steps down, so number of milliliters is 1000 or \(10^3\) times the number of liters. Since \(1 \text{ mL} = 1 \text{ cm}^3\), the unit mL can be replaced by the unit cm\(^3\) and the number of cubic centimeters is 1000 or \(10^3\) times the number of liters.

Multiply the number given by 1000 or \(10^3\).

When multiplying by powers of ten, move the decimal point to the right (\(\rightarrow\)) a number of places equal to the power of ten. Since here you need 3 powers of ten, move the decimal point over 3 places to the right.

\[9 \text{ L} = 9000 \text{ cm}^3\]

Multiple Choice:
✓ Ok. I have studied this example and am ready to get a new problem.

17) Problem #PRACFKF "PRACFKF - 60259 - Conversion: x Ft to Yd"
How many yards are in 18 feet?

Algebraic Expression:
✓ 6

Scaffold:
Here is a complete explanation:
The typical conversion formulae used in modern times for the old English system of measurement are:

<table>
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<tr>
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</tr>
<tr>
<td></td>
<td></td>
<td>4 quarts = 1 gallon</td>
</tr>
</tbody>
</table>

The conversion rate of interest is: 3 ft. = 1 yd.

Since you are going from feet to yards, the number of yards is smaller than 18 by a factor of 3.

Divide the given number by the conversion formula.

\[18 \text{ ft} = 18 \text{ ft} \times \frac{1 \text{ yd}}{1 \text{ ft}} = 6 \text{ yds}\]
Multiple Choice:

Ok. I have studied this example and am ready to get a new problem.

18) Problem #PRACGGX "PRACGGX - 60292 - Conversion: x hr to day"
How many days are 120 hours?
Algebraic Expression:

\[ 120 \text{ hr} \times \frac{1 \text{ day}}{24 \text{ hr}} = 5 \text{ days} \]

Scaffold:

Here is a complete explanation:

Typical conversion factors for measurement of time is given in the table below.

<table>
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<td>365 days = 1 year</td>
<td></td>
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</tbody>
</table>

The conversion rate of interest is: \( 1 \text{ day} = 24 \text{ hours} \).

You are going from hours to days, so the number of days will be smaller than 120 by a factor of 24.

Multiply the number given by the conversion formula.

\[ 120 \text{ hr} \times \frac{1 \text{ day}}{24 \text{ hr}} = 5 \text{ days} \]

Multiple Choice:

Ok. I have studied this example and am ready to get a new problem.

19) Problem #PRACFZC "PRACFZC - 60281 - Conversion: x mm to m"
How many meters are 6736 millimeters?
Algebraic Expression:
Scaffold:

Here is a complete explanation:

The metric system is based on powers of ten. This can be visualized with the following stair-step pattern:

\[
\begin{align*}
\text{km} &= 1000 \text{ m} \\
\text{hm} &= 100 \text{ m} \\
\text{dam} &= 10 \text{ m} \\
\text{m} &= 1 \text{ m} \\
\text{dm} &= 0.1 \text{ m} \\
\text{cm} &= 0.01 \text{ m} \\
\text{mm} &= 0.001 \text{ m} \\
\end{align*}
\]

The number of steps you go down equals the power of 10 you multiply the original number by. The number of steps you go up equals the power of 10 you divide by.

In general the prefixes determine the power of 10 the base unit is multiplied by to get the size of the new unit. The prefixes are listed on the table below.

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<td>trillionth</td>
</tr>
</tbody>
</table>
From mm to m is three steps up, so the number of meters is $1/1000$, 0.001 or $10^{-3}$ times the number of millimeters.

Divide the number given by 1000 or multiply it by $10^{-3} = 1/10^3$.

When dividing by powers of ten, move the decimal point to the left (←) a number of places equal to the power of ten. Since here you need -3 powers of ten, move the decimal point over 3 places to the left.

$6736 \text{ mm} = 6.736 \text{ m}$

Multiple Choice:

✓ Ok. I have studied this example and am ready to get a new problem.

20) Problem #PRACFZN "PRACFZN - 60270 - Conversion: x m to cm"

How many centimeters are in 8 meters?

Algebraic Expression:

✓ 800

Scaffold:

Here is a complete explanation:

The metric system is based on powers of ten. This can be visualized with the following stair-step pattern:

$$\begin{align*}
\text{km} &= 1000 \text{ m} \\
\text{hm} &= 100 \text{ m} \\
\text{dam} &= 10 \text{ m} \\
\text{m} &= 1 \text{ m} \\
\text{dm} &= 0.1 \text{ m} \\
\text{cm} &= 0.01 \text{ m} \\
\text{mm} &= 0.001 \text{ m}
\end{align*}$$

The number of steps you go down equals the power of 10 you multiply the original number by. The number of steps you go up equals the power of 10 you divide by.

In general the prefixes determine the power of 10 the base unit is multiplied by to get the size of the new unit. The prefixes are listed on the table below.

The power indicates the number of times to multiply by 10 where negative powers indicate division instead of multiplication.

<table>
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<tr>
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<tbody>
<tr>
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<td>T</td>
<td>$10^{12}$</td>
<td>trillion</td>
</tr>
<tr>
<td>giga-</td>
<td>G</td>
<td>$10^{9}$</td>
<td>billion</td>
</tr>
</tbody>
</table>
From m to cm is two steps down, so the number of centimeters is 100 or $10^2$ times larger than the number of meters.

Multiply the number given by 100 or $10^2$.

When multiplying by powers of ten, move the decimal point to the right (→) a number of places equal to the power of ten. Since here you need 2 powers of ten, move the decimal point over 2 places to the right.

$8 \text{ m} = 800 \text{ cm}$

Multiple Choice:

✔ Ok. I have studied this example and am ready to get a new problem.

21) Problem #PRACFKR "PRACFKR - 62168 - Conversion: x Mi to Ft"

How many feet are in 5 miles?

You may use the conversion formula 1 mi = 5280 ft

Algebraic Expression:

✔ 26400

Scaffold:

Here is a complete explanation:

Use the given conversion formula: $5280 \text{ ft} = 1 \text{ mi}$.

You are going from miles to feet, so the number of feet will be larger than 5 by a factor of 5280.

Multiply the given number by the conversion formula.

$5 \text{ mi} = 5 \text{ mi} \times 5280 \text{ ft} = 26400 \text{ ft}$
Multiple Choice:
✓ Ok. I have studied this example and am ready to get a new problem.

22) Problem #PRACGHS "PRACGHS - 60293 - Conversion: x day to year"
How many years are 5475 days?

Algebraic Expression:
✓ 15

Scaffold:
Here is a complete explanation:

Typical conversion factors for measurement of time is given in the table below.

<table>
<thead>
<tr>
<th>Time</th>
<th>Notes</th>
</tr>
</thead>
<tbody>
<tr>
<td>60 s = 1 min</td>
<td></td>
</tr>
<tr>
<td>60 min = 1 hr</td>
<td>Since the earth's rotation defines a day and the second is based on an atomic process, this number is not exact. It was defined to be exact at one point in time, however.</td>
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<td>24 hr = 1 day</td>
<td>This is based on the usual average of the number of days in a month in the modern solar calander. This is not an exact number, and the actual revolution time for the moon, the original definition of a month, is about 27.3 days.</td>
</tr>
<tr>
<td>7 days = 1 week</td>
<td></td>
</tr>
<tr>
<td>30 days = 1 month</td>
<td>Actually, it is closer to 1 year = 365.24 days - it measures the length of time for earth's revolution around the sun.</td>
</tr>
<tr>
<td>365 days = 1 year</td>
<td></td>
</tr>
</tbody>
</table>

The conversion rate of interest is: $365 \text{ days} = 1 \text{ year}$.

You are going from days to years, so the number of years will be smaller than 5475 by a factor of 365.

Multiply the number given by the conversion formula.

$$\frac{1 \text{ year}}{365 \text{ days}} = \frac{5475 \text{ days}}{365 \text{ days}} * 15 \text{ years} = 15 \text{ years}$$

Multiple Choice:
✓ Ok. I have studied this example and am ready to get a new problem.

23) Problem #PRACFYN "PRACFYN - 60280 - Conversion: x m to km"
How many kilometers are 12715 meters?

Algebraic Expression:
Scaffold:

Here is a complete explanation:

The metric system is based on powers of ten. This can be visualized with the following stair-step pattern:

\[
\begin{align*}
\text{km} &= 1000 \text{ m} \\
\text{hm} &= 100 \text{ m} \\
\text{dam} &= 10 \text{ m} \\
\text{m} &= 1 \text{ m} \\
\text{dm} &= 0.1 \text{ m} \\
\text{cm} &= 0.01 \text{ m} \\
\text{mm} &= 0.001 \text{ m} \\
\end{align*}
\]

The number of steps you go down equals the power of 10 you multiply the original number by. The number of steps you go up equals the power of 10 you divide by.

In general the prefixes determine the power of 10 the base unit is multiplied by to get the size of the new unit. The prefixes are listed on the table below.

The power indicates the number of times to multiply by 10 where negative powers indicate division instead of multiplication.

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<th>Multiple</th>
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</thead>
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<td>T</td>
<td>$10^{12}$</td>
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<td>giga-</td>
<td>G</td>
<td>$10^9$</td>
<td>billion</td>
</tr>
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<td>mega-</td>
<td>M</td>
<td>$10^6$</td>
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<td>k</td>
<td>$10^3$</td>
<td>thousand</td>
</tr>
<tr>
<td>hecto-</td>
<td>h</td>
<td>$10^2$</td>
<td>hundred</td>
</tr>
<tr>
<td>deka-</td>
<td>da</td>
<td>$10^1$</td>
<td>ten</td>
</tr>
<tr>
<td>------</td>
<td>-------------</td>
<td>----------</td>
<td>----------------------</td>
</tr>
<tr>
<td></td>
<td></td>
<td>$10^0$</td>
<td>one</td>
</tr>
<tr>
<td>deci-</td>
<td>d</td>
<td>$10^{-1}$</td>
<td>tenth</td>
</tr>
<tr>
<td>centi-</td>
<td>c</td>
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<tr>
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<td>p</td>
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<td>trillionth</td>
</tr>
</tbody>
</table>
From m to km is three steps up, so the number of kilometers is 1/1000, 0.001 or \(10^{-3}\) times the number of meters.

Divide the number given by 1000 or multiply it by \(10^{-3} = 1/10^3\).

When dividing by powers of ten, move the decimal point to the left (←) a number of places equal to the power of ten. Since here you need -3 powers of ten, move the decimal point over 3 places to the left.

\(12715 \text{ m} = 12.715 \text{ km}\)

**Multiple Choice:**

✔️ Ok. I have studied this example and am ready to get a new problem.

### 24) Problem #PRACFNP "PRACFNP - 60257 - Conversion: x Yd to Ft"

How many feet are in 8 yards?

**Algebraic Expression:**

✔️ 24

**Scaffold:**

**Here is a complete explanation:**

The typical conversion formulae used in modern times for the old English system of measurement are:

<table>
<thead>
<tr>
<th>Distance</th>
<th>Mass</th>
<th>Volume</th>
</tr>
</thead>
<tbody>
<tr>
<td>12 in = 1 ft</td>
<td>16 oz. = 1 lb.</td>
<td>3 tsp. = 1 tbsp.</td>
</tr>
<tr>
<td>3 ft = 1 yd</td>
<td>2 tbsp. = 1 oz.</td>
<td>8 oz. = 1 cup</td>
</tr>
<tr>
<td>5280 ft. = 1 mi.</td>
<td>2 cup = 1 pint</td>
<td>2 pint = 1 quart</td>
</tr>
<tr>
<td></td>
<td></td>
<td>4 quarts = 1 gallon</td>
</tr>
</tbody>
</table>

The conversion rate of interest is: \(3 \text{ ft} = 1 \text{ yd}\).

You are going from yards to feet, so the number of feet will be larger than 8 by a factor of 3.

Multiply the given number by the conversion formula.

\[
\frac{\text{ft}}{\text{yd}} = \frac{8 \text{ yds}}{8 \text{ yds}} \times 3 = 24 \text{ ft}
\]

**Multiple Choice:**

✔️ Ok. I have studied this example and am ready to get a new problem.
25) Problem #PRACFTH "PRACFTH - 60266 - Conversion: x Cup to Pint"
How many pints are 34 cups?

**Algebraic Expression:**

17

**Scaffold:**

Here is a complete explanation:

The typical conversion formulae used in modern times for the old English system of measurement are:

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</tr>
<tr>
<td></td>
<td></td>
<td>4 quarts = 1 gallon</td>
</tr>
</tbody>
</table>

The conversion rate of interest is 2 cups = 1 pint.

You are going from cups to pints, so the number of pints is smaller than 34 by a factor of 2.

Multiply the given number by the conversion formula.

\[ \frac{1 \text{ pint}}{2 \text{ cups}} \times 34 \text{ cups} = 17 \text{ pints} \]

**Multiple Choice:**

Ok. I have studied this example and am ready to get a new problem.

---

26) Problem #PRACFYH "PRACFYH - 60280 - Conversion: x m to km"
How many kilometers are 5816 meters?

**Algebraic Expression:**

5.816

**Scaffold:**

Here is a complete explanation:

The metric system is based on powers of ten. This can be visualized with the following stair-step
The number of steps you go down equals the power of 10 you multiply the original number by. The number of steps you go up equals the power of 10 you divide by.

In general the prefixes determine the power of 10 the base unit is multiplied by to get the size of the new unit. The prefixes are listed on the table below.

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From m to km is three steps up, so the number of kilometers is $1/1000$, 0.001 or $10^{-3}$ times the number of meters.

Divide the number given by 1000 or multiply it by $10^{-3} = 1/10^3$.

When dividing by powers of ten, move the decimal point to the left ($←$) a number of places equal to the
power of ten. Since here you need \(-3\) powers of ten, move the decimal point over 3 places to the left.

\[5816 \text{ m} = 5.816 \text{ km}\]

**Multiple Choice:**

✔️ Ok. I have studied this example and am ready to get a new problem.

---

27) Problem #PRACGHG "PRACGHG - 60287 - Conversion: x day to hr"

How many hours are in 3 days?

**Algebraic Expression:**

✔️ 72

**Scaffold:**

*Here is a complete explanation:*

Typical conversion factors for measurement of time is given in the table below.

<table>
<thead>
<tr>
<th>Time</th>
<th>Notes</th>
</tr>
</thead>
<tbody>
<tr>
<td>60 s = 1 min</td>
<td></td>
</tr>
<tr>
<td>60 min = 1 hr</td>
<td>Since the earth's rotation defines a day and the second is based on an atomic process, this number is not exact. It was defined to be exact at one point in time, however.</td>
</tr>
<tr>
<td>24 hr = 1 day</td>
<td>This is based on the usual average of the number of days in a month in the modern solar calander. This is not an exact number, and the actual revolution time for the moon, the original definition of a month, is about 27.3 days.</td>
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<td>7 days = 1 week</td>
<td></td>
</tr>
<tr>
<td>30 days = 1 month</td>
<td>Actually, it is closer to 1 year = 365.24 days - it measures the length of time for earth's revolution around the sun.</td>
</tr>
<tr>
<td>365 days = 1 year</td>
<td></td>
</tr>
</tbody>
</table>

The conversion rate of interest is: 1 day = 24 hours.

You are going from days to hours, so the number of hours will be larger than 3 by a factor of 24.

Multiply the number given by the conversion formula.

\[
\frac{\text{hr}}{\text{day}} = \frac{3\text{ days} \times 24\text{ hr}}{1\text{ day}} = 72\text{ hr}
\]

**Multiple Choice:**

✔️ Ok. I have studied this example and am ready to get a new problem.

---

28) Problem #PRACFME "PRACFME - 60255 - Conversion: x Ft to In"

How many inches are in 15 feet?

**Algebraic Expression:**
Scaffold:

Here is a complete explanation:

The typical conversion formulae used in modern times for the old English system of measurement are:

<table>
<thead>
<tr>
<th>Distance</th>
<th>Mass</th>
<th>Volume</th>
</tr>
</thead>
<tbody>
<tr>
<td>12 in = 1 ft</td>
<td>16 oz. = 1 lb.</td>
<td>3 tsp. = 1 tbsp.</td>
</tr>
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<td>3 ft = 1 yd</td>
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<td></td>
<td>4 quarts = 1 gallon</td>
</tr>
</tbody>
</table>

The conversion rate of interest is: 12 in. = 1 ft.

You are going from feet to inches, so the number of inches will be larger than 15 by a factor of 12.

\[
\text{in} \quad \frac{15 \text{ ft}}{1 \text{ ft}} \times 12 = 180 \text{ in}
\]

Multiple Choice:

✓ Ok. I have read the solution and am ready for a new problem.

29) Problem #PRACFSB "PRACFSB - 60263 - Conversion: x Quart to Pint"

How many pints are in 21 quarts?

Algebraic Expression:

✓ 42

Scaffold:

Here is a complete explanation:

The typical conversion formulae used in modern times for the old English system of measurement are:
The conversion rate of interest is $2 \text{ pint} = 1 \text{ quart}$.

You are going from quarts to pints, so the number of pints is greater than 21 by a factor of 2.

Multiply the given number by the conversion formula.

$$\frac{\text{pints}}{\text{quart}} = \frac{21 \text{ quarts} \times 2}{1 \text{ quart}} = 42 \text{ pints}$$

Multiple Choice:
✓ Ok. I have studied this example and am ready to get a new problem.

---

30) Problem #PRACFSM "PRACFSM - 60264 - Conversion: x Gallon to Quart"

How many quarts are in 11 gallons?

**Algebraic Expression:**
✓ 44

**Scaffold:**

Here is a complete explanation:

The typical conversion formulae used in modern times for the old English system of measurement are:

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</tr>
<tr>
<td></td>
<td></td>
<td>4 quarts = 1 gallon</td>
</tr>
</tbody>
</table>

The conversion rate of interest is $4 \text{ quart} = 1 \text{ gallon}$.

You are going from gallons to quarts, so the number of quarts is greater than 11 by a factor of 4.

Multiply the given number by the conversion formula.

$$\frac{\text{quarts}}{\text{gallon}} = \frac{11 \text{ gallons} \times 4}{1 \text{ gallon}} = 44 \text{ quarts}$$

Multiple Choice:
✓ Ok. I have studied this example and am ready to get a new problem.
31) Problem #PRACGF9 "PRACGF9 - 60291 - Conversion: x min to hr"

How many hours are 540 minutes?

**Algebraic Expression:**

✓ 9

**Scaffold:**

*Here is a complete explanation:*

Typical conversion factors for measurement of time is given in the table below.

<table>
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</table>

The conversion rate of interest is: 1 hr = 60 min.

You are going from minutes to hours, so the number of hours will be smaller than 540 by a factor of 60.

Multiply the number given by the conversion formula.

\[
\frac{1 \text{ hr}}{540 \text{ min}} = 540 \text{ min} \times \frac{1 \text{ hr}}{60 \text{ min}} = 9 \text{ hr}
\]

**Multiple Choice:**

✓ Ok. I have studied this example and am ready to get a new problem.

32) Problem #PRACGCB "PRACGCB - 60284 - Conversion: x cm\(^3\) to L"

How many liters are 9755 cubic centimeters?

**Algebraic Expression:**

✓ 9.755

**Scaffold:**

*Here is a complete explanation:*
**Cubic centimeters:**

It is worth noting that cm$^3$ is in fact a unit of volume like L and mL are. This is because a volume is three lengths multiplied together multiplied by some number with no units. 1 cm$^3 = 1$ cm * 1 cm * 1 cm, called a centimeter cubed or a cubic centimeter, is equal to the volume of a cube with sides of length 1 cm. Another abbreviation used for this unit is cc.

The important aspect here, however, is that 1 cm$^3 = 1$ mL.

**Metric system:**
The metric system is based on powers of ten. This can be visualized with the following stair-step pattern:

- kL = 1000 L |
- hL = 100 L |
- daL = 10 L |
- L = 1 L |
- dL = 0.1 L |
- cL = 0.01 L |
- mL = 0.001 L |

The number of steps you go down equals the power of 10 you multiply the original number by. The number of steps you go up equals the power of 10 you divide by.

In general the prefixes determine the power of 10 the base unit is multiplied by to get the size of the new unit. The prefixes are listed on the table below.

The power indicates the number of times to multiply by 10 where negative powers indicate division instead of multiplication.

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<td>------</td>
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<td>--------</td>
<td>one</td>
</tr>
<tr>
<td>deci-</td>
<td>d</td>
<td>$10^{-1}$</td>
<td>tenth</td>
</tr>
<tr>
<td>centi-</td>
<td>c</td>
<td>$10^{-2}$</td>
<td>hundredth</td>
</tr>
<tr>
<td>milli-</td>
<td>m</td>
<td>$10^{-3}$</td>
<td>thousandth</td>
</tr>
</tbody>
</table>
Solving the problem:
From mL to L is three steps up, so number of liters is 1/1000, 0.001 or $10^{-3}$ times the number of milliliters.

Since 1 mL = 1 cm$^3$, the unit mL can be replaced by the unit cm$^3$ and the number of liters is 1/1000, 0.001 or $10^{-3}$ times the number of cubic centimeters.

Divide the number given by 1000 or multiply it by $10^{-3} = 1/10^3$.

When dividing by powers of ten, move the decimal point to the left (← ) a number of places equal to the power of ten. Since here you need -3 powers of ten, move the decimal point over 3 places to the left.

9755 cm$^3 = 9.755$ L

Multiple Choice:
✓ Ok. I have studied this example and am ready to get a new problem.

33) Problem #PRACF5H "PRACF5H - 60282 - Conversion: x g to kg"
How many kilograms are 1339 grams?

Algebraic Expression:
✓ 1.339

Scaffold:
Here is a complete explanation:

The metric system is based on powers of ten. This can be visualized with the following stair-step pattern:

\[
\text{kg} = 1000 \text{ g} |
\]
\[
\text{hg} = 100 \text{ g} |
\]
\[
\text{dag} = 10 \text{ g} |
\]
\[
\text{g} = 1 \text{ g} |
\]
\[
\text{dg} = 0.1 \text{ g} |
\]
\[
\text{cg} = 0.01 \text{ g} |
\]
\[
\text{mg} = 0.001 \text{ g} |
\]

The number of steps you go down equals the power of 10 you multiply the original number by. The number of steps you go up equals the power of 10 you divide by.
In general the prefixes determine the power of 10 the base unit is multiplied by to get the size of the new unit. The prefixes are listed on the table below.

The power indicates the number of times to multiply by 10 where negative powers indicate division instead of multiplication.

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<tr>
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<tbody>
<tr>
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<td>trillion</td>
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<td>G</td>
<td>$10^9$</td>
<td>billion</td>
</tr>
<tr>
<td>mega-</td>
<td>M</td>
<td>$10^6$</td>
<td>million</td>
</tr>
<tr>
<td>kilo-</td>
<td>k</td>
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<td>thousand</td>
</tr>
<tr>
<td>hecto-</td>
<td>h</td>
<td>$10^2$</td>
<td>hundred</td>
</tr>
<tr>
<td>deka-</td>
<td>da</td>
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<td>ten</td>
</tr>
<tr>
<td>--------</td>
<td>--------------</td>
<td>----------</td>
<td>----------------------</td>
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<tr>
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<td>thousandth</td>
</tr>
<tr>
<td>micro-</td>
<td>μ</td>
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<tr>
<td>nano-</td>
<td>n</td>
<td>$10^{-9}$</td>
<td>billionth</td>
</tr>
<tr>
<td>pico-</td>
<td>p</td>
<td>$10^{-12}$</td>
<td>trillionth</td>
</tr>
</tbody>
</table>

From g to kg is three steps up, so the number of kilograms is $1/1000$, 0.001 or $10^{-3}$ times the number of grams.

Divide the number given by 1000 or multiply it by $10^{-3} = 1/10^3$.

When dividing by powers of ten, move the decimal point to the left ($\leftarrow$) a number of places equal to the power of ten. Since here you need $-3$ powers of ten, move the decimal point over 3 places to the left.

$1339 \text{ g} = 1.339 \text{ kg}$

Multiple Choice:

✔ Ok. I have studied this example and am ready to get a new problem.

☐ 34) Problem #PRACFMN "PRACFMN - 62169 - Conversion: x Ft to Mi"
How many miles are 26400 ft?

You may use the conversion formula 1 mi = 5280 ft

Algebraic Expression:

✔ 5
Scaffold:

Here is a complete explanation:

Use the given conversion formula: \( \text{5280 ft.} = 1 \text{ mi.} \)

Since you are going from \text{feet} to \text{miles}, the number of \text{miles} is smaller than \text{26400} by a factor of \text{5280}.

Divide the given number by the conversion formula.

\[
\frac{1 \text{ mi}}{26400 \text{ ft}} = 5 \text{ mi}
\]

Multiple Choice:

✓ Ok. I have studied this example and am ready to get a new problem.

☐ 35) Problem #PRACFR8 "PRACFR8 - 60263 - Conversion: x Quart to Pint"

How many pints are in 14 quarts?

Algebraic Expression:

✓ 28

Scaffold:

Here is a complete explanation:

The typical conversion formulae used in modern times for the old English system of measurement are:

<table>
<thead>
<tr>
<th>Distance</th>
<th>Mass</th>
<th>Volume</th>
</tr>
</thead>
<tbody>
<tr>
<td>12 in = 1 ft</td>
<td>16 oz. = 1 lb.</td>
<td>3 tsp. = 1 tbsp.</td>
</tr>
<tr>
<td>3 ft = 1 yd</td>
<td></td>
<td>2 tbsp. = 1 oz.</td>
</tr>
<tr>
<td>5280 ft. = 1 mi.</td>
<td></td>
<td>8 oz. = 1 cup</td>
</tr>
<tr>
<td></td>
<td></td>
<td>2 cup = 1 pint</td>
</tr>
<tr>
<td></td>
<td></td>
<td>2 pint = 1 quart</td>
</tr>
<tr>
<td></td>
<td></td>
<td>4 quarts = 1 gallon</td>
</tr>
</tbody>
</table>

The conversion rate of interest is \( 2 \text{ pint} = 1 \text{ quart} \).

You are going from \text{quarts} to \text{pints}, so the number of \text{pints} is greater than \text{14} by a factor of \text{2}.

Multiply the given number by the conversion formula.

\[
\frac{\text{pints}}{\text{quart}} = 28 \text{ pints}
\]

14 quarts = 14 quarts * \( \frac{2}{\text{quart}} \) = 28 pints
Multiple Choice:

✓ Ok. I have studied this example and am ready to get a new problem.

Hints:

The typical conversion formulae used in modern times for the old English system of measurement are:

<table>
<thead>
<tr>
<th>Distance</th>
<th>Mass</th>
<th>Volume</th>
</tr>
</thead>
<tbody>
<tr>
<td>12 in = 1 ft</td>
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<td></td>
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<td></td>
<td>2 pint = 1 quart</td>
</tr>
<tr>
<td></td>
<td></td>
<td>4 quarts = 1 gallon</td>
</tr>
</tbody>
</table>
The conversion rate of interest is 2 pint = 1 quart.

You are going from quarts to pints, so the number of pints is greater than 14 by a factor of 2.

14 quarts = 14 quarts \times \frac{2}{1\text{ quart}} = 28 \text{ pints}

36) Problem #PRACGAG "PRACGAG - 60275 - Conversion: x L to cm^3"
How many cubic centimeters are in 2 liters?

Algebraic Expression:

✓ 2000

Scaffold:  
Here is a complete explanation:

Cubic centimeters:
It is worth noting that cm\(^3\) is in fact a unit of volume like L and mL are. This is because a volume is three lengths multiplied together multiplied by some number with no units. 1 cm\(^3\) = 1 cm * 1 cm * 1 cm, called a centimeter cubed or a cubic centimeter, is equal to the volume of a cube with sides of length 1 cm. Another abbreviation used for this unit is cc.

The important aspect here, however, is that 1 cm\(^3\) = 1 mL.

Metric system:
The metric system is based on powers of ten. This can be visualized with the following stair-step pattern:

\[
\begin{align*}
\text{kL} &= 1000 \text{ L} \\
\text{hL} &= 100 \text{ L} \\
\text{daL} &= 10 \text{ L} \\
\text{L} &= 1 \text{ L} \\
\text{dL} &= 0.1 \text{ L} \\
\text{cL} &= 0.01 \text{ L} \\
\text{mL} &= 0.001 \text{ L}
\end{align*}
\]

The number of steps you go down equals the power of 10 you multiply the original number by. The number of steps you go up equals the power of 10 you divide by.

In general the prefixes determine the power of 10 the base unit is multiplied by to get the size of the new unit. The prefixes are listed on the table below.

The power indicates the number of times to multiply by 10 where negative powers indicate division instead of multiplication.

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<th>Prefix</th>
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<th>Multiple</th>
<th>English for Multiple</th>
</tr>
</thead>
<tbody>
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<td>10(^{12})</td>
<td>trillion</td>
</tr>
<tr>
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<td>G</td>
<td>10(^{9})</td>
<td>billion</td>
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<tr>
<td>mega-</td>
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<td>k</td>
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<tr>
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<td>h</td>
<td>10(^{2})</td>
<td>hundred</td>
</tr>
<tr>
<td>deka-</td>
<td>da</td>
<td>10(^{1})</td>
<td>ten</td>
</tr>
</tbody>
</table>
Solving the problem:
From L to mL is three steps down, so number of milliliters is 1000 or \(10^3\) times the number of liters. Since \(1 \text{ mL} = 1 \text{ cm}^3\), the unit mL can be replaced by the unit cm\(^3\) and the number of cubic centimeters is 1000 or \(10^3\) times the number of liters.

Multiply the number given by 1000 or \(10^3\).

When multiplying by powers of ten, move the decimal point to the right (\(\rightarrow\)) a number of places equal to the power of ten. Since here you need 3 powers of ten, move the decimal point over 3 places to the right.

\[2 \text{ L} = 2000 \text{ cm}^3\]

Multiple Choice:
✓ Ok. I have studied this example and am ready to get a new problem.

---

37) Problem #PRACGAW "PRACGAW - 60276 - Conversion: x mL to cm\(^3\)"
How many cubic centimeters are in 144 milliliters?

Algebraic Expression:
✓ 144

Scaffold:
Here is a complete explanation:

It is worth noting that cm\(^3\) is in fact a unit of volume like L and mL are. This is because a volume is three lengths multiplied together multiplied by some number with no units. \(1 \text{ cm}^3 = 1 \text{ cm} * 1 \text{ cm} * 1 \text{ cm}\), called a centimeter cubed or a cubic centimeter, is equal to the volume of a cube with sides of length 1 cm. Another abbreviation used for this unit is cc.

The important aspect here, however, is that \(1 \text{ cm}^3 = 1 \text{ mL}\). The two units are identical.

Since the units are identical, type in the same number as given.

\[144 \text{ mL} = 144 \text{ cm}^3\]
38) Problem #PRACFFJ "PRACFFJ - 60260 - Conversion: x Oz to Lb"

How many pounds are 152 ounces?

**Algebraic Expression:**

\[ 9.5 \]

**Scaffold:**

Here is a complete explanation:

The typical conversion formulae used in modern times for the old English system of measurement are:

<table>
<thead>
<tr>
<th>Distance</th>
<th>Mass</th>
<th>Volume</th>
</tr>
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<tr>
<td>12 in = 1 ft</td>
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<td></td>
<td></td>
<td>2 pint = 1 quart</td>
</tr>
<tr>
<td></td>
<td></td>
<td>4 quarts = 1 gallon</td>
</tr>
</tbody>
</table>

The conversion rate of interest is: \(16 \text{ oz} = 1 \text{ lb}\) (lb is the abbreviation for pound.)

Since you are going from ounces to pounds, the number of pounds is going to be smaller than 152 by a factor of 16.

Divide the given number by the conversion formula.

\[
\frac{1 \text{ lb}}{16 \text{ oz}} = \frac{152 \text{ oz}}{16 \text{ oz}} = 9.5 \text{ lbs}
\]

**Multiple Choice:**

✓ Ok. I have studied this example and am ready to get a new problem.

39) Problem #PRACF5D "PRACF5D - 60282 - Conversion: x g to kg"

How many kilograms are 9604 grams?

**Algebraic Expression:**

\[ 9.604 \]

**Scaffold:**

Here is a complete explanation:
The metric system is based on powers of ten. This can be visualized with the following stair-step pattern:

\[ \text{kg} = 1000 \text{ g} \]
\[ \text{hg} = 100 \text{ g} \]
\[ \text{dag} = 10 \text{ g} \]
\[ \_g = 1 \text{ g} \]
\[ \text{dg} = 0.1 \text{ g} \]
\[ \text{cg} = 0.01 \text{ g} \]
\[ \text{mg} = 0.001 \text{ g} \]

The number of steps you go down equals the power of 10 you multiply the original number by. The number of steps you go up equals the power of 10 you divide by.

In general the prefixes determine the power of 10 the base unit is multiplied by to get the size of the new unit. The prefixes are listed on the table below.

The power indicates the number of times to multiply by 10 where negative powers indicate division instead of multiplication.

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<tr>
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<td>ten</td>
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<td>-------</td>
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<tr>
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<td>trillionth</td>
</tr>
</tbody>
</table>

From g to kg is three steps up, so the number of kilograms is $1/1000$, 0.001 or $10^{-3}$ times the number of grams.

Divide the number given by 1000 or multiply it by $10^{-3} = 1/10^3$. 
When dividing by powers of ten, move the decimal point to the left (-) a number of places equal to the power of ten. Since here you need -3 powers of ten, move the decimal point over 3 places to the left.

9604 g = 9.604 kg

Multiple Choice:
✔️ Ok. I have studied this example and am ready to get a new problem.

---

40) Problem #PRACGG5 "PRACGG5 - 60292 - Conversion: x hr to day"

How many days are 360 hours?

Algebraic Expression:
✔️ 15

Scaffold:

Here is a complete explanation:

Typical conversion factors for measurement of time is given in the table below.

<table>
<thead>
<tr>
<th>Time</th>
<th>Notes</th>
</tr>
</thead>
<tbody>
<tr>
<td>60 s = 1 min</td>
<td></td>
</tr>
<tr>
<td>60 min = 1 hr</td>
<td></td>
</tr>
<tr>
<td>24 hr = 1 day</td>
<td>Since the earth's rotation defines a day and the second is based on an atomic process, this number is not exact. It was defined to be exact at one point in time, however.</td>
</tr>
<tr>
<td>7 days = 1 week</td>
<td>This is based on the usual average of the number of days in a month in the modern solar calendar. This is not an exact number, and the actual revolution time for the moon, the original definition of a month, is about 27.3 days.</td>
</tr>
<tr>
<td>30 days = 1 month</td>
<td>Actually, it is closer to 1 year = 365.24 days - it measures the length of time for earth's revolution around the sun.</td>
</tr>
<tr>
<td>365 days = 1 year</td>
<td></td>
</tr>
</tbody>
</table>

The conversion rate of interest is: 1 day = 24 hours.

You are going from hours to days, so the number of days will be smaller than 360 by a factor of 24.

Multiply the number given by the conversion formula.

\[
\frac{1 \text{ day}}{24 \text{ hr}} = 360 \text{ hr} \cdot \frac{1 \text{ day}}{24 \text{ hr}} = 15 \text{ days}
\]

Multiple Choice:
✔️ Ok. I have studied this example and am ready to get a new problem.

---

41) Problem #PRACF3G "PRACF3G - 60279 - Conversion: x cm to m"
How many meters are 202 centimeters?

**Algebraic Expression:**

\[ 2.02 \]

**Scaffold:**

Here is a complete explanation:

The metric system is based on powers of ten. This can be visualized with the following stair-step pattern:

\[
\begin{align*}
\text{km} & = 1000 \text{ m} | \\
\text{hm} & = 100 \text{ m} | \\
\text{dam} & = 10 \text{ m} | \\
\text{m} & = 1 \text{ m} | \\
\text{dm} & = 0.1 \text{ m} | \\
\text{cm} & = 0.01 \text{ m} | \\
\text{mm} & = 0.001 \text{ m} |
\end{align*}
\]

The number of steps you go down equals the power of 10 you multiply the original number by. The number of steps you go up equals the power of 10 you divide by.

In general the prefixes determine the power of 10 the base unit is multiplied by to get the size of the new unit. The prefixes are listed on the table below.

The power indicates the number of times to multiply by 10 where negative powers indicate division instead of multiplication.

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<td>billion</td>
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<tr>
<td>giga-</td>
<td>G</td>
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<tr>
<td>mega-</td>
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<td>deka-</td>
<td>da</td>
<td>(10^1)</td>
<td>ten</td>
</tr>
<tr>
<td>------</td>
<td>-------</td>
<td>(10^0)</td>
<td>one</td>
</tr>
<tr>
<td>deci-</td>
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<td>(10^{-1})</td>
<td>tenth</td>
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<td>pico-</td>
<td>p</td>
<td>(10^{-12})</td>
<td>trillionth</td>
</tr>
</tbody>
</table>
From cm to m is two steps up, so the number of meters is 1/100, 0.01 or $10^{-2}$ times the number of centimeters.

Divide the number given by 100 or multiply it by $10^{-2} = 1/10^2$.

When dividing by powers of ten, move the decimal point to the left (←) a number of places equal to the power of ten. Since here you need -2 powers of ten, move the decimal point over 2 places to the left.

202 cm = 2.02 m

**Multiple Choice:**

✔️ Ok. I have studied this example and am ready to get a new problem.

---

42) Problem #PRACGJT "PRACGJT - 60290 - Conversion: x s to min"

How many minutes are 540 seconds?

**Algebraic Expression:**

✔️ 9

**Scaffold:**

Here is a complete explanation:

Typical conversion factors for measurement of time is given in the table below.

<table>
<thead>
<tr>
<th>Time</th>
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</thead>
<tbody>
<tr>
<td>60 s = 1 min</td>
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<td>60 min = 1 hr</td>
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<td>24 hr = 1 day</td>
<td>Since the earth's rotation defines a day and the second is based on an atomic process, this number is not exact. It was defined to be exact at one point in time, however.</td>
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<tr>
<td>365 days = 1 year</td>
<td>Actually, it is closer to 1 year = 365.24 days - it measures the length of time for the earth's revolution around the sun.</td>
</tr>
</tbody>
</table>

The conversion rate of interest is: $1 \text{ min} = 60 \text{ s}$.

You are going from seconds to minutes, so the number of minutes will be smaller than 540 by a factor of 60.

Multiply the number given by the conversion formula.

\[
\frac{1 \text{ min}}{540 \text{ s}} = \frac{540 \text{ s} \times 9 \text{ min}}{60 \text{ s}} = 9 \text{ min}
\]
43) Problem #PRACGGS "PRACGGS - 60286 - Conversion: x hr to min"

How many minutes are in 2 hours?

**Algebraic Expression:**

✓ 120

**Scaffold:**

*Here is a complete explanation:*

Typical conversion factors for measurement of time is given in the table below.

<table>
<thead>
<tr>
<th>Time</th>
<th>Notes</th>
</tr>
</thead>
<tbody>
<tr>
<td>60 s = 1 min</td>
<td></td>
</tr>
<tr>
<td>60 min = 1 hr</td>
<td>Since the earth's rotation defines a day and the second is based on an atomic process, this number is not exact. It was defined to be exact at one point in time, however.</td>
</tr>
<tr>
<td>24 hr = 1 day</td>
<td>This is based on the usual average of the number of days in a month in the modern solar calander. This is not an exact number, and the actual revolution time for the moon, the original definition of a month, is about 27.3 days.</td>
</tr>
<tr>
<td>7 days = 1 week</td>
<td></td>
</tr>
<tr>
<td>30 days = 1 month</td>
<td>Actually, it is closer to 1 year = 365.24 days - it measures the length of time for earth's revolution around the sun.</td>
</tr>
<tr>
<td>365 days = 1 year</td>
<td></td>
</tr>
</tbody>
</table>

The conversion rate of interest is: 1 hr = 60 min.

You are going from **hours** to **minutes**, so the number of **minutes** will be larger than 2 by a factor of 60.

Multiply the **number given** by the **conversion formula**.

\[
\text{min} = \frac{2 \text{ hr} \times 60}{\text{hr}} = 120 \text{ min}
\]

**Multiple Choice:**

✓ Ok. I have studied this example and am ready to get a new problem.

44) Problem #PRACGFY "PRACGFY - 60285 - Conversion: x min to s"

How many seconds are in 4 minutes?

**Algebraic Expression:**

✓ 240

**Scaffold:**
Here is a complete explanation:

Typical conversion factors for measurement of time is given in the table below.

<table>
<thead>
<tr>
<th>Time</th>
<th>Notes</th>
</tr>
</thead>
<tbody>
<tr>
<td>60 s = 1 min</td>
<td></td>
</tr>
<tr>
<td>60 min = 1 hr</td>
<td></td>
</tr>
<tr>
<td>24 hr = 1 day</td>
<td>Since the earth's rotation defines a day and the second is based on an atomic process, this number is not exact. It was defined to be exact at one point in time, however.</td>
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<td>30 days = 1 month</td>
<td>Actually, it is closer to 1 year = 365.24 days - it measures the length of time for earth's revolution around the sun.</td>
</tr>
<tr>
<td>365 days = 1 year</td>
<td></td>
</tr>
</tbody>
</table>

The conversion rate of interest is: 1 min = 60 s.

You are going from minutes to seconds, so the number of seconds will be larger than 4 by a factor of 60.

Multiply the number given by the conversion formula.

\[
\frac{s}{min} = 4 \text{ min} \times \frac{60 \text{ s}}{1 \text{ min}} = 240 \text{ s}
\]

Multiple Choice:

✓ Ok. I have studied this example and am ready to get a new problem.

☐ 45) Problem #PRACGHX "PRACGHX - 60293 - Conversion: x day to year"
How many years are 5110 days?

Algebraic Expression:

✓ 14

Scaffold:

Here is a complete explanation:

Typical conversion factors for measurement of time is given in the table below.

<table>
<thead>
<tr>
<th>Time</th>
<th>Notes</th>
</tr>
</thead>
<tbody>
<tr>
<td>60 s = 1 min</td>
<td></td>
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<td>Since the earth's rotation defines a day and the second is based on an atomic process, this number is not exact. It was defined to be exact at one point in time, however.</td>
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</tbody>
</table>
7 days = 1 week

30 days = 1 month

This is based on the usual average of the number of days in a month in the modern solar calendar. This is not an exact number, and the actual revolution time for the moon, the original definition of a month, is about 27.3 days.

365 days = 1 year

Actually, it is closer to 1 year = 365.24 days - it measures the length of time for earth's revolution around the sun.

The conversion rate of interest is: 365 days = 1 year.

You are going from days to years, so the number of years will be smaller than 5110 by a factor of 365.

Multiply the number given by the conversion formula.

\[
\frac{1 \text{ year}}{365 \text{ days}} \times 5110 \text{ days} = 14 \text{ years}
\]

Multiple Choice:
✓ Ok. I have studied this example and am ready to get a new problem.

46) Problem #PRACGBW "PRACGBW - 60283 - Conversion: x mL to L"

How many liters are 12880 milliliters?

Algebraic Expression:
✓ 12.88

Scaffold:
Here is a complete explanation:

The metric system is based on powers of ten. This can be visualized with the following stair-step pattern:

- kL = 1000 L
- hL = 100 L
- daL = 10 L
- L = 1 L
- dL = 0.1 L
- cL = 0.01 L
- mL = 0.001 L

The number of steps you go down equals the power of 10 you multiply the original number by. The number of steps you go up equals the power of 10 you divide by.

In general the prefixes determine the power of 10 the base unit is multiplied by to get the size of the new unit. The prefixes are listed on the table below.

The power indicates the number of times to multiply by 10 where negative powers indicate division
instead of multiplication.

<table>
<thead>
<tr>
<th>Prefix</th>
<th>Abbreviation</th>
<th>Multiple</th>
<th>English for Multiple</th>
</tr>
</thead>
<tbody>
<tr>
<td>tetra-</td>
<td>T</td>
<td>$10^{12}$</td>
<td>trillion</td>
</tr>
<tr>
<td>giga-</td>
<td>G</td>
<td>$10^9$</td>
<td>billion</td>
</tr>
<tr>
<td>mega-</td>
<td>M</td>
<td>$10^6$</td>
<td>million</td>
</tr>
<tr>
<td>kilo-</td>
<td>k</td>
<td>$10^3$</td>
<td>thousand</td>
</tr>
<tr>
<td>hecto-</td>
<td>h</td>
<td>$10^2$</td>
<td>hundred</td>
</tr>
<tr>
<td>deka-</td>
<td>da</td>
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<td>ten</td>
</tr>
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<td>-------</td>
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<td>----------</td>
<td>----------------------</td>
</tr>
<tr>
<td>deci-</td>
<td>d</td>
<td>$10^{-1}$</td>
<td>tenth</td>
</tr>
<tr>
<td>centi-</td>
<td>c</td>
<td>$10^{-2}$</td>
<td>hundredth</td>
</tr>
<tr>
<td>milli-</td>
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<td>thousandth</td>
</tr>
<tr>
<td>micro-</td>
<td>μ</td>
<td>$10^{-6}$</td>
<td>millionth</td>
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<tr>
<td>nano-</td>
<td>n</td>
<td>$10^{-9}$</td>
<td>billionth</td>
</tr>
<tr>
<td>pico-</td>
<td>p</td>
<td>$10^{-12}$</td>
<td>trillionth</td>
</tr>
</tbody>
</table>

From mL to L is three steps up, so the number of liters is $1/1000$, 0.001 or $10^{-3}$ times the number of milliliters.

Divide the number given by 1000 or multiply it by $10^{-3} = 1/10^3$.

When dividing by powers of ten, move the decimal point to the left (←) a number of places equal to the power of ten. Since here you need -3 powers of ten, move the decimal point over 3 places to the left.

12880 mL = 12.88 L

Multiple Choice:
✔ Ok. I have studied this example and am ready to get a new problem.

47) Problem #PRACFZM "PRACFZM - 60270 - Conversion: x m to cm"
How many centimeters are in 21 meters?

Algebraic Expression:
✔ 2100

Scaffold:
Here is a complete explanation:

The metric system is based on powers of ten. This can be visualized with the following stair-step pattern:
The number of steps you go down equals the power of 10 you multiply the original number by. The number of steps you go up equals the power of 10 you divide by.

In general the prefixes determine the power of 10 the base unit is multiplied by to get the size of the new unit. The prefixes are listed on the table below.

The power indicates the number of times to multiply by 10 where negative powers indicate division instead of multiplication.

<table>
<thead>
<tr>
<th>Prefix</th>
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<th>Multiple</th>
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</tr>
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<tr>
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<td>hundred</td>
</tr>
<tr>
<td>deka-</td>
<td>da</td>
<td>$10^1$</td>
<td>ten</td>
</tr>
<tr>
<td>------</td>
<td>-------</td>
<td>$10^0$</td>
<td>one</td>
</tr>
<tr>
<td>deci-</td>
<td>d</td>
<td>$10^{-1}$</td>
<td>tenth</td>
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<tr>
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</tr>
<tr>
<td>pico-</td>
<td>p</td>
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<td>trillionth</td>
</tr>
</tbody>
</table>

From m to cm is two steps down, so the number of centimeters is $100$ or $10^2$ times larger than the number of meters.

Multiply the number given by $100$ or $10^2$.

When multiplying by powers of ten, move the decimal point to the right ($\rightarrow$) a number of places equal to the power of ten. Since here you need 2 powers of ten, move the decimal point over 2 places to the right.
21 m = 2100 cm

Multiple Choice:
✓ Ok. I have studied this example and am ready to get a new problem.

48) Problem #PRACF46 "PRACF46 - 60282 - Conversion: x g to kg"

How many kilograms are 3351 grams?

Algebraic Expression:
✓ 3.351

Scaffold:
Here is a complete explanation:

The metric system is based on powers of ten. This can be visualized with the following stair-step pattern:

\[ \text{kg} = 1000 \text{ g} \]
\[ \text{hg} = 100 \text{ g} \]
\[ \text{dag} = 10 \text{ g} \]
\[ \text{g} = 1 \text{ g} \]
\[ \text{dg} = 0.1 \text{ g} \]
\[ \text{cg} = 0.01 \text{ g} \]
\[ \text{mg} = 0.001 \text{ g} \]

The number of steps you go down equals the power of 10 you multiply the original number by. The number of steps you go up equals the power of 10 you divide by.

In general the prefixes determine the power of 10 the base unit is multiplied by to get the size of the new unit. The prefixes are listed on the table below.

<table>
<thead>
<tr>
<th>Prefix</th>
<th>Abbreviation</th>
<th>Multiple</th>
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</thead>
<tbody>
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<td>$10^{12}$</td>
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</tr>
<tr>
<td>deci-</td>
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<td>tenth</td>
</tr>
</tbody>
</table>
From g to kg is three steps up, so the number of kilograms is $\frac{1}{1000}$, 0.001 or $10^{-3}$ times the number of grams.

Divide the number given by 1000 or multiply it by $10^{-3} = \frac{1}{10^3}$.

When dividing by powers of ten, move the decimal point to the left (←) a number of places equal to the power of ten. Since here you need -3 powers of ten, move the decimal point over 3 places to the left.

$3351 \text{ g} = 3.351 \text{ kg}$

Multiple Choice:

✓ Ok. I have studied this example and am ready to get a new problem.

Hints:

The metric system is based on powers of ten. This can be visualized with the following stair-step pattern:

<table>
<thead>
<tr>
<th>Prefix</th>
<th>Exponent</th>
<th>Unit</th>
</tr>
</thead>
<tbody>
<tr>
<td>centi-</td>
<td>$10^{-2}$</td>
<td>hundredth</td>
</tr>
<tr>
<td>milli-</td>
<td>$10^{-3}$</td>
<td>thousandth</td>
</tr>
<tr>
<td>micro-</td>
<td>$10^{-6}$</td>
<td>millionth</td>
</tr>
<tr>
<td>nano-</td>
<td>$10^{-9}$</td>
<td>billionth</td>
</tr>
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</tr>
</tbody>
</table>

$\text{kg} = 1000 \text{ g}$ |
$\text{hg} = 100 \text{ g}$ |
$\text{dag} = 10 \text{ g}$ |
The number of steps you go down equals the power of 10 you multiply the original number by. The number of steps you go up equals the power of 10 you divide by.

From g to kg is three steps up, so the number of kilograms is $1/1000$, 0.001 or $10^{-3}$ times the number of grams.

Divide the number given by 1000 or multiply it by $10^{-3} = 1/10^3$. 
When dividing by powers of ten, move the decimal point to the left (←) a number of places equal to the power of ten. Since here you need -3 powers of ten, move the decimal point over 3 places to the left.

3351 g = 3.351 kg

49) Problem #PRACF5N "PRACF5N - 60282 - Conversion: x g to kg"

How many kilograms are 8759 grams?

**Algebraic Expression:**

8.759

**Scaffold:**

Here is a complete explanation:

The metric system is based on powers of ten. This can be visualized with the following stair-step pattern:

- **kg = 1000 g**
- **hg = 100 g**
- **dag = 10 g**
- **g = 1 g**
- **dg = 0.1 g**
- **cg = 0.01 g**
- **mg = 0.001 g**

The number of steps you go down equals the power of 10 you multiply the original number by. The number of steps you go up equals the power of 10 you divide by.

In general the prefixes determine the power of 10 the base unit is multiplied by to get the size of the
The power indicates the number of times to multiply by 10 where negative powers indicate division instead of multiplication.

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<tr>
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<th>Abbreviation</th>
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<tbody>
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From g to kg is three steps up, so the number of kilograms is $\frac{1}{1000}$, 0.001 or $10^{-3}$ times the number of grams.

Divide the number given by 1000 or multiply it by $10^{-3} = \frac{1}{10^3}$.

When dividing by powers of ten, move the decimal point to the left ($\leftarrow$) a number of places equal to the power of ten. Since here you need -3 powers of ten, move the decimal point over 3 places to the left.

$8759 \; g = 8.759 \; kg$

Multiple Choice:

✓ Ok. I have studied this example and am ready to get a new problem.

50) Problem #PRACGBA "PRACGBA - 60277 - Conversion: x cm$^3$ to mL"

How many milliliters are in 30 cubic centimeters?

Algebraic Expression:

✓ 30

Scaffold:

Here is a complete explanation:
It is worth noting that cm$^3$ is in fact a unit of volume like L and mL are. This is because a volume is three lengths multiplied together multiplied by some number with no units. 1 cm$^3$ = 1 cm * 1 cm * 1 cm, called a centimeter cubed or a cubic centimeter, is equal to the volume of a cube with sides of length 1 cm. Another abbreviation used for this unit is cc.

The important aspect here, however, is that 1 cm$^3$ = 1 mL. The two units are identical.

Since the units are identical, type in the same number as given.

30 cm$^3$ = 30 mL

**Multiple Choice:**

✔ Ok. I have studied this example and am ready to get a new problem.

---

51) Problem #PRACFYZ "PRACFYZ - 60269 - Conversion: x cm to mm"

How many millimeters are in 2 centimeters?

**Algebraic Expression:**

✔ 20

**Scaffold:**

Here is a complete explanation:

The metric system is based on powers of ten. This can be visualized with the following stair-step pattern:

\[
\text{km} = 1000 \text{ m} | \quad \text{hm} = 100 \text{ m} | \quad \text{dam} = 10 \text{ m} | \quad \text{m} = 1 \text{ m} | \quad \text{dm} = 0.1 \text{ m} | \quad \text{cm} = 0.01 \text{ m} | \quad \text{mm} = 0.001 \text{ m}
\]

The number of steps you go down equals the power of 10 you multiply the original number by. The number of steps you go up equals the power of 10 you divide by.

In general the prefixes determine the power of 10 the base unit is multiplied by to get the size of the new unit. The prefixes are listed on the table below.

The power indicates the number of times to multiply by 10 where negative powers indicate division instead of multiplication.

**Prefix**   **Abbreviation**   **Multiple**   **English for Multiple**
tetra-  T  $10^{12}$  trillion
giga-    G    10⁹    billion
mega-    M    10⁶    million
deka-    da    10¹    ten
hilo-    k    10³    thousand
hecto-   h    10²    hundred
deka-    da    10¹    ten
--------    --------    10⁰    one
deci-    d    10⁻¹    tenth
centi-   c    10⁻²    hundredth
milli-   m    10⁻³    thousandth
micro-   μ    10⁻⁶    millionth
nano-    n    10⁻⁹    billionth
pico-    p    10⁻¹²    trillionth

From cm to mm is one step down, so the number of mm is 10 times larger than the number of cm.

Multiply the number given by 10 or 10¹.

When multiplying by powers of ten, move the decimal point to the right (→) a number of places equal to the power of ten. Since here you need 1 power of ten, move the decimal point over 1 place to the right.

2 cm = 20 mm

Multiple Choice:
✓ Ok. I have studied this example and am ready to get a new problem.

☐ 52) Problem #PRACFZ5 "PRACFZ5 - 60271 - Conversion: x km to m"

How many meters are in 12 kilometers?

Algebraic Expression:
✓ 12000

Scaffold:
Here is a complete explanation:

The metric system is based on powers of ten. This can be visualized with the following stair-step pattern:

\[ \text{km} = 1000 \text{ m} | \text{hm} = 100 \text{ m} | \text{dam} = 10 \text{ m} | \text{m} = 1 \text{ m} | \text{dm} = 0.1 \text{ m} | \]
The number of steps you go down equals the power of 10 you multiply the original number by. The number of steps you go up equals the power of 10 you divide by.

In general the prefixes determine the power of 10 the base unit is multiplied by to get the size of the new unit. The prefixes are listed on the table below.

The power indicates the number of times to multiply by 10 where negative powers indicate division instead of multiplication.

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<td>centi-</td>
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<td>$10^{-2}$</td>
<td>hundredth</td>
</tr>
<tr>
<td>milli-</td>
<td>m</td>
<td>$10^{-3}$</td>
<td>thousandth</td>
</tr>
<tr>
<td>micro-</td>
<td>μ</td>
<td>$10^{-6}$</td>
<td>millionth</td>
</tr>
<tr>
<td>nano-</td>
<td>n</td>
<td>$10^{-9}$</td>
<td>billionth</td>
</tr>
<tr>
<td>pico-</td>
<td>p</td>
<td>$10^{-12}$</td>
<td>trillionth</td>
</tr>
</tbody>
</table>

From km to m is three steps down, so the number of meters is 1000 or $10^{3}$ times the number of kilometers.

Multiply the number given by 1000 or $10^{3}$.

When multiplying by powers of ten, move the decimal point to the right ($\rightarrow$) a number of places equal to the power of ten. Since here you need 3 powers of ten, move the decimal point over 3 places to the right.

$12 \text{ km} = 12000 \text{ m}$

Multiple Choice:

✓ Ok. I have studied this example and am ready to get a new problem.
53) Problem #PRACFFR "PRACFFR - 60260 - Conversion: x Oz to Lb"

How many pounds are 40 ounces?

**Algebraic Expression:**

\[
2.5
\]

**Scaffold:**

**Here is a complete explanation:**

The typical conversion formulae used in modern times for the old English system of measurement are:

<table>
<thead>
<tr>
<th>Distance</th>
<th>Mass</th>
<th>Volume</th>
</tr>
</thead>
<tbody>
<tr>
<td>12 in = 1 ft</td>
<td>16 oz = 1 lb.</td>
<td>3 tsp. = 1 tbsp.</td>
</tr>
<tr>
<td>3 ft = 1 yd</td>
<td>2 tbsp. = 1 oz.</td>
<td>8 oz. = 1 cup</td>
</tr>
<tr>
<td>5280 ft. = 1 mi.</td>
<td>2 cup = 1 pint</td>
<td>2 pint = 1 quart</td>
</tr>
<tr>
<td></td>
<td></td>
<td>4 quarts = 1 gallon</td>
</tr>
</tbody>
</table>

The conversion rate of interest is: \(16 \text{ oz} = 1 \text{ lb.}\) (lb is the abbreviation for pound.)

Since you are going from ounces to pounds, the number of pounds is going to be smaller than 40 by a factor of 16.

Divide the given number by the conversion formula.

\[
40 \text{ oz} = 40 \text{ oz} \times \frac{1 \text{ lb}}{16 \text{ oz}} = 2.5 \text{ lbs}
\]

**Multiple Choice:**

✓ Ok. I have studied this example and am ready to get a new problem.

54) Problem #PRACFKU "PRACFKU - 62168 - Conversion: x Mi to Ft"

How many feet are in 6 miles?

You may use the conversion formula \(1 \text{ mi} = 5280 \text{ ft}\)

**Algebraic Expression:**

\[
31680
\]

**Scaffold:**

**Here is a complete explanation:**

Use the given conversion formula: \(5280 \text{ ft} = 1 \text{ mi.}\)
You are going from miles to feet, so the number of feet will be larger than 6 by a factor of 5280.

Multiply the given number by the conversion formula.

\[
\text{ft} = \frac{6 \text{ mi} \times 5280}{\text{mi}} = 31680 \text{ ft}
\]

Multiple Choice:
✓ Ok. I have studied this example and am ready to get a new problem.

55) Problem #PRACGAY "PRACGAY - 60276 - Conversion: x mL to cm^3"

How many cubic centimeters are in 31 milliliters?

Algebraic Expression:
✓ 31

Scaffold:
Here is a complete explanation:

It is worth noting that cm\(^3\) is in fact a unit of volume like L and mL are. This is because a volume is three lengths multiplied together multiplied by some number with no units. 1 cm\(^3\) = 1 cm * 1 cm * 1 cm, called a centimeter cubed or a cubic centimeter, is equal to the volume of a cube with sides of length 1 cm. Another abbreviation used for this unit is cc.

The important aspect here, however, is that 1 cm\(^3\) = 1 mL. The two units are identical.

Since the units are identical, type in the same number as given.

31 mL = 31 cm\(^3\)

Multiple Choice:
✓ Ok. I have studied this example and am ready to get a new problem.

56) Problem #PRACFSR "PRACFSR - 60264 - Conversion: x Gallon to Quart"

How many quarts are in 12 gallons?

Algebraic Expression:
✓ 48

Scaffold:
Here is a complete explanation:

The typical conversion formulae used in modern times for the old English system of measurement are:

<table>
<thead>
<tr>
<th>Distance</th>
<th>Mass</th>
<th>Volume</th>
</tr>
</thead>
<tbody>
<tr>
<td>12 in = 1 ft</td>
<td>16 oz. = 1 lb.</td>
<td>3 tsp. = 1 tbsp.</td>
</tr>
</tbody>
</table>
The conversion rate of interest is 4 quart = 1 gallon.

You are going from gallons to quarts, so the number of quarts is greater than 12 by a factor of 4.

Multiply the given number by the conversion formula.

\[
\text{quarts} = \frac{12 \text{ gallons} \ast 4 \text{ quarts}}{\text{gallon}} = 48 \text{ quarts}
\]

Multiple Choice:

✓ Ok. I have studied this example and am ready to get a new problem.

57) Problem #PRACGAT "PRACGAT - 60276 - Conversion: x mL to cm^3"

How many cubic centimeters are in 46 milliliters?

Algebraic Expression:

✓ 46

Scaffold:

Here is a complete explanation:

It is worth noting that cm³ is in fact a unit of volume like L and mL are. This is because a volume is three lengths multiplied together multiplied by some number with no units. 1 cm³ = 1 cm * 1 cm * 1 cm, called a centimeter cubed or a cubic centimeter, is equal to the volume of a cube with sides of length 1 cm. Another abbreviation used for this unit is cc.

The important aspect here, however, is that 1 cm³ = 1 mL.

The two units are identical.

Since the units are identical, type in the same number as given.

46 mL = 46 cm³

Multiple Choice:

✓ Ok. I have studied this example and am ready to get a new problem.

58) Problem #PRACF2Z "PRACF2Z - 60278 - Conversion: x mm to cm"

How many centimeters are in 290 millimeters?

Algebraic Expression:
Scaffold:

Here is a complete explanation:

The metric system is based on powers of ten. This can be visualized with the following stair-step pattern:

\[\begin{align*}
\text{km} &= 1000 \text{ m} \\
\text{hm} &= 100 \text{ m} \\
\text{dam} &= 10 \text{ m} \\
\text{m} &= 1 \text{ m} \\
\text{dm} &= 0.1 \text{ m} \\
\text{cm} &= 0.01 \text{ m} \\
\text{mm} &= 0.001 \text{ m}
\end{align*}\]

The number of steps you go down equals the power of 10 you multiply the original number by. The number of steps you go up equals the power of 10 you divide by.

In general the prefixes determine the power of 10 the base unit is multiplied by to get the size of the new unit. The prefixes are listed on the table below.

The power indicates the number of times to multiply by 10 where negative powers indicate division instead of multiplication.

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<td>T</td>
<td>$10^{12}$</td>
<td>trillion</td>
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<tr>
<td>giga-</td>
<td>G</td>
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<tr>
<td>kilo-</td>
<td>k</td>
<td>$10^{3}$</td>
<td>thousand</td>
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<tr>
<td>hecto-</td>
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</tr>
<tr>
<td>deka-</td>
<td>da</td>
<td>$10^{1}$</td>
<td>ten</td>
</tr>
<tr>
<td>------</td>
<td>------</td>
<td>$10^{0}$</td>
<td>one</td>
</tr>
<tr>
<td>deci-</td>
<td>d</td>
<td>$10^{-1}$</td>
<td>tenth</td>
</tr>
<tr>
<td>centi-</td>
<td>c</td>
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<td>hundredth</td>
</tr>
<tr>
<td>milli-</td>
<td>m</td>
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<tr>
<td>pico-</td>
<td>p</td>
<td>$10^{-12}$</td>
<td>trillionth</td>
</tr>
</tbody>
</table>
From mm to cm is one step up, so the number of cm is \(1/10\), 0.1 or \(10^{-1}\) times the number of mm.

Divide the number given by 10 or multiply it by \(10^{-1} = 1/10\).

When dividing by powers of ten, move the decimal point to the left (\(\leftarrow\)) a number of places equal to the power of ten. Since here you need -1 power of ten, move the decimal point over 1 place to the left.

290 mm = 29 cm

Multiple Choice:

✓ Ok. I have studied this example and am ready to get a new problem.

---

59) Problem #PRACFKD "PRACFKD - 60259 - Conversion: x Ft to Yd"
How many yards are in 12 feet?

Algebraic Expression:

✓ 4

Scaffold:

Here is a complete explanation:

The typical conversion formulae used in modern times for the old English system of measurement are:

<table>
<thead>
<tr>
<th>Distance</th>
<th>Mass</th>
<th>Volume</th>
</tr>
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<tbody>
<tr>
<td>12 in = 1 ft</td>
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<tr>
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<td></td>
<td></td>
<td>2 cup = 1 pint</td>
</tr>
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<td></td>
<td>2 pint = 1 quart</td>
</tr>
<tr>
<td></td>
<td></td>
<td>4 quarts = 1 gallon</td>
</tr>
</tbody>
</table>

The conversion rate of interest is: \(3 \text{ ft.} = 1 \text{ yd.}\).

Since you are going from feet to yards, the number of yards is smaller than 12 by a factor of 3.

Divide the given number by the conversion formula.

\[
\frac{1 \text{ yd}}{12 \text{ ft}} = \frac{12 \text{ ft} \times 4 \text{ yds}}{3 \text{ ft}}
\]

Multiple Choice:

✓ Ok. I have studied this example and am ready to get a new problem.
How many millimeters are in 8 meters?

**Algebraic Expression:**

\[ 8000 \]

**Scaffold:**

Here is a complete explanation:

The metric system is based on powers of ten. This can be visualized with the following stair-step pattern:

\[ \text{km} = 1000 \text{ m} | \text{hm} = 100 \text{ m} | \text{dam} = 10 \text{ m} | \text{m} = 1 \text{ m} | \text{dm} = 0.1 \text{ m} | \text{cm} = 0.01 \text{ m} | \text{mm} = 0.001 \text{ m} \]

The number of steps you go down equals the power of 10 you multiply the original number by. The number of steps you go up equals the power of 10 you divide by.

In general the prefixes determine the power of 10 the base unit is multiplied by to get the size of the new unit. The prefixes are listed on the table below.

The power indicates the number of times to multiply by 10 where negative powers indicate division instead of multiplication.

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<td>$10^{12}$</td>
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<td>giga-</td>
<td>G</td>
<td>$10^{9}$</td>
<td>billion</td>
</tr>
<tr>
<td>mega-</td>
<td>M</td>
<td>$10^{6}$</td>
<td>million</td>
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<tr>
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<td>k</td>
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<td>thousand</td>
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<td>--------</td>
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</tr>
<tr>
<td>nano-</td>
<td>n</td>
<td>$10^{-9}$</td>
<td>billionth</td>
</tr>
</tbody>
</table>
From m to mm is three steps down, so the number of millimeters is 1000 or $10^3$ times the number of meters.

Multiply the number given by 1000 or $10^3$.

When multiplying by powers of ten, move the decimal point to the right (→) a number of places equal to the power of ten. Since here you need 3 powers of ten, move the decimal point over 3 places to the right.

$8 \text{ m} = 8000 \text{ mm}$

Multiple Choice:

✓ Ok. I have studied this example and am ready to get a new problem.

61) Problem #PRACF5X "PRACF5X - 60273 - Conversion: x kg to g"

How many grams are in 13 kilograms?

Algebraic Expression:

✓ 13000

Scaffold:

Here is a complete explanation:

The metric system is based on powers of ten. This can be visualized with the following stair-step pattern:

$\text{kg} = 1000 \text{ g}$

$\text{hg} = 100 \text{ g}$

$\text{dag} = 10 \text{ g}$

$\text{g} = 1 \text{ g}$

$\text{dg} = 0.1 \text{ g}$

$\text{cg} = 0.01 \text{ g}$

$\text{mg} = 0.001 \text{ g}$

The number of steps you go down equals the power of 10 you multiply the original number by. The number of steps you go up equals the power of 10 you divide by.

In general the prefixes determine the power of 10 the base unit is multiplied by to get the size of the new unit. The prefixes are listed on the table below.

The power indicates the number of times to multiply by 10 where negative powers indicate division instead of multiplication.
Prefix | Abbreviation | Multiple | English for Multiple
--- | --- | --- | ---
tetra- | T | $10^{12}$ | trillion
giga- | G | $10^{9}$ | billion
mega- | M | $10^{6}$ | million
kilo- | k | $10^{3}$ | thousand
hecto- | h | $10^{2}$ | hundred
deka- | da | $10^{1}$ | ten
------ | ------ | --- | ---
deci- | d | $10^{-1}$ | tenth
centi- | c | $10^{-2}$ | hundredth
milli- | m | $10^{-3}$ | thousandth
micro- | μ | $10^{-6}$ | millionth
nano- | n | $10^{-9}$ | billionth
pico- | p | $10^{-12}$ | trillionth

From kg to g is three steps down, so the number of grams is $1000$ or $10^3$ times the number for kilograms.

Multiply the number given by $1000$ or $10^3$.

When multiplying by powers of ten, move the decimal point to the right ($\rightarrow$) a number of places equal to the power of ten. Since here you need $3$ powers of ten, move the decimal point over $3$ places to the right.

$13 \text{ kg} = 13000 \text{ g}$

Multiple Choice:
✓ Ok. I have studied this example and am ready to get a new problem.

62) Problem #PRACFT7 "PRACFT7 - 60267 - Conversion: x Pint to Quart"
How many quarts are 52 pints?

Algebraic Expression:
✓ $26$

Scaffold:
Here is a complete explanation:

The typical conversion formulae used in modern times for the old English system of measurement are:

<table>
<thead>
<tr>
<th>Distance</th>
<th>Mass</th>
<th>Volume</th>
</tr>
</thead>
</table>
The conversion rate of interest is\(2\text{ pint} = 1\text{ quart}\).

You are going from pints to quarts, so the number of quarts is smaller than 52 by a factor of 2.

Multiply the given number by the conversion formula.

\[
\frac{1\text{ quart}}{2\text{ pints}} = \frac{52\text{ pints}}{2\text{ pints}} = 26\text{ quarts}
\]

Multiple Choice:

✔ Ok. I have studied this example and am ready to get a new problem.

---

63) Problem #PRACFNS "PRACFNS - 60257 - Conversion: x Yd to Ft"

How many feet are in 24 yards?

Algebraic Expression:

✔ 72

Scaffold:

Here is a complete explanation:

The typical conversion formulae used in modern times for the old English system of measurement are:

Distance | Mass | Volume
--- | --- | ---
12 in = 1 ft | 16 oz. = 1 lb. | 3 tsp. = 1 tbsp.
3 ft = 1 yd | | 2 tbsp. = 1 oz.
5280 ft. = 1 mi. | | 8 oz. = 1 cup
| | 2 cup = 1 pint
| | 2 pint = 1 quart
| | 4 quarts = 1 gallon

The conversion rate of interest is: \(3\text{ ft} = 1\text{ yd}\).

You are going from yards to feet, so the number of feet will be larger than 24 by a factor of 3.
Multiply the given number by the conversion formula.

\[
\text{ft} \quad 24 \text{ yds} = 24 \text{ yds} \times \frac{3}{1 \text{ yd}} = 72 \text{ ft}
\]

**Multiple Choice:**

✓ Ok. I have studied this example and am ready to get a new problem.

**64) Problem #PRACF3C "PRACF3C - 60279 - Conversion: x cm to m"**

How many meters are 1157 centimeters?

**Algebraic Expression:**

✓ 11.57

**Scaffold:**

*Here is a complete explanation:*

The metric system is based on powers of ten. This can be visualized with the following stair-step pattern:

\[
\text{km} = 10^3 \text{ m} | \quad \text{hm} = 10^2 \text{ m} | \quad \text{dam} = 10 \text{ m} | \quad \text{m} = 1 \text{ m} | \quad \text{dm} = 0.1 \text{ m} | \quad \text{cm} = 0.01 \text{ m} | \quad \text{mm} = 0.001 \text{ m}
\]

The number of steps you go down equals the power of 10 you multiply the original number by. The number of steps you go up equals the power of 10 you divide by.

In general the prefixes determine the power of 10 the base unit is multiplied by to get the size of the new unit. The prefixes are listed on the table below.

The power indicates the number of times to multiply by 10 where negative powers indicate division instead of multiplication.

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<td>mega-</td>
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<td>$10^2$</td>
<td>hundred</td>
</tr>
</tbody>
</table>
deka- da $10^1$ ten
-------- --------- $10^0$ one
deci- d $10^{-1}$ tenth
centi- c $10^{-2}$ hundredth
milli- m $10^{-3}$ thousandth
micro- μ $10^{-6}$ millionth
nano- n $10^{-9}$ billionth
pico- p $10^{-12}$ trillionth

From cm to m is two steps up, so the number of meters is $1/100$, 0.01 or $10^{-2}$ times the number of centimeters.

Divide the number given by 100 or multiply it by $10^{-2} = 1/10^2$.

When dividing by powers of ten, move the decimal point to the left (←) a number of places equal to the power of ten. Since here you need -2 powers of ten, move the decimal point over 2 places to the left.

$1157 \text{ cm} = 11.57 \text{ m}$

Multiple Choice:
✓ Ok. I have studied this example and am ready to get a new problem.

65) Problem #PRACF2X "PRACF2X - 60278 - Conversion: x mm to cm"
How many centimeters are in 113 millimeters?

Algebraic Expression:
✓ 11.3

Scaffold:
Here is a complete explanation:

The metric system is based on powers of ten. This can be visualized with the following stair-step pattern:

$\text{km} = 1000 \text{ m}$
$\text{hm} = 100 \text{ m}$
$\text{dam} = 10 \text{ m}$
$\text{m} = 1 \text{ m}$
$\text{dm} = 0.1 \text{ m}$
$\text{cm} = 0.01 \text{ m}$
$\text{mm} = 0.001 \text{ m}$

The number of steps you go down equals the power of 10 you multiply the original number by. The number of steps you go up equals the power of 10 you divide by.
In general the prefixes determine the power of 10 the base unit is multiplied by to get the size of the new unit. The prefixes are listed on the table below.

The power indicates the number of times to multiply by 10 where negative powers indicate division instead of multiplication.

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<td>pico-</td>
<td>p</td>
<td>$10^{-12}$</td>
<td>trillionth</td>
</tr>
</tbody>
</table>

From mm to cm is one step up, so the number of cm is $1/10$, 0.1 or $10^{-1}$ times the number of mm.

Divide the number given by 10 or multiply it by $10^{-1} = 1/10^1$.

When dividing by powers of ten, move the decimal point to the left (←) a number of places equal to the power of ten. Since here you need -1 power of ten, move the decimal point over 1 place to the left.

113 mm = 11.3 cm

**Multiple Choice:**

✔ Ok. I have studied this example and am ready to get a new problem.

66) Problem #PRACFEY "PRACFEY - 60258 - Conversion: x Lb to Oz"

How many ounces are in 5 pounds?

**Algebraic Expression:**

✔ 80

**Scaffold:**

*Here is a complete explanation:*
The typical conversion formulae used in modern times for the old English system of measurement are:

<table>
<thead>
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<th>Volume</th>
</tr>
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<tbody>
<tr>
<td>12 in = 1 ft</td>
<td>16 oz. = 1 lb.</td>
<td>3 tsp. = 1 tbsp.</td>
</tr>
<tr>
<td>3 ft = 1 yd</td>
<td></td>
<td>2 tbsp. = 1 oz.</td>
</tr>
<tr>
<td>5280 ft. = 1 mi.</td>
<td></td>
<td>8 oz. = 1 cup</td>
</tr>
</tbody>
</table>

Since you are going from **pounds** to **ounces**, the number of **ounces** will be larger than **5** by a factor of **16**.

Multiply the given number by the conversion formula.

\[
5 \text{ lbs} = 5 \text{ lbs} \times \frac{16 \text{ oz}}{1 \text{ lb}} = 80 \text{ oz}
\]

Multiple Choice:

✓ Ok. I have studied this example and am ready to get a new problem.

---

67) Problem #PRACF9R "PRACF9R - 60274 - Conversion: x L to mL"

How many milliliters are in 15 liters?

**Algebraic Expression:**

✓ 15000

**Scaffold:**

**Here is a complete explanation:**

The metric system is based on powers of ten. This can be visualized with the following stair-step pattern:

\[
\begin{align*}
k\text{L} &= 1000 \text{ L} \\
h\text{L} &= 100 \text{ L} \\
da\text{L} &= 10 \text{ L} \\
\text{L} &= 1 \text{ L} \\
d\text{L} &= 0.1 \text{ L} \\
c\text{L} &= 0.01 \text{ L} \\
m\text{L} &= 0.001 \text{ L}
\end{align*}
\]
The number of steps you go down equals the power of 10 you multiply the original number by. The number of steps you go up equals the power of 10 you divide by.

In general the prefixes determine the power of 10 the base unit is multiplied by to get the size of the new unit. The prefixes are listed on the table below.

The power indicates the number of times to multiply by 10 where negative powers indicate division instead of multiplication.

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<tr>
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</tr>
<tr>
<td>giga-</td>
<td>G</td>
<td>$10^{9}$</td>
<td>billion</td>
</tr>
<tr>
<td>mega-</td>
<td>M</td>
<td>$10^{6}$</td>
<td>million</td>
</tr>
<tr>
<td>kilo-</td>
<td>k</td>
<td>$10^{3}$</td>
<td>thousand</td>
</tr>
<tr>
<td>hecto-</td>
<td>h</td>
<td>$10^{2}$</td>
<td>hundred</td>
</tr>
<tr>
<td>deka-</td>
<td>da</td>
<td>$10^{1}$</td>
<td>ten</td>
</tr>
<tr>
<td></td>
<td></td>
<td>$10^{0}$</td>
<td>one</td>
</tr>
<tr>
<td>deci-</td>
<td>d</td>
<td>$10^{-1}$</td>
<td>tenth</td>
</tr>
<tr>
<td>centi-</td>
<td>c</td>
<td>$10^{-2}$</td>
<td>hundredth</td>
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<td>milli-</td>
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<td>$10^{-3}$</td>
<td>thousandth</td>
</tr>
<tr>
<td>micro-</td>
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<td>$10^{-9}$</td>
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</tr>
<tr>
<td>pico-</td>
<td>p</td>
<td>$10^{-12}$</td>
<td>trillionth</td>
</tr>
</tbody>
</table>

From $L$ to $mL$ is three steps down, so the number of milliliters is $1000 \text{ or } 10^3$ times the number of liters.

Multiply the number given by $1000 \text{ or } 10^3$.

When multiplying by powers of ten, move the decimal point to the right ($\rightarrow$) a number of places equal to the power of ten. Since here you need 3 powers of ten, move the decimal point over 3 places to the right.

15 $L = 15000 \text{ mL}$

**Multiple Choice:**

✅ Ok. I have studied this example and am ready to get a new problem.

---

68) Problem #PRACFSH "PRACFSH - 60263 - Conversion: x Quart to Pint"

How many pints are in 4 quarts?
Algebraic Expression:

8

Scaffold:

Here is a complete explanation:

The typical conversion formulae used in modern times for the old English system of measurement are:

<table>
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<th>Mass</th>
<th>Volume</th>
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<td></td>
<td></td>
<td>2 pint = 1 quart</td>
</tr>
<tr>
<td></td>
<td></td>
<td>4 quarts = 1 gallon</td>
</tr>
</tbody>
</table>

The conversion rate of interest is 2 pint = 1 quart.

You are going from quarts to pints, so the number of pints is greater than 4 by a factor of 2.

Multiply the given number by the conversion formula.

\[
\text{pints} = \frac{4 \text{ quarts} \times 2}{\text{quart}} = 8 \text{ pints}
\]

Multiple Choice:

Ok. I have studied this example and am ready to get a new problem.

69) Problem #PRACGH8 "PRACGH8 - 60288 - Conversion: x year to day"
How many days are in 16 years?

Algebraic Expression:

5840

Scaffold:

Here is a complete explanation:

Typical conversion factors for measurement of time is given in the table below.

<table>
<thead>
<tr>
<th>Time</th>
<th>Notes</th>
</tr>
</thead>
<tbody>
<tr>
<td>60 s = 1 min</td>
<td>Since the earth's rotation defines a day and the second is based on an atomic</td>
</tr>
</tbody>
</table>
process, this number is not exact. It was defined to be exact at one point in time, however.

7 days = 1 week

This is based on the usual average of the number of days in a month in the modern solar calander. This is not an exact number, and the actual revolution time for the moon, the original definition of a month, is about 27.3 days.

30 days = 1 month

Actually, it is closer to 1 year = 365.24 days - it measures the length of time for earth's revolution around the sun.

365 days = 1 year

You are going from years to days, so the number of days will be larger than 16 by a factor of 365.

Multiply the number given by the conversion formula.

\[
\text{days} = 16 \text{ years} \times \frac{365 \text{ days}}{1 \text{ year}} = 5840 \text{ days}
\]

Multiple Choice:

✔ Ok. I have studied this example and am ready to get a new problem.

70) Problem #PRACGH7 "PRACGH7 - 60288 - Conversion: x year to day"
How many days are in 15 years?

Algebraic Expression:

✔ 5475

Scaffold:
Here is a complete explanation:

Typical conversion factors for measurement of time is given in the table below.

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<th>Time</th>
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</thead>
<tbody>
<tr>
<td>60 s = 1 min</td>
<td>Since the earth's rotation defines a day and the second is based on an atomic process, this number is not exact. It was defined to be exact at one point in time, however.</td>
</tr>
<tr>
<td>60 min = 1 hr</td>
<td></td>
</tr>
<tr>
<td>24 hr = 1 day</td>
<td>This is based on the usual average of the number of days in a month in the modern solar calander. This is not an exact number, and the actual revolution time for the moon, the original definition of a month, is about 27.3 days.</td>
</tr>
<tr>
<td>7 days = 1 week</td>
<td></td>
</tr>
<tr>
<td>30 days = 1 month</td>
<td>Actually, it is closer to 1 year = 365.24 days - it measures the length of time for earth's revolution around the sun.</td>
</tr>
<tr>
<td>365 days = 1 year</td>
<td></td>
</tr>
</tbody>
</table>

The conversion rate of interest is: 1 year = 365 days.
You are going from years to days, so the number of days will be larger than 15 by a factor of 365.

Multiply the number given by the conversion formula.

\[
\text{days} = \frac{15 \text{ years} \times 365 \text{ days}}{\text{year}} = 5475 \text{ days}
\]

Multiple Choice:
✓ Ok. I have studied this example and am ready to get a new problem.

71) Problem #PRACGB6 "PRACGB6 - 60284 - Conversion: x cm^3 to L"
How many liters are 8837 cubic centimeters?

Algebraic Expression:
✓ 8.837

Scaffold:
Here is a complete explanation:

Cubic centimeters:

It is worth noting that cm\(^3\) is in fact a unit of volume like L and mL are. This is because a volume is three lengths multiplied together multiplied by some number with no units. 1 cm\(^3\) = 1 cm \times 1 cm \times 1 cm, called a centimeter cubed or a cubic centimeter, is equal to the volume of a cube with sides of length 1 cm. Another abbreviation used for this unit is cc.

The important aspect here, however, is that 1 cm\(^3\) = 1 mL.

Metric system:
The metric system is based on powers of ten. This can be visualized with the following stair-step pattern:

\[
\begin{align*}
\text{kL} &= 1000 \text{ L} \\
\text{hL} &= 100 \text{ L} \\
\text{daL} &= 10 \text{ L} \\
\text{L} &= 1 \text{ L} \\
\text{dL} &= 0.1 \text{ L} \\
\text{cL} &= 0.01 \text{ L} \\
\text{mL} &= 0.001 \text{ L}
\end{align*}
\]

The number of steps you go down equals the power of 10 you multiply the original number by. The number of steps you go up equals the power of 10 you divide by.

In general the prefixes determine the power of 10 the base unit is multiplied by to get the size of the new unit. The prefixes are listed on the table below.
The power indicates the number of times to multiply by 10 where negative powers indicate division instead of multiplication.

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</table>

**Solving the problem:**
From mL to L is three steps up, so number of liters is $1/1000$, 0.001 or $10^{-3}$ times the number of milliliters.

Since 1 mL = 1 cm$^3$, the unit mL can be replaced by the unit cm$^3$ and the number of liters is $1/1000$, 0.001 or $10^{-3}$ times the number of cubic centimeters.

Divide the number given by 1000 or multiply it by $10^{-3} = 1/10^3$.

When dividing by powers of ten, move the decimal point to the left (←) a number of places equal to the power of ten. Since here you need -3 powers of ten, move the decimal point over 3 places to the left.

$8837 \text{ cm}^3 = 8.837 \text{ L}$

**Multiple Choice:**
✓ Ok. I have studied this example and am ready to get a new problem.

---

72) Problem #PRACFZ4 "PRACFZ4 - 60271 - Conversion: x km to m"

How many meters are in 15 kilometers?

**Algebraic Expression:**

✓ 15000
Scaffold:

Here is a complete explanation:

The metric system is based on powers of ten. This can be visualized with the following stair-step pattern:

- km = 1000 m
- hm = 100 m
- dam = 10 m
- m = 1 m
- dm = 0.1 m
- cm = 0.01 m
- mm = 0.001 m

The number of steps you go down equals the power of 10 you multiply the original number by. The number of steps you go up equals the power of 10 you divide by.

In general the prefixes determine the power of 10 the base unit is multiplied by to get the size of the new unit. The prefixes are listed on the table below.

The power indicates the number of times to multiply by 10 where negative powers indicate division instead of multiplication.

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</tr>
</tbody>
</table>

From km to m is three steps down, so the number of meters is $1000$ or $10^3$ times the number of kilometers.
Multiply the number given by 1000 or $10^3$.

When multiplying by powers of ten, move the decimal point to the right ($\rightarrow$) a number of places equal to the power of ten. Since here you need 3 powers of ten, move the decimal point over 3 places to the right.

15 km = 15000 m

**Multiple Choice:**
✓ Ok. I have studied this example and am ready to get a new problem.

---

73) Problem #PRACGA2 "PRACGA2 - 60276 - Conversion: $x$ mL to cm$^3$"

How many cubic centimeters are in 123 milliliters?

**Algebraic Expression:**
✓ 123

**Scaffold:**

Here is a complete explanation:

It is worth noting that cm$^3$ is in fact a unit of volume like L and mL are. This is because a volume is three lengths multiplied together multiplied by some number with no units. 1 cm$^3$ = 1 cm * 1 cm * 1 cm, called a centimeter cubed or a cubic centimeter, is equal to the volume of a cube with sides of length 1 cm. Another abbreviation used for this unit is cc.

The important aspect here, however, is that 1 cm$^3$ = 1 mL. The two units are identical.

Since the units are identical, type in the same number as given.

123 mL = 123 cm$^3$

**Multiple Choice:**
✓ Ok. I have studied this example and am ready to get a new problem.

---

74) Problem #PRACFK3 "PRACFK3 - 60255 - Conversion: $x$ Ft to In"

How many inches are in 19 feet?

**Algebraic Expression:**
✓ 228

**Hints:**
The typical conversion formulae used in modern times for the old English system of measurement are:

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<th>Mass</th>
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</tr>
</thead>
<tbody>
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<td>3 ft = 1 yd</td>
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<td>5280 ft. = 1 mi.</td>
<td></td>
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</tr>
<tr>
<td></td>
<td></td>
<td>2 cup = 1 pint</td>
</tr>
<tr>
<td></td>
<td></td>
<td>2 pint = 1 quart</td>
</tr>
<tr>
<td></td>
<td></td>
<td>4 quarts = 1 gallon</td>
</tr>
</tbody>
</table>
The conversion rate of interest is: 12 in. = 1 ft.

You are going from feet to inches, so the number of inches will be larger than 19 by a factor of 12.

\[
19\text{ ft} = 19\text{ ft} \times 12\frac{\text{in}}{\text{ft}} = 228\text{ in}
\]

**Scaffold:**

*Here is a complete explanation:*

The typical conversion formulae used in modern times for the old English system of measurement are:

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<td></td>
<td></td>
<td>4 quarts = 1 gallon</td>
</tr>
</tbody>
</table>

The conversion rate of interest is: **12 in. = 1 ft.**

You are going from **feet** to **inches**, so the number of **inches** will be larger than **19** by a factor of **12**.

\[
19\text{ ft} = 19\text{ ft} \times 12\frac{\text{in}}{\text{ft}} = 228\text{ in}
\]
Multiple Choice:
✔ Ok. I have read the solution and am ready for a new problem.

75) Problem #PRACFU3 "PRACFU3 - 60268 - Conversion: x Quart to Gallon"
How many gallons are 20 quarts?

Algebraic Expression:
✔ 5

Scaffold:
Here is a complete explanation:

The typical conversion formulae used in modern times for the old English system of measurement are:

<table>
<thead>
<tr>
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<th>Mass</th>
<th>Volume</th>
</tr>
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<tr>
<td>12 in = 1 ft</td>
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<tr>
<td></td>
<td></td>
<td>4 quarts = 1 gallon</td>
</tr>
</tbody>
</table>

The conversion rate of interest is 4 quart = 1 gallon.

You are going from quarts to gallons, so the number of gallons is smaller than 20 by a factor of 4.

Multiply the given number by the conversion formula.

\[
\frac{1 \text{ gallon}}{4 \text{ quarts}} \times 20 \text{ quarts} = 5 \text{ gallons}
\]

Multiple Choice:
✔ Ok. I have studied this example and am ready to get a new problem.

76) Problem #PRACGB5 "PRACGB5 - 60284 - Conversion: x cm^3 to L"
How many liters are 10020 cubic centimeters?

Algebraic Expression:
✔ 10.02

Scaffold:
Here is a complete explanation:
Cubic centimeters:

It is worth noting that cm\(^3\) is in fact a unit of volume like L and mL are. This is because a volume is three lengths multiplied together multiplied by some number with no units. 1 cm\(^3\) = 1 cm * 1 cm * 1 cm, called a centimeter cubed or a cubic centimeter, is equal to the volume of a cube with sides of length 1 cm. Another abbreviation used for this unit is cc.

The important aspect here, however, is that 1 cm\(^3\) = 1 mL.

Metric system:

The metric system is based on powers of ten. This can be visualized with the following stair-step pattern:

\[
\begin{align*}
\text{kL} &= 1000 \text{ L} \\
\text{hL} &= 100 \text{ L} \\
\text{daL} &= 10 \text{ L} \\
\text{L} &= 1 \text{ L} \\
\text{dL} &= 0.1 \text{ L} \\
\text{cL} &= 0.01 \text{ L} \\
\text{mL} &= 0.001 \text{ L}
\end{align*}
\]

The number of steps you go down equals the power of 10 you multiply the original number by. The number of steps you go up equals the power of 10 you divide by.

In general the prefixes determine the power of 10 the base unit is multiplied by to get the size of the new unit. The prefixes are listed on the table below.

The power indicates the number of times to multiply by 10 where negative powers indicate division instead of multiplication.

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<td>ten</td>
</tr>
<tr>
<td>-------</td>
<td>--------------</td>
<td>----------</td>
<td>---------------------</td>
</tr>
<tr>
<td></td>
<td></td>
<td>10(^{0})</td>
<td>one</td>
</tr>
<tr>
<td>deci-</td>
<td>d</td>
<td>10(^{-1})</td>
<td>tenth</td>
</tr>
<tr>
<td>centi-</td>
<td>c</td>
<td>10(^{-2})</td>
<td>hundredth</td>
</tr>
</tbody>
</table>
Solving the problem:

From mL to L is three steps up, so number of liters is \( \frac{1}{1000} \), 0.001 or \( 10^{-3} \) times the number of milliliters.

Since \( 1 \text{ mL} = 1 \text{ cm}^3 \), the unit mL can be replaced by the unit cm\(^3\) and the number of liters is \( \frac{1}{1000} \), 0.001 or \( 10^{-3} \) times the number of cubic centimeters.

Divide the number given by 1000 or multiply it by \( 10^{-3} = \frac{1}{10^3} \).

When dividing by powers of ten, move the decimal point to the left (←) a number of places equal to the power of ten. Since here you need -3 powers of ten, move the decimal point over 3 places to the left.

\[ 10020 \text{ cm}^3 = 10.02 \text{ L} \]

Multiple Choice:

✓ Ok. I have studied this example and am ready to get a new problem.

---

77) Problem #PRACFTZ "PRACFTZ - 60261 - Conversion: x Cup to Oz"

How many ounces are in 12 cups?

**Algebraic Expression:**

✓ 96

**Scaffold:**

**Here is a complete explanation:**

The typical conversion formulae used in modern times for the old English system of measurement are:

<table>
<thead>
<tr>
<th>Distance</th>
<th>Mass</th>
<th>Volume</th>
</tr>
</thead>
<tbody>
<tr>
<td>12 in = 1 ft</td>
<td>16 oz. = 1 lb.</td>
<td>3 tsp. = 1 tbsp.</td>
</tr>
<tr>
<td>3 ft = 1 yd</td>
<td></td>
<td>2 tbsp. = 1 oz.</td>
</tr>
<tr>
<td>5280 ft. = 1 mi.</td>
<td></td>
<td>8 oz. = 1 cup</td>
</tr>
<tr>
<td></td>
<td></td>
<td>2 cup = 1 pint</td>
</tr>
<tr>
<td></td>
<td></td>
<td>2 pint = 1 quart</td>
</tr>
<tr>
<td></td>
<td></td>
<td>4 quarts = 1 gallon</td>
</tr>
</tbody>
</table>

The conversion rate of interest is 8 oz = 1 cup.
Since you are going from cups to ounces, the number of ounces is greater than 12 by a factor of 8.

Multiply the given number by the conversion formula.

\[
\frac{oz}{cup} = \frac{12 \text{ cups}}{12 \text{ cups}} \times \frac{8}{1} = 96 \text{ oz}
\]

Multiple Choice:

✓ Ok. I have studied this example and am ready to get a new problem.

78) Problem #PRACF5Z "PRACF5Z - 60273 - Conversion: x kg to g" 
How many grams are in 14 kilograms?

Algebraic Expression:

✓ 14000

Scaffold:

Here is a complete explanation:

The metric system is based on powers of ten. This can be visualized with the following stair-step pattern:

\[
\begin{align*}
\text{kg} &= 1000 \text{ g} \\
\text{hg} &= 100 \text{ g} \\
\text{dag} &= 10 \text{ g} \\
\text{g} &= 1 \text{ g} \\
\text{dg} &= 0.1 \text{ g} \\
\text{cg} &= 0.01 \text{ g} \\
\text{mg} &= 0.001 \text{ g}
\end{align*}
\]

The number of steps you go down equals the power of 10 you multiply the original number by. The number of steps you go up equals the power of 10 you divide by.

In general the prefixes determine the power of 10 the base unit is multiplied by to get the size of the new unit. The prefixes are listed on the table below.

The power indicates the number of times to multiply by 10 where negative powers indicate division instead of multiplication.

<table>
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<tr>
<th>Prefix</th>
<th>Abbreviation</th>
<th>Multiple</th>
<th>English for Multiple</th>
</tr>
</thead>
<tbody>
<tr>
<td>tetra-</td>
<td>T</td>
<td>(10^{12})</td>
<td>trillion</td>
</tr>
<tr>
<td>giga-</td>
<td>G</td>
<td>(10^9)</td>
<td>billion</td>
</tr>
<tr>
<td>mega-</td>
<td>M</td>
<td>(10^6)</td>
<td>million</td>
</tr>
</tbody>
</table>
From kg to g is three steps down, so the number of grams is 1000 or $10^3$ times the number of kilograms.

Multiply the number given by 1000 or $10^3$.

When multiplying by powers of ten, move the decimal point to the right (→) a number of places equal to the power of ten. Since here you need 3 powers of ten, move the decimal point over 3 places to the right.

14 kg = 14000 g

**Multiple Choice:**

✔ Ok. I have studied this example and am ready to get a new problem.

---

79) Problem #PRACGH9 "PRACGH9 - 60288 - Conversion: x year to day"

How many days are in 15 years?

**Algebraic Expression:**

✔ 5475

**Scaffold:**

**Here is a complete explanation:**

Typical conversion factors for measurement of time is given in the table below.

<table>
<thead>
<tr>
<th>Time</th>
<th>Notes</th>
</tr>
</thead>
<tbody>
<tr>
<td>60 s = 1 min</td>
<td></td>
</tr>
<tr>
<td>60 min = 1 hr</td>
<td>Since the earth's rotation defines a day and the second is based on an atomic process, this number is not exact. It was defined to be exact at one point in time, however.</td>
</tr>
<tr>
<td>24 hr = 1 day</td>
<td></td>
</tr>
<tr>
<td>7 days = 1 week</td>
<td></td>
</tr>
</tbody>
</table>
30 days = 1 month  This is based on the usual average of the number of days in a month in the modern solar calendar. This is not an exact number, and the actual revolution time for the moon, the original definition of a month, is about 27.3 days.

365 days = 1 year  Actually, it is closer to 1 year = 365.24 days - it measures the length of time for earth's revolution around the sun.

The conversion rate of interest is: 1 year = 365 days.

You are going from years to days, so the number of days will be larger than 15 by a factor of 365.

Multiply the number given by the conversion formula.

\[
days = \frac{15 \text{ years} \times 365 \text{ days}}{1 \text{ year}} = 5475 \text{ days}
\]

Multiple Choice:
✔ Ok. I have studied this example and am ready to get a new problem.

80) Problem #PRACFNA "PRACFNA - 60256 - Conversion: x In to Ft"
How many feet is 186 inches?

Algebraic Expression:
✓ 15.5

Scaffold:
Here is a complete explanation:

The typical conversion formulae used in modern times for the old English system of measurement are:

<table>
<thead>
<tr>
<th>Distance</th>
<th>Mass</th>
<th>Volume</th>
</tr>
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<tbody>
<tr>
<td>12 in = 1 ft</td>
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<td></td>
<td></td>
<td>2 cup = 1 pint</td>
</tr>
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<td></td>
<td></td>
<td>2 pint = 1 quart</td>
</tr>
<tr>
<td></td>
<td></td>
<td>4 quarts = 1 gallon</td>
</tr>
</tbody>
</table>

The conversion rate of interest is: 12 in. = 1 ft.

You are going from inches to feet, so the number of feet will be smaller than 186 by a factor of 12.

Divide the number given by the conversion formula.

\[
186 \text{ in} = \frac{186 \text{ in} \times 1 \text{ ft}}{12 \text{ in}} = 15.5 \text{ ft}
\]
Multiple Choice:
✓ Ok. I have studied this example and am ready to get a new problem.

81) Problem #PRACFTQ "PRACFTQ - 60266 - Conversion: x Cup to Pint"
How many pints are 68 cups?
Algebraic Expression:
✓ 34

Scaffold:
Here is a complete explanation:

The typical conversion formulae used in modern times for the old English system of measurement are:

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<tr>
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<th>Mass</th>
<th>Volume</th>
</tr>
</thead>
<tbody>
<tr>
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<td></td>
<td></td>
<td>2 pint = 1 quart</td>
</tr>
<tr>
<td></td>
<td></td>
<td>4 quarts = 1 gallon</td>
</tr>
</tbody>
</table>

The conversion rate of interest is 2 cups = 1 pint.

You are going from cups to pints, so the number of pints is smaller than 68 by a factor of 2.

Multiply the given number by the conversion formula.

\[
\frac{1 \text{ pint}}{2 \text{ cups}} = \frac{68 \text{ cups}}{2 \text{ cups}} = 34 \text{ pints}
\]

Multiple Choice:
✓ Ok. I have studied this example and am ready to get a new problem.

82) Problem #PRACGFW "PRACGFW - 60285 - Conversion: x min to s"
How many seconds are in 9 minutes?
Algebraic Expression:
✓ 540

Scaffold:
Here is a complete explanation:
Typical conversion factors for measurement of time is given in the table below.

<table>
<thead>
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<th>Time</th>
<th>Notes</th>
</tr>
</thead>
<tbody>
<tr>
<td>60 s = 1 min</td>
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</tr>
<tr>
<td>60 min = 1 hr</td>
<td>Since the earth's rotation defines a day and the second is based on an atomic process, this number is not exact. It was defined to be exact at one point in time, however.</td>
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</tr>
<tr>
<td>7 days = 1 week</td>
<td></td>
</tr>
<tr>
<td>30 days = 1 month</td>
<td>Actually, it is closer to 1 year = 365.24 days - it measures the length of time for earth's revolution around the sun.</td>
</tr>
<tr>
<td>365 days = 1 year</td>
<td></td>
</tr>
</tbody>
</table>

The conversion rate of interest is: 1 min = 60 s.

You are going from minutes to seconds, so the number of seconds will be larger than 9 by a factor of 60.

Multiply the number given by the conversion formula.

\[
\frac{s}{9 \text{ min}} = 9 \text{ min} \times 60 = 540 \text{ s}
\]

Multiple Choice:

✓ Ok. I have studied this example and am ready to get a new problem.

83) Problem #PRACGCH "PRACGCH - 60284 - Conversion: x cm^3 to L"
How many liters are 11636 cubic centimeters?

Algebraic Expression:

✓ 11.636

Scaffold:

Here is a complete explanation:

Cubic centimeters:

It is worth noting that cm³ is in fact a unit of volume like L and mL are. This is because a volume is three lengths multiplied together multiplied by some number with no units. 1 cm³ = 1 cm * 1 cm * 1 cm, called a centimeter cubed or a cubic centimeter, is equal to the volume of a cube with sides of length 1 cm. Another abreviation used for this unit is cc.

The important aspect here, however, is that 1 cm³ = 1 mL.

Metric system:
The metric system is based on powers of ten. This can be visualized with the following stair-step pattern:

\[
\begin{align*}
kL &= 1000 \text{ L} \\
hL &= 100 \text{ L} \\
daL &= 10 \text{ L} \\
L &= 1 \text{ L} \\
dL &= 0.1 \text{ L} \\
cL &= 0.01 \text{ L} \\
mL &= 0.001 \text{ L}
\end{align*}
\]

The number of steps you go down equals the power of 10 you multiply the original number by. The number of steps you go up equals the power of 10 you divide by.

In general the prefixes determine the power of 10 the base unit is multiplied by to get the size of the new unit. The prefixes are listed on the table below.

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<thead>
<tr>
<th>Prefix</th>
<th>Abbreviation</th>
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<th>English for Multiple</th>
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</thead>
<tbody>
<tr>
<td>tetra-</td>
<td>T</td>
<td>(10^{12})</td>
<td>trillion</td>
</tr>
<tr>
<td>giga-</td>
<td>G</td>
<td>(10^{9})</td>
<td>billion</td>
</tr>
<tr>
<td>mega-</td>
<td>M</td>
<td>(10^{6})</td>
<td>million</td>
</tr>
<tr>
<td>kilo-</td>
<td>k</td>
<td>(10^{3})</td>
<td>thousand</td>
</tr>
<tr>
<td>hecto-</td>
<td>h</td>
<td>(10^{2})</td>
<td>hundred</td>
</tr>
<tr>
<td>deka-</td>
<td>da</td>
<td>(10^{1})</td>
<td>ten</td>
</tr>
<tr>
<td>------</td>
<td>------------</td>
<td>10^0</td>
<td>one</td>
</tr>
<tr>
<td>deci-</td>
<td>d</td>
<td>(10^{-1})</td>
<td>tenth</td>
</tr>
<tr>
<td>centi-</td>
<td>c</td>
<td>(10^{-2})</td>
<td>hundredth</td>
</tr>
<tr>
<td>milli-</td>
<td>m</td>
<td>(10^{-3})</td>
<td>thousandth</td>
</tr>
<tr>
<td>micro-</td>
<td>(\mu)</td>
<td>(10^{-6})</td>
<td>millionth</td>
</tr>
<tr>
<td>nano-</td>
<td>n</td>
<td>(10^{-9})</td>
<td>billionth</td>
</tr>
<tr>
<td>pico-</td>
<td>p</td>
<td>(10^{-12})</td>
<td>trillionth</td>
</tr>
</tbody>
</table>

**Solving the problem:**

From m\(\text{L}\) to L is three steps up, so number of liters is \(1/1000\), 0.001 or \(10^{-3}\) times the number of milliliters.
Since \(1 \text{ mL} = 1 \text{ cm}^3\), the unit \text{ mL} can be replaced by the unit \text{ cm}^3 and the number of \text{ liters} is \(1/1000, 0.001\) or \(10^{-3}\) times the number of \text{ cubic centimeters}.

Divide the number given by 1000 or multiply it by \(10^{-3} = 1/10^3\).

When dividing by powers of ten, move the decimal point to the left \(\leftarrow\) a number of places equal to the power of ten. Since here you need \(-3\) powers of ten, move the decimal point over 3 places to the left.

\[
11636 \text{ cm}^3 = 11.636 \text{ L}
\]

**Multiple Choice:**

✓ Ok. I have studied this example and am ready to get a new problem.

---

84) Problem #PRACFKN "PRACFKN - 62168 - Conversion: x Mi to Ft"

How many feet are in 4 miles?

You may use the conversion formula \(1 \text{ mi} = 5280 \text{ ft}\)

**Algebraic Expression:**

✓ 21120

**Scaffold:**

Here is a complete explanation:

Use the given conversion formula: \(5280 \text{ ft} = 1 \text{ mi}\).

You are going from miles to feet, so the number of feet will be larger than 4 by a factor of 5280.

Multiply the given number by the conversion formula.

\[
\frac{\text{ft}}{\text{mi}}
\]

\[
4 \text{ mi} = 4 \text{ mi} \times 5280 \text{ ft} = 21120 \text{ ft}
\]

**Multiple Choice:**

✓ Ok. I have studied this example and am ready to get a new problem.

---

85) Problem #PRACFZK "PRACFZK - 60270 - Conversion: x m to cm"

How many centimeters are in 20 meters?

**Algebraic Expression:**

✓ 2000

**Scaffold:**

Here is a complete explanation:

The metric system is based on powers of ten. This can be visualized with the following stair-step
The number of steps you go down equals the power of 10 you multiply the original number by. The number of steps you go up equals the power of 10 you divide by.

In general the prefixes determine the power of 10 the base unit is multiplied by to get the size of the new unit. The prefixes are listed on the table below.

The power indicates the number of times to multiply by 10 where negative powers indicate division instead of multiplication.

<table>
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<td>G</td>
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<td>-------</td>
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<td>pico-</td>
<td>p</td>
<td>$10^{-12}$</td>
<td>trillionth</td>
</tr>
</tbody>
</table>

From m to cm is two steps down, so the number of centimeters is $100$ or $10^2$ times larger than the number of meters.

Multiply the number given by $100$ or $10^2$.

When multiplying by powers of ten, move the decimal point to the right ($\rightarrow$) a number of places equal
to the power of ten. Since here you need 2 powers of ten, move the decimal point over 2 places to the right.

20 m = 2000 cm

**Multiple Choice:**

✓ Ok. I have studied this example and am ready to get a new problem.

---

**Problem #PRACF5C "PRACF5C - 60282 - Conversion: x g to kg"**

How many kilograms are 7988 grams?

**Algebraic Expression:**

✓ 7.988

**Scaffold:**

*Here is a complete explanation:*

The metric system is based on powers of ten. This can be visualized with the following stair-step pattern:

- kg = 1000 g
- hg = 100 g
- dag = 10 g
- g = 1 g
- dg = 0.1 g
- cg = 0.01 g
- mg = 0.001 g

The number of steps you go down equals the power of 10 you multiply the original number by. The number of steps you go up equals the power of 10 you divide by.

In general the prefixes determine the power of 10 the base unit is multiplied by to get the size of the new unit. The prefixes are listed on the table below.

The power indicates the number of times to multiply by 10 where negative powers indicate division instead of multiplication.

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<td>h</td>
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<td>hundred</td>
</tr>
<tr>
<td>deka-</td>
<td>da</td>
<td>10^{1}</td>
<td>ten</td>
</tr>
</tbody>
</table>
From g to kg is three steps up, so the number of kilograms is $1/1000$, 0.001 or $10^{-3}$ times the number of grams.

Divide the number given by 1000 or multiply it by $10^{-3} = 1/10^3$.

When dividing by powers of ten, move the decimal point to the left ($\leftarrow$) a number of places equal to the power of ten. Since here you need $-3$ powers of ten, move the decimal point over 3 places to the left.

$7988 \text{ g} = 7.988 \text{ kg}$

Multiple Choice:
✓ Ok. I have studied this example and am ready to get a new problem.

---

87) Problem #PRACFKT "PRACFKT - 62168 - Conversion: x Mi to Ft"

How many feet are in 6 miles?

You may use the conversion formula $1 \text{ mi} = 5280 \text{ ft}$

**Algebraic Expression:**
✓ $31680$

**Scaffold:**

**Here is a complete explanation:**

Use the given conversion formula: $5280 \text{ ft} = 1 \text{ mi}$.

You are going from miles to feet, so the number of feet will be larger than 6 by a factor of 5280.

Multiply the given number by the conversion formula.

\[
\begin{align*}
\text{ft} \\
6 \text{ mi} &= 6 \text{ mi} \times 5280 = 31680 \text{ ft} \\
\text{mi}
\end{align*}
\]

**Multiple Choice:**
✓ Ok. I have studied this example and am ready to get a new problem.
88) Problem #PRACGAZ "PRACGAZ - 60276 - Conversion: x mL to cm^3"
How many cubic centimeters are in 126 milliliters?

Algebraic Expression:

✓ 126

Scaffold:
Here is a complete explanation:

It is worth noting that cm\(^3\) is in fact a unit of volume like L and mL are. This is because a volume is three lengths multiplied together multiplied by some number with no units. 1 cm\(^3\) = 1 cm * 1 cm * 1 cm, called a centimeter cubed or a cubic centimeter, is equal to the volume of a cube with sides of length 1 cm. Another abbreviation used for this unit is cc.

The important aspect here, however, is that 1 cm\(^3\) = 1 mL. The two units are identical.

Since the units are identical, type in the same number as given.

126 mL = 126 cm\(^3\)

Multiple Choice:
✓ Ok. I have studied this example and am ready to get a new problem.

89) Problem #PRACGAH "PRACGAH - 60275 - Conversion: x L to cm^3"
How many cubic centimeters are in 6 liters?

Algebraic Expression:

✓ 6000

Scaffold:
Here is a complete explanation:

Cubic centimeters:
It is worth noting that cm\(^3\) is in fact a unit of volume like L and mL are. This is because a volume is three lengths multiplied together multiplied by some number with no units. 1 cm\(^3\) = 1 cm * 1 cm * 1 cm, called a centimeter cubed or a cubic centimeter, is equal to the volume of a cube with sides of length 1 cm. Another abbreviation used for this unit is cc.

The important aspect here, however, is that 1 cm\(^3\) = 1 mL.

Metric system:
The metric system is based on powers of ten. This can be visualized with the following stair-step pattern:

| kL = 1000 L |
| hL = 100 L |
The number of steps you go down equals the power of 10 you multiply the original number by. The number of steps you go up equals the power of 10 you divide by.

In general the prefixes determine the power of 10 the base unit is multiplied by to get the size of the new unit. The prefixes are listed on the table below.

The power indicates the number of times to multiply by 10 where negative powers indicate division instead of multiplication.

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</thead>
<tbody>
<tr>
<td>tetra-</td>
<td>T</td>
<td>$10^{12}$</td>
<td>trillion</td>
</tr>
<tr>
<td>giga-</td>
<td>G</td>
<td>$10^9$</td>
<td>billion</td>
</tr>
<tr>
<td>mega-</td>
<td>M</td>
<td>$10^6$</td>
<td>million</td>
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<td>h</td>
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<tr>
<td>deka-</td>
<td>da</td>
<td>$10^1$</td>
<td>ten</td>
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<td>--------</td>
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<td>one</td>
</tr>
<tr>
<td>deci-</td>
<td>d</td>
<td>$10^{-1}$</td>
<td>tenth</td>
</tr>
<tr>
<td>centi-</td>
<td>c</td>
<td>$10^{-2}$</td>
<td>hundredth</td>
</tr>
<tr>
<td>milli-</td>
<td>m</td>
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<td>thousandth</td>
</tr>
<tr>
<td>micro-</td>
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</tr>
<tr>
<td>pico-</td>
<td>p</td>
<td>$10^{-12}$</td>
<td>trillionth</td>
</tr>
</tbody>
</table>

**Solving the problem:**

From $L$ to $mL$ is three steps down, so number of milliliters is $1000$ or $10^3$ times the number of liters. Since $1\ mL = 1\ cm^3$, the unit mL can be replaced by the unit cm$^3$ and the number of cubic centimeters is $1000$ or $10^3$ times the number of liters.

Multiply the number given by $1000$ or $10^3$.

When multiplying by powers of ten, move the decimal point to the right (→) a number of places equal to the power of ten. Since here you need 3 powers of ten, move the decimal point over 3 places to the
right.

\[ 6 \text{ L} = 6000 \text{ cm}^3 \]

**Multiple Choice:**

✅ Ok. I have studied this example and am ready to get a new problem.

---

90) Problem #PRACGCM "PRACGCM - 60284 - Conversion: x cm^3 to L"

How many liters are 5680 cubic centimeters?

**Algebraic Expression:**

✅ 5.68

**Scaffold:**

Here is a complete explanation:

**Cubic centimeters:**

It is worth noting that cm\(^3\) is in fact a unit of volume like L and mL are. This is because a volume is three lengths multiplied together multiplied by some number with no units. 1 cm\(^3\) = 1 cm * 1 cm * 1 cm, called a centimeter cubed or a cubic centimeter, is equal to the volume of a cube with sides of length 1 cm. Another abbreviation used for this unit is cc.

The important aspect here, however, is that 1 cm\(^3\) = 1 mL.

**Metric system:**

The metric system is based on powers of ten. This can be visualized with the following stair-step pattern:

\[
\begin{align*}
\text{kL} &= 1000 \text{ L} \\
\text{hL} &= 100 \text{ L} \\
\text{daL} &= 10 \text{ L} \\
\text{L} &= 1 \text{ L} \\
\text{dL} &= 0.1 \text{ L} \\
\text{cL} &= 0.01 \text{ L} \\
\text{mL} &= 0.001 \text{ L} \\
\end{align*}
\]

The number of steps you go down equals the power of 10 you multiply the original number by. The number of steps you go up equals the power of 10 you divide by.

In general the prefixes determine the power of 10 the base unit is multiplied by to get the size of the new unit. The prefixes are listed on the table below.

The power indicates the number of times to multiply by 10 where negative powers indicate division instead of multiplication.
### Solving the problem:

From **mL** to **L** is three steps up, so number of **liters** is $1/1000$, 0.001 or $10^{-3}$ times the number of **milliliters**.

Since $1\text{ mL} = 1\text{ cm}^3$, the unit **mL** can be replaced by the unit **cm}^3 and the number of **liters** is $1/1000$, 0.001 or $10^{-3}$ times the number of **cubic centimeters**.

Divide the number given by 1000 or multiply it by $10^{-3} = 1/10^3$.

When dividing by powers of ten, move the decimal point to the left (←) a number of places equal to the power of ten. Since here you need -3 powers of ten, move the decimal point over 3 places to the left.

5680 cm$^3 = 5.68$ L

**Multiple Choice:**

☑️ Ok. I have studied this example and am ready to get a new problem.

---

91) Problem #PRACF2N "PRACF2N - 60272 - Conversion: x m to mm"

How many millimeters are in 10 meters?

**Algebraic Expression:**

☑️ 10000

**Scaffold:**

Here is a complete explanation:
The metric system is based on powers of ten. This can be visualized with the following stair-step pattern:

\[
\begin{align*}
\text{km} &= 1000 \, \text{m} \\
\text{hm} &= 100 \, \text{m} \\
\text{dam} &= 10 \, \text{m} \\
\text{m} &= 1 \, \text{m} \\
\text{dm} &= 0.1 \, \text{m} \\
\text{cm} &= 0.01 \, \text{m} \\
\text{mm} &= 0.001 \, \text{m}
\end{align*}
\]

The number of steps you go down equals the power of 10 you multiply the original number by. The number of steps you go up equals the power of 10 you divide by.

In general the prefixes determine the power of 10 the base unit is multiplied by to get the size of the new unit. The prefixes are listed on the table below.

The power indicates the number of times to multiply by 10 where negative powers indicate division instead of multiplication.

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<td>(\mu)</td>
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<tr>
<td>pico-</td>
<td>p</td>
<td>(10^{-12})</td>
<td>trillionth</td>
</tr>
</tbody>
</table>

From m to mm is three steps down, so the number of millimeters is \(1000\) or \(10^3\) times the number of meters.
Multiply the number given by 1000 or $10^3$.

When multiplying by powers of ten, move the decimal point to the right ($\rightarrow$) a number of places equal to the power of ten. Since here you need 3 powers of ten, move the decimal point over 3 places to the right.

$10 \text{ m} = 10000 \text{ mm}$

**Multiple Choice:**

✓ Ok. I have studied this example and am ready to get a new problem.

92) Problem #PRACY4 "PRACY4 - 60269 - Conversion: x cm to mm"

How many millimeters are in 11 centimeters?

**Algebraic Expression:**

✓ 110

**Scaffold:**

**Here is a complete explanation:**

The metric system is based on powers of ten. This can be visualized with the following stair-step pattern:

- $\text{km} = 1000 \text{ m}$
- $\text{hm} = 100 \text{ m}$
- $\text{dam} = 10 \text{ m}$
- $\text{m} = 1 \text{ m}$
- $\text{dm} = 0.1 \text{ m}$
- $\text{cm} = 0.01 \text{ m}$
- $\text{mm} = 0.001 \text{ m}$

The number of steps you go down equals the power of 10 you multiply the original number by. The number of steps you go up equals the power of 10 you divide by.

In general the prefixes determine the power of 10 the base unit is multiplied by to get the size of the new unit. The prefixes are listed on the table below.

The power indicates the number of times to multiply by 10 where negative powers indicate division instead of multiplication.

<table>
<thead>
<tr>
<th>Prefix</th>
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</tr>
<tr>
<td>hecto-</td>
<td>h</td>
<td>$10^{2}$</td>
<td>hundred</td>
</tr>
</tbody>
</table>
From cm to mm is one step down, so the number of mm is 10 times larger than the number of cm.

Multiply the number given by 10 or $10^1$.

When multiplying by powers of ten, move the decimal point to the right (→) a number of places equal to the power of ten. Since here you need 1 power of ten, move the decimal point over 1 place to the right.

$$11 \text{ cm} = 110 \text{ mm}$$

Multiple Choice:

✓ Ok. I have studied this example and am ready to get a new problem.

---

93) Problem #PRACF5V "PRACF5V - 60273 - Conversion: x kg to g"

How many grams are in 4 kilograms?

Algebraic Expression:

✓ 4000

Scaffold:

Here is a complete explanation:

The metric system is based on powers of ten. This can be visualized with the following stair-step pattern:

- $\text{kg} = 1000 \text{ g}$
- $\text{hg} = 100 \text{ g}$
- $\text{dag} = 10 \text{ g}$
- $\text{g} = 1 \text{ g}$
- $\text{dg} = 0.1 \text{ g}$
- $\text{cg} = 0.01 \text{ g}$
- $\text{mg} = 0.001 \text{ g}$

The number of steps you go down equals the power of 10 you multiply the original number by. The number of steps you go up equals the power of 10 you divide by.
In general the prefixes determine the power of 10 the base unit is multiplied by to get the size of the new unit. The prefixes are listed on the table below.

The power indicates the number of times to multiply by 10 where negative powers indicate division instead of multiplication.

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<tr>
<td>kilo-</td>
<td>k</td>
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<tr>
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<td></td>
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<td>pico-</td>
<td>p</td>
<td>$10^{-12}$</td>
<td>trillionth</td>
</tr>
</tbody>
</table>

From kg to g is three steps down, so the number of grams is $1000$ or $10^3$ times the number of kilograms.

Multiply the number given by 1000 or $10^3$.

When multiplying by powers of ten, move the decimal point to the right (→) a number of places equal to the power of ten. Since here you need 3 powers of ten, move the decimal point over 3 places to the right.

$4 \text{ kg} = 4000 \text{ g}$

**Multiple Choice:**

✔ Ok. I have studied this example and am ready to get a new problem.

94) Problem #PRACFEV "PRACFEV - 60258 - Conversion: x Lb to Oz"

How many ounces are in 6 pounds?

**Algebraic Expression:**

✔ 96
Scaffold:

Here is a complete explanation:

The typical conversion formulae used in modern times for the old English system of measurement are:

<table>
<thead>
<tr>
<th>Distance</th>
<th>Mass</th>
<th>Volume</th>
</tr>
</thead>
<tbody>
<tr>
<td>12 in = 1 ft</td>
<td>16 oz. = 1 lb.</td>
<td>3 tsp. = 1 tbsp.</td>
</tr>
<tr>
<td>3 ft = 1 yd</td>
<td></td>
<td>2 tbsp. = 1 oz.</td>
</tr>
<tr>
<td>5280 ft. = 1 mi.</td>
<td></td>
<td>8 oz. = 1 cup</td>
</tr>
<tr>
<td></td>
<td></td>
<td>2 pint = 1 quart</td>
</tr>
<tr>
<td></td>
<td></td>
<td>4 quarts = 1 gallon</td>
</tr>
</tbody>
</table>

The conversion rate of interest is: 16 oz = 1 lb. (lb is the abbreviation for pound.)

Since you are going from pounds to ounces, the number of ounces will be larger than 6 by a factor of 16.

Multiply the given number by the conversion formula.

\[
\text{oz} \\
6 \text{ lbs} = 6 \text{ lbs} \times \frac{16 \text{ oz}}{1 \text{ lb}} = 96 \text{ oz}
\]

Multiple Choice:

✓ Ok. I have studied this example and am ready to get a new problem.

95) Problem #PRACFTB "PRACFTB - 60265 - Conversion: x Oz to Cup"

How many cups are in 48 ounces?

Algebraic Expression:

✓ 6

Scaffold:

Here is a complete explanation:

The typical conversion formulae used in modern times for the old English system of measurement are:

<table>
<thead>
<tr>
<th>Distance</th>
<th>Mass</th>
<th>Volume</th>
</tr>
</thead>
<tbody>
<tr>
<td>12 in = 1 ft</td>
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<tr>
<td></td>
<td></td>
<td>2 pint = 1 quart</td>
</tr>
<tr>
<td></td>
<td></td>
<td>4 quarts = 1 gallon</td>
</tr>
</tbody>
</table>
The conversion rate of interest is \( 8 \text{ oz} = 1 \text{ cup} \).

Since you are going from ounces to cups, the number of cups is smaller than 48 by a factor of 8.

Multiply the given number by the conversion formula.

\[
\frac{1 \text{ cup}}{8 \text{ oz}} = \frac{48 \text{ oz}}{8 \text{ oz}} = 6 \text{ cups}
\]

Multiple Choice:

✔️ Ok. I have studied this example and am ready to get a new problem.

96) Problem #PRACFZ8 "PRACFZ8 - 60271 - Conversion: x km to m"

How many meters are in 13 kilometers?

Algebraic Expression:

✔️ 13000

Scaffold:

Here is a complete explanation:

The metric system is based on powers of ten. This can be visualized with the following stair-step pattern:

\[
\begin{align*}
\text{km} &= 1000 \text{ m} \\
\text{hm} &= 100 \text{ m} \\
\text{dam} &= 10 \text{ m} \\
\text{m} &= 1 \text{ m} \\
\text{dm} &= 0.1 \text{ m} \\
\text{cm} &= 0.01 \text{ m} \\
\text{mm} &= 0.001 \text{ m}
\end{align*}
\]

The number of steps you go down equals the power of 10 you multiply the original number by. The number of steps you go up equals the power of 10 you divide by.

In general the prefixes determine the power of 10 the base unit is multiplied by to get the size of the new unit. The prefixes are listed on the table below.

The power indicates the number of times to multiply by 10 where negative powers indicate division instead of multiplication.
From km to m is three steps down, so the number of meters is 1000 or $10^3$ times the number of kilometers.

Multiply the number given by 1000 or $10^3$.

When multiplying by powers of ten, move the decimal point to the right ($→$) a number of places equal to the power of ten. Since here you need 3 powers of ten, move the decimal point over 3 places to the right.

13 km = 13000 m

**Multiple Choice:**

✔️ Ok. I have studied this example and am ready to get a new problem.

---

**97) Problem #PRACFEH "PRACFEH - 60258 - Conversion: x Lb to Oz"**

How many ounces are in 4 pounds?

**Algebraic Expression:**

✔️ 64

**Scaffold:**

Here is a complete explanation:

The typical conversion formulae used in modern times for the old English system of measurement are:

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</table>
| 5280 ft. = 1 mi. | 8 oz. = 1 cup | }
2 cup = 1 pint
2 pint = 1 quart
4 quarts = 1 gallon

The conversion rate of interest is: \(16 \text{ oz} = 1 \text{ lb.}\) (lb is the abbreviation for pound.)

Since you are going from pounds to ounces, the number of ounces will be larger than 4 by a factor of 16.

Multiply the given number by the conversion formula.

\[
\frac{\text{oz}}{\text{lb}} = \frac{4 \text{ lbs} \times 16}{1 \text{ lb}} = 64 \text{ oz}
\]

**Multiple Choice:**

✓ Ok. I have studied this example and am ready to get a new problem.

---

98) Problem #PRACGJM "PRACGJM - 60290 - Conversion: x s to min"

How many minutes are 420 seconds?

**Algebraic Expression:**

✓ 7

**Scaffold:**

*Here is a complete explanation:*

Typical conversion factors for measurement of time is given in the table below.

<table>
<thead>
<tr>
<th>Time</th>
<th>Notes</th>
</tr>
</thead>
<tbody>
<tr>
<td>60 s = 1 min</td>
<td></td>
</tr>
<tr>
<td>60 min = 1 hr</td>
<td></td>
</tr>
<tr>
<td>24 hr = 1 day</td>
<td>Since the earth's rotation defines a day and the second is based on an atomic process, this number is not exact. It was defined to be exact at one point in time, however.</td>
</tr>
<tr>
<td>7 days = 1 week</td>
<td>This is based on the usual average of the number of days in a month in the modern solar calendar. This is not an exact number, and the actual revolution time for the moon, the original definition of a month, is about 27.3 days.</td>
</tr>
<tr>
<td>30 days = 1 month</td>
<td>Actually, it is closer to 1 year = 365.24 days - it measures the length of time for earth's revolution around the sun.</td>
</tr>
<tr>
<td>365 days = 1 year</td>
<td></td>
</tr>
</tbody>
</table>

The conversion rate of interest is: \(1 \text{ min} = 60 \text{ s.}\)

You are going from seconds to minutes, so the number of minutes will be smaller than 420 by a factor of 60.
Multiply the number given by the conversion formula.

\[
420 \text{ s} = 420 \text{ s} \times \frac{1 \text{ min}}{60 \text{ s}} = 7 \text{ min}
\]

Multiple Choice:

✔ Ok. I have studied this example and am ready to get a new problem.

99) Problem #PRACF24 "PRACF24 - 60278 - Conversion: x mm to cm"

How many centimeters are in 371 millimeters?

**Algebraic Expression:**

✔ 37.1

**Scaffold:**

**Here is a complete explanation:**

The metric system is based on powers of ten. This can be visualized with the following stair-step pattern:

\[
\begin{align*}
\text{km} & = 1000 \text{ m} | \\
\text{hm} & = 100 \text{ m} | \\
\text{dam} & = 10 \text{ m} | \\
\text{m} & = 1 \text{ m} | \\
\text{dm} & = 0.1 \text{ m} | \\
\text{cm} & = 0.01 \text{ m} | \\
\text{mm} & = 0.001 \text{ m} | \\
\end{align*}
\]

The number of steps you go down equals the power of 10 you multiply the original number by. The number of steps you go up equals the power of 10 you divide by.

In general the prefixes determine the power of 10 the base unit is multiplied by to get the size of the new unit. The prefixes are listed on the table below.

The power indicates the number of times to multiply by 10 where negative powers indicate division instead of multiplication.

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hecto- h $10^2$ hundred
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------ ------- $10^0$ one
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centi- c $10^{-2}$ hundredth
milli- m $10^{-3}$ thousandth
micro- μ $10^{-6}$ millionth
nano- n $10^{-9}$ billionth
pico- p $10^{-12}$ trillionth

From mm to cm is one step up, so the number of cm is $1/10$, 0.1 or $10^{-1}$ times the number of mm.

Divide the number given by 10 or multiply it by $10^{-1} = 1/10$.

When dividing by powers of ten, move the decimal point to the left ($\leftarrow$) a number of places equal to the power of ten. Since here you need -1 power of ten, move the decimal point over 1 place to the left.

371 mm = 37.1 cm

Multiple Choice:
✓ Ok. I have studied this example and am ready to get a new problem.

☐ 100) Problem #PRACFEW "PRACFEW - 60258 - Conversion: x Lb to Oz"

How many ounces are in 6 pounds?

Algebraic Expression:
✓ 96

Scaffold:
Here is a complete explanation:

The typical conversion formulae used in modern times for the old English system of measurement are:

<table>
<thead>
<tr>
<th>Distance</th>
<th>Mass</th>
<th>Volume</th>
</tr>
</thead>
<tbody>
<tr>
<td>12 in = 1 ft</td>
<td>16 oz. = 1 lb.</td>
<td>3 tsp. = 1 tbsp.</td>
</tr>
<tr>
<td>3 ft = 1 yd</td>
<td></td>
<td>2 tbsp. = 1 oz.</td>
</tr>
<tr>
<td>5280 ft. = 1 mi.</td>
<td></td>
<td>8 oz. = 1 cup</td>
</tr>
<tr>
<td></td>
<td></td>
<td>2 cup = 1 pint</td>
</tr>
<tr>
<td></td>
<td></td>
<td>2 pint = 1 quart</td>
</tr>
<tr>
<td></td>
<td></td>
<td>4 quarts = 1 gallon</td>
</tr>
</tbody>
</table>

The conversion rate of interest is: 16 oz = 1 lb. (lb is the abbreviation for pound.)
Since you are going from pounds to ounces, the number of ounces will be larger than 6 by a factor of 16.

Multiply the given number by the conversion formula.

\[
\text{oz} \quad \frac{6 \text{ lbs}}{1 \text{ lb}} \times 16 = 96 \text{ oz}
\]

**Multiple Choice:**
✓ Ok. I have studied this example and am ready to get a new problem.

---

101) Problem #PRACFUM "PRACFUM - 60262 - Conversion: x Pint to Cup"
How many cups are in 3 pints?

**Algebraic Expression:**
✓ 6

**Scaffold:**
**Here is a complete explanation:**

The typical conversion formulae used in modern times for the old English system of measurement are:

<table>
<thead>
<tr>
<th>Distance</th>
<th>Mass</th>
<th>Volume</th>
</tr>
</thead>
<tbody>
<tr>
<td>12 in = 1 ft</td>
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<td>2 pint = 1 quart</td>
</tr>
<tr>
<td></td>
<td></td>
<td>4 quarts = 1 gallon</td>
</tr>
</tbody>
</table>

The conversion rate of interest is \(2 \text{ cups} = 1 \text{ pint}\).

You are going from pints to cups, so the number of cups is greater than 3 by a factor of 2.

Multiply the given number by the conversion formula.

\[
\text{cups} \quad \frac{3 \text{ pints}}{1 \text{ pint}} \times 2 = 6 \text{ cups}
\]

**Multiple Choice:**
✓ Ok. I have studied this example and am ready to get a new problem.
102) Problem #PRACFEX "PRACFEX - 60258 - Conversion: x Lb to Oz"
How many ounces are in 13 pounds?

**Algebraic Expression:**

√ 208

**Scaffold:**

*Here is a complete explanation:*

The typical conversion formulae used in modern times for the old English system of measurement are:

<table>
<thead>
<tr>
<th>Distance</th>
<th>Mass</th>
<th>Volume</th>
</tr>
</thead>
<tbody>
<tr>
<td>12 in = 1 ft</td>
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</tr>
<tr>
<td></td>
<td></td>
<td>4 quarts = 1 gallon</td>
</tr>
</tbody>
</table>

The conversion rate of interest is: 16 oz = 1 lb. (Lb is the abbreviation for pound.)

Since you are going from pounds to ounces, the number of ounces will be larger than 13 by a factor of 16.

Multiply the given number by the conversion formula.

\[
\frac{oz}{lb} = \frac{13 \text{ lbs}}{1 \text{ lb}} \times \frac{16}{1} = 208 \text{ oz}
\]

**Multiple Choice:**

√ Ok. I have studied this example and am ready to get a new problem.

103) Problem #PRACFUF "PRACFUF - 60267 - Conversion: x Pint to Quart"
How many quarts are 6 pints?

**Algebraic Expression:**

√ 3

**Scaffold:**

*Here is a complete explanation:*

The typical conversion formulae used in modern times for the old English system of measurement are:
The conversion rate of interest is 2 pint = 1 quart.

You are going from pints to quarts, so the number of quarts is smaller than 6 by a factor of 2.

Multiply the given number by the conversion formula.

\[ \frac{1\text{ quart}}{2\text{ pints}} \]

\[ 6\text{ pints} \times \frac{1\text{ quart}}{2\text{ pints}} = 3\text{ quarts} \]

Multiple Choice:

✅ Ok. I have studied this example and am ready to get a new problem.

104) Problem #PRACGH6 "PRACGH6 - 60288 - Conversion: x year to day"
How many days are in 13 years?

Algebraic Expression:

✅ 4745

Scaffold:

Here is a complete explanation:

Typical conversion factors for measurement of time is given in the table below.

<table>
<thead>
<tr>
<th>Time</th>
<th>Notes</th>
</tr>
</thead>
<tbody>
<tr>
<td>60 s = 1 min</td>
<td></td>
</tr>
<tr>
<td>60 min = 1 hr</td>
<td>Since the earth's rotation defines a day and the second is based on an atomic process, this number is not exact. It was defined to be exact at one point in time, however.</td>
</tr>
<tr>
<td>24 hr = 1 day</td>
<td></td>
</tr>
<tr>
<td>7 days = 1 week</td>
<td>This is based on the usual average of the number of days in a month in the modern solar calendar. This is not an exact number, and the actual revolution time for the moon, the original definition of a month, is about 27.3 days.</td>
</tr>
<tr>
<td>30 days = 1 month</td>
<td>Actually, it is closer to 1 year = 365.24 days - it measures the length of time for earth's revolution around the sun.</td>
</tr>
<tr>
<td>365 days = 1 year</td>
<td></td>
</tr>
</tbody>
</table>

The conversion rate of interest is: 1 year = 365 days.
You are going from years to days, so the number of days will be larger than 13 by a factor of 365.

Multiply the number given by the conversion formula.

\[
\text{days} \\
13 \text{ years} = 13 \text{ years} \times \frac{365 \text{ days}}{\text{year}} = 4745 \text{ days}
\]

Multiple Choice:
✓ Ok. I have studied this example and am ready to get a new problem.

105) Problem #PRACGAA "PRACGAA - 60275 - Conversion: x L to cm^3"

How many cubic centimeters are in 12 liters?

Algebraic Expression:
✓ 12000

Scaffold:
Here is a complete explanation:

Cubic centimeters:
It is worth noting that cm\(^3\) is in fact a unit of volume like L and mL are. This is because a volume is three lengths multiplied together multiplied by some number with no units. 1 cm\(^3\) = 1 cm * 1 cm * 1 cm, called a centimeter cubed or a cubic centimeter, is equal to the volume of a cube with sides of length 1 cm. Another abbreviation used for this unit is cc.

The important aspect here, however, is that 1 cm\(^3\) = 1 mL.

Metric system:
The metric system is based on powers of ten. This can be visualized with the following stair-step pattern:

\[
\begin{align*}
\text{kL} &= 1000 \text{ L} \\
\text{hL} &= 100 \text{ L} \\
\text{daL} &= 10 \text{ L} \\
\text{L} &= 1 \text{ L} \\
\text{dL} &= 0.1 \text{ L} \\
\text{cL} &= 0.01 \text{ L} \\
\text{mL} &= 0.001 \text{ L}
\end{align*}
\]

The number of steps you go down equals the power of 10 you multiply the original number by. The number of steps you go up equals the power of 10 you divide by.

In general the prefixes determine the power of 10 the base unit is multiplied by to get the size of the new unit. The prefixes are listed on the table below.

The power indicates the number of times to multiply by 10 where negative powers indicate division
instead of multiplication.

<table>
<thead>
<tr>
<th>Prefix</th>
<th>Abbreviation</th>
<th>Multiple</th>
<th>English for Multiple</th>
</tr>
</thead>
<tbody>
<tr>
<td>tetra-</td>
<td>T</td>
<td>$10^{12}$</td>
<td>trillion</td>
</tr>
<tr>
<td>giga-</td>
<td>G</td>
<td>$10^9$</td>
<td>billion</td>
</tr>
<tr>
<td>mega-</td>
<td>M</td>
<td>$10^6$</td>
<td>million</td>
</tr>
<tr>
<td>kilo-</td>
<td>k</td>
<td>$10^3$</td>
<td>thousand</td>
</tr>
<tr>
<td>hecto-</td>
<td>h</td>
<td>$10^2$</td>
<td>hundred</td>
</tr>
<tr>
<td>deka-</td>
<td>da</td>
<td>$10^1$</td>
<td>ten</td>
</tr>
<tr>
<td>------</td>
<td>-----------</td>
<td>10^0</td>
<td>one</td>
</tr>
<tr>
<td>deci-</td>
<td>d</td>
<td>$10^{-1}$</td>
<td>tenth</td>
</tr>
<tr>
<td>centi-</td>
<td>c</td>
<td>$10^{-2}$</td>
<td>hundredth</td>
</tr>
<tr>
<td>milli-</td>
<td>m</td>
<td>$10^{-3}$</td>
<td>thousandth</td>
</tr>
<tr>
<td>micro-</td>
<td>μ</td>
<td>$10^{-6}$</td>
<td>millionth</td>
</tr>
<tr>
<td>nano-</td>
<td>n</td>
<td>$10^{-9}$</td>
<td>billionth</td>
</tr>
<tr>
<td>pico-</td>
<td>p</td>
<td>$10^{-12}$</td>
<td>trillionth</td>
</tr>
</tbody>
</table>

**Solving the problem:**

From L to mL is three steps down, so number of milliliters is $1000$ or $10^3$ times the number of liters. Since $1 \text{ mL} = 1 \text{ cm}^3$, the unit mL can be replaced by the unit cm$^3$ and the number of cubic centimeters is $1000$ or $10^3$ times the number of liters.

Multiply the number given by 1000 or $10^3$.

When multiplying by powers of ten, move the decimal point to the right (→) a number of places equal to the power of ten. Since here you need 3 powers of ten, move the decimal point over 3 places to the right.

$$12 \text{ L} = 12000 \text{ cm}^3$$

**Multiple Choice:**

Ok. I have studied this example and am ready to get a new problem.

106) Problem #PRACFZ6 "PRACFZ6 - 60271 - Conversion: x km to m"

How many meters are in 16 kilometers?

**Algebraic Expression:**

$16000$

**Scaffold:**
Here is a complete explanation:

The metric system is based on powers of ten. This can be visualized with the following stair-step pattern:

\[ \text{km} = 1000 \, \text{m} \]
\[ \text{hm} = 100 \, \text{m} \]
\[ \text{dam} = 10 \, \text{m} \]
\[ \text{m} = 1 \]
\[ \text{dm} = 0.1 \, \text{m} \]
\[ \text{cm} = 0.01 \, \text{m} \]
\[ \text{mm} = 0.001 \, \text{m} \]

The number of steps you go down equals the power of 10 you multiply the original number by. The number of steps you go up equals the power of 10 you divide by.

In general the prefixes determine the power of 10 the base unit is multiplied by to get the size of the new unit. The prefixes are listed on the table below.

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<td>T</td>
<td>(10^{12})</td>
<td>trillion</td>
</tr>
<tr>
<td>giga-</td>
<td>G</td>
<td>(10^9)</td>
<td>billion</td>
</tr>
<tr>
<td>mega-</td>
<td>M</td>
<td>(10^6)</td>
<td>million</td>
</tr>
<tr>
<td>kilo-</td>
<td>k</td>
<td>(10^3)</td>
<td>thousand</td>
</tr>
<tr>
<td>hecto-</td>
<td>h</td>
<td>(10^2)</td>
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<tr>
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<td>da</td>
<td>(10^1)</td>
<td>ten</td>
</tr>
<tr>
<td>--------</td>
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<td>pico-</td>
<td>p</td>
<td>(10^{-12})</td>
<td>trillionth</td>
</tr>
</tbody>
</table>

From km to m is three steps down, so the number of meters is 1000 or \(10^3\) times the number of kilometers.
Multiply the number given by 1000 or $10^3$.

When multiplying by powers of ten, move the decimal point to the right (→) a number of places equal to the power of ten. Since here you need 3 powers of ten, move the decimal point over 3 places to the right.

$16 \text{ km} = 16000 \text{ m}$

**Multiple Choice:**

✓ Ok. I have studied this example and am ready to get a new problem.

---

107) Problem #PRACFY6 "PRACFY6 - 60269 - Conversion: x cm to mm"

How many millimeters are in 82 centimeters?

**Algebraic Expression:**

✓ 820

**Scaffold:**

Here is a complete explanation:

The metric system is based on powers of ten. This can be visualized with the following stair-step pattern:

\[
\begin{align*}
\text{km} & = 1000 \text{ m} \\
\text{hm} & = 100 \text{ m} \\
\text{dam} & = 10 \text{ m} \\
\text{m} & = 1 \text{ m} \\
\text{dm} & = 0.1 \text{ m} \\
\text{cm} & = 0.01 \text{ m} \\
\text{mm} & = 0.001 \text{ m}
\end{align*}
\]

The number of steps you go down equals the power of 10 you multiply the original number by. The number of steps you go up equals the power of 10 you divide by.

In general the prefixes determine the power of 10 the base unit is multiplied by to get the size of the new unit. The prefixes are listed on the table below.

The power indicates the number of times to multiply by 10 where negative powers indicate division instead of multiplication.

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<tr>
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</tr>
<tr>
<td>hecto-</td>
<td>h</td>
<td>$10^{2}$</td>
<td>hundred</td>
</tr>
</tbody>
</table>
From cm to mm is one step down, so the number of mm is 10 times larger than the number of cm.

Multiply the number given by 10 or $10^1$.

When multiplying by powers of ten, move the decimal point to the right ($\rightarrow$) a number of places equal to the power of ten. Since here you need 1 power of ten, move the decimal point over 1 place to the right.

82 cm = 820 mm

Multiple Choice:
✓ Ok. I have studied this example and am ready to get a new problem.

108) Problem #PRACGGV "PRACGGV - 60286 - Conversion: x hr to min"

How many minutes are in 10 hours?

Algebraic Expression:
✓ 600

Scaffold:
Here is a complete explanation:

Typical conversion factors for measurement of time is given in the table below.

<table>
<thead>
<tr>
<th>Time</th>
<th>Notes</th>
</tr>
</thead>
<tbody>
<tr>
<td>60 s = 1 min</td>
<td></td>
</tr>
<tr>
<td>60 min = 1 hr</td>
<td></td>
</tr>
<tr>
<td>24 hr = 1 day</td>
<td>Since the earth's rotation defines a day and the second is based on an atomic process, this number is not exact. It was defined to be exact at one point in time, however.</td>
</tr>
<tr>
<td>7 days = 1 week</td>
<td>This is based on the usual average of the number of days in a month in the modern solar calendar. This is not an exact number, and the actual revolution time for the moon, the original definition of a month, is about 27.3 days.</td>
</tr>
<tr>
<td>30 days = 1 month</td>
<td>Actually, it is closer to 1 year = 365.24 days - it measures the length of time for</td>
</tr>
</tbody>
</table>
earth's revolution around the sun.

The conversion rate of interest is: $1 \text{ hr} = 60 \text{ min}$.

You are going from hours to minutes, so the number of minutes will be larger than 10 by a factor of 60.

Multiply the number given by the conversion formula.

$$\frac{\text{min}}{10 \text{ hr}} = \frac{60 \text{ min}}{1 \text{ hr}}$$

Multiple Choice:
- ✔ Ok. I have studied this example and am ready to get a new problem.

109) Problem #PRACFSA "PRACFSA - 60263 - Conversion: x Quart to Pint"

How many pints are in 32 quarts?

**Algebraic Expression:**

$64$

**Scaffold:**

Here is a complete explanation:

The typical conversion formulae used in modern times for the old English system of measurement are:

<table>
<thead>
<tr>
<th>Distance</th>
<th>Mass</th>
<th>Volume</th>
</tr>
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<tr>
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<td></td>
<td></td>
<td>2 pint = 1 quart</td>
</tr>
<tr>
<td></td>
<td></td>
<td>4 quarts = 1 gallon</td>
</tr>
</tbody>
</table>

The conversion rate of interest is $2 \text{ pint} = 1 \text{ quart}$.

You are going from quarts to pints, so the number of pints is greater than 32 by a factor of 2.

Multiply the given number by the conversion formula.

$$\frac{\text{pints}}{32 \text{ quarts}} = \frac{64 \text{ pints}}{1 \text{ quart}}$$

Multiple Choice:
- ✔ Ok. I have studied this example and am ready to get a new problem.
110) Problem #PRACGHH "PRACGHH - 60287 - Conversion: x day to hr"

How many hours are in 11 days?

**Algebraic Expression:**

264

**Scaffold:**

Here is a complete explanation:

Typical conversion factors for measurement of time is given in the table below.

<table>
<thead>
<tr>
<th>Time</th>
<th>Notes</th>
</tr>
</thead>
<tbody>
<tr>
<td>60 s = 1 min</td>
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</tr>
<tr>
<td>60 min = 1 hr</td>
<td></td>
</tr>
<tr>
<td>24 hr = 1 day</td>
<td>Since the earth's rotation defines a day and the second is based on an atomic process, this number is not exact. It was defined to be exact at one point in time, however.</td>
</tr>
<tr>
<td>7 days = 1 week</td>
<td>This is based on the usual average of the number of days in a month in the modern solar calendar. This is not an exact number, and the actual revolution time for the moon, the original definition of a month, is about 27.3 days.</td>
</tr>
<tr>
<td>30 days = 1 month</td>
<td>Actually, it is closer to 1 year = 365.24 days - it measures the length of time for earth's revolution around the sun.</td>
</tr>
<tr>
<td>365 days = 1 year</td>
<td></td>
</tr>
</tbody>
</table>

The conversion rate of interest is: 1 day = 24 hours.

You are going from days to hours, so the number of hours will be larger than 11 by a factor of 24.

Multiply the number given by the conversion formula.

\[
\frac{hr}{day} = \frac{11 \text{ days} \times 24 \text{ hr}}{1 \text{ day}} = 264 \text{ hr}
\]

**Multiple Choice:**

Ok. I have studied this example and am ready to get a new problem.

111) Problem #PRACGHU "PRACGHU - 60293 - Conversion: x day to year"

How many years are 730 days?

**Algebraic Expression:**

2

**Scaffold:**

Here is a complete explanation:
Typical conversion factors for measurement of time is given in the table below.

<table>
<thead>
<tr>
<th>Time</th>
<th>Notes</th>
</tr>
</thead>
<tbody>
<tr>
<td>60 s = 1 min</td>
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<td>This is based on the usual average of the number of days in a month in the modern solar calendar. This is not an exact number, and the actual revolution time for the moon, the original definition of a month, is about 27.3 days.</td>
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<tr>
<td>7 days = 1 week</td>
<td></td>
</tr>
<tr>
<td>30 days = 1 month</td>
<td>Actually, it is closer to 1 year = 365.24 days - it measures the length of time for earth's revolution around the sun.</td>
</tr>
<tr>
<td>365 days = 1 year</td>
<td>The conversion rate of interest is: 365 days = 1 year.</td>
</tr>
</tbody>
</table>

You are going from days to years, so the number of years will be smaller than 730 by a factor of 365.

Multiply the number given by the conversion formula:

\[
\frac{1 \text{ year}}{365 \text{ days}} = \frac{730 \text{ days}}{730 \text{ days}} = 2 \text{ years}
\]

Multiple Choice:

✓ Ok. I have studied this example and am ready to get a new problem.

112) Problem #PRACFY3 "PRACFY3 - 60269 - Conversion: x cm to mm"

How many millimeters are in 92 centimeters?

Algebraic Expression:

✓ 920

Scaffold:

Here is a complete explanation:

The metric system is based on powers of ten. This can be visualized with the following stair-step pattern:

\[
\begin{align*}
\text{km} &= 1000 \text{ m} \\
\text{hm} &= 100 \text{ m} \\
\text{dam} &= 10 \text{ m} \\
\text{m} &= 1 \text{ m} \\
\text{dm} &= 0.1 \text{ m} \\
\text{cm} &= 0.01 \text{ m}
\end{align*}
\]
mm = 0.001 m

The number of steps you go down equals the power of 10 you multiply the original number by. The number of steps you go up equals the power of 10 you divide by.

In general the prefixes determine the power of 10 the base unit is multiplied by to get the size of the new unit. The prefixes are listed on the table below.

The power indicates the number of times to multiply by 10 where negative powers indicate division instead of multiplication.

<table>
<thead>
<tr>
<th>Prefix</th>
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<tbody>
<tr>
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<td>T</td>
<td>$10^{12}$</td>
<td>trillion</td>
</tr>
<tr>
<td>giga-</td>
<td>G</td>
<td>$10^{9}$</td>
<td>billion</td>
</tr>
<tr>
<td>mega-</td>
<td>M</td>
<td>$10^{6}$</td>
<td>million</td>
</tr>
<tr>
<td>kilo-</td>
<td>k</td>
<td>$10^{3}$</td>
<td>thousand</td>
</tr>
<tr>
<td>hecto-</td>
<td>h</td>
<td>$10^{2}$</td>
<td>hundred</td>
</tr>
<tr>
<td>deka-</td>
<td>da</td>
<td>$10^{1}$</td>
<td>ten</td>
</tr>
<tr>
<td>-------</td>
<td>--------------</td>
<td>----------</td>
<td>----------------------</td>
</tr>
<tr>
<td>deci-</td>
<td>d</td>
<td>$10^{-1}$</td>
<td>tenth</td>
</tr>
<tr>
<td>centi-</td>
<td>c</td>
<td>$10^{-2}$</td>
<td>hundredth</td>
</tr>
<tr>
<td>milli-</td>
<td>m</td>
<td>$10^{-3}$</td>
<td>thousandth</td>
</tr>
<tr>
<td>micro-</td>
<td>μ</td>
<td>$10^{-6}$</td>
<td>millionth</td>
</tr>
<tr>
<td>nano-</td>
<td>n</td>
<td>$10^{-9}$</td>
<td>billionth</td>
</tr>
<tr>
<td>pico-</td>
<td>p</td>
<td>$10^{-12}$</td>
<td>trillionth</td>
</tr>
</tbody>
</table>

From cm to mm is one step down, so the number of mm is 10 times larger than the number of cm.

Multiply the number given by 10 or $10^1$.

When multiplying by powers of ten, move the decimal point to the right (→) a number of places equal to the power of ten. Since here you need 1 power of ten, move the decimal point over 1 place to the right.

$92 \text{ cm} = 920 \text{ mm}$

**Multiple Choice:**

✅ Ok. I have studied this example and am ready to get a new problem.

113) Problem #PRACGCC "PRACGCC - 60284 - Conversion: x cm^3 to L"

How many liters are 12338 cubic centimeters?

**Algebraic Expression:**
Scaffold:
   Here is a complete explanation:

Cubic centimeters:

It is worth noting that cm$^3$ is in fact a unit of volume like L and mL are. This is because a volume is three lengths multiplied together multiplied by some number with no units. 1 cm$^3$ = 1 cm * 1 cm * 1 cm, called a centimeter cubed or a cubic centimeter, is equal to the volume of a cube with sides of length 1 cm. Another abbreviation used for this unit is cc.

The important aspect here, however, is that 1 cm$^3$ = 1 mL.

Metric system:

The metric system is based on powers of ten. This can be visualized with the following stair-step pattern:

\[
\begin{align*}
kL &= 1000 \text{ L} \\
hL &= 100 \text{ L} \\
daL &= 10 \text{ L} \\
L &= 1 \text{ L} \\
dL &= 0.1 \text{ L} \\
cL &= 0.01 \text{ L} \\
mL &= 0.001 \text{ L} 
\end{align*}
\]

The number of steps you go down equals the power of 10 you multiply the original number by. The number of steps you go up equals the power of 10 you divide by.

In general the prefixes determine the power of 10 the base unit is multiplied by to get the size of the new unit. The prefixes are listed on the table below.

The power indicates the number of times to multiply by 10 where negative powers indicate division instead of multiplication.

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</tr>
<tr>
<td>deka-</td>
<td>da</td>
<td>$10^1$</td>
<td>ten</td>
</tr>
</tbody>
</table>
Solving the problem:
From mL to L is three steps up, so number of liters is 1/1000, 0.001 or $10^{-3}$ times the number of milliliters.

Since $1 \text{ mL} = 1 \text{ cm}^3$, the unit mL can be replaced by the unit cm$^3$ and the number of liters is 1/1000, 0.001 or $10^{-3}$ times the number of cubic centimeters.

Divide the number given by 1000 or multiply it by $10^{-3} = 1/10^3$.

When dividing by powers of ten, move the decimal point to the left (-) a number of places equal to the power of ten. Since here you need -3 powers of ten, move the decimal point over 3 places to the left.

$12338 \text{ cm}^3 = 12.338 \text{ L}$

Multiple Choice:
✓ Ok. I have studied this example and am ready to get a new problem.
115) Problem #PRACFUG "PRACFUG - 60267 - Conversion: x Pint to Quart"

How many quarts are 52 pints?

**Algebraic Expression:**

✓ 26

**Scaffold:**

Here is a complete explanation:

The typical conversion formulae used in modern times for the old English system of measurement are:

<table>
<thead>
<tr>
<th>Distance</th>
<th>Mass</th>
<th>Volume</th>
</tr>
</thead>
<tbody>
<tr>
<td>12 in = 1 ft</td>
<td>16 oz. = 1 lb.</td>
<td>3 tsp. = 1 tbsp.</td>
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<td>3 ft = 1 yd</td>
<td></td>
<td>2 tbsp. = 1 oz.</td>
</tr>
<tr>
<td>5280 ft. = 1 mi.</td>
<td></td>
<td>8 oz. = 1 cup</td>
</tr>
<tr>
<td></td>
<td></td>
<td>2 cup = 1 pint</td>
</tr>
<tr>
<td></td>
<td></td>
<td>2 pint = 1 quart</td>
</tr>
<tr>
<td></td>
<td></td>
<td>4 quarts = 1 gallon</td>
</tr>
</tbody>
</table>

The conversion rate of interest is \(2 \text{ pint} = 1 \text{ quart}\).

You are going from pints to quarts, so the number of quarts is smaller than 52 by a factor of 2.

Multiply the given number by the conversion formula.

\[
\frac{1 \text{ quart}}{2 \text{ pints}} \times 52 \text{ pints} = 26 \text{ quarts}
\]

**Multiple Choice:**

✓ Ok. I have studied this example and am ready to get a new problem.

116) Problem #PRACFTN "PRACFTN - 60266 - Conversion: x Cup to Pint"

How many pints are 12 cups?

**Algebraic Expression:**

✓ 6

**Scaffold:**

Here is a complete explanation:
The typical conversion formulae used in modern times for the old English system of measurement are:

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</tr>
<tr>
<td></td>
<td></td>
<td>4 quarts = 1 gallon</td>
</tr>
</tbody>
</table>

The conversion rate of interest is **2 cups = 1 pint**.

You are going from **cups** to **pints**, so the number of **pints** is smaller than **12** by a factor of **2**.

Multiply the **given number** by the **conversion formula**.

\[
\frac{1 \text{ pint}}{2 \text{ cups}} \times 12 \text{ cups} = 6 \text{ pints}
\]

**Multiple Choice:**

✔️ Ok. I have studied this example and am ready to get a new problem.

---

117) Problem #PRACFUS "PRACFUS - 60262 - Conversion: x Pint to Cup"

How many cups are in 31 pints?

**Algebraic Expression:**

✔️ 62

**Scaffold:**

**Here is a complete explanation:**

The typical conversion formulae used in modern times for the old English system of measurement are:
The conversion rate of interest is \(2 \text{ cups} = 1 \text{ pint}\).

You are going from \text{pints} to \text{cups}, so the number of \text{cups} is greater than 31 by a factor of 2.

Multiply the \text{given number} by the \text{conversion formula}.

\[
\text{cups} \\
31 \text{ pints} = 31 \text{ pints} \times \frac{2 \text{ cups}}{1 \text{ pint}} = 62 \text{ cups}
\]

\text{Multiple Choice:}

✓ Ok. I have studied this example and am ready to get a new problem.

---

118) Problem #PRACGFT "PRACGFT - 60285 - Conversion: \text{x min to s}"

How many seconds are in 11 minutes?

\text{Algebraic Expression:}

✓ 660

\text{Scaffold:}

\text{Here is a complete explanation:}

Typical conversion factors for measurement of time is given in the table below.

<table>
<thead>
<tr>
<th>Time</th>
<th>Notes</th>
</tr>
</thead>
<tbody>
<tr>
<td>60 s = 1 min</td>
<td></td>
</tr>
<tr>
<td>60 min = 1 hr</td>
<td></td>
</tr>
<tr>
<td>24 hr = 1 day</td>
<td>Since the earth's rotation defines a day and the second is based on an atomic process, this number is not exact. It was defined to be exact at one point in time, however.</td>
</tr>
<tr>
<td>7 days = 1 week</td>
<td>This is based on the usual average of the number of days in a month in the modern solar calendar. This is not an exact number, and the actual revolution time for the moon, the original definition of a month, is about 27.3 days.</td>
</tr>
<tr>
<td>30 days = 1 month</td>
<td>Actually, it is closer to 1 year = 365.24 days - it measures the length of time for earth's revolution around the sun.</td>
</tr>
<tr>
<td>365 days = 1 year</td>
<td></td>
</tr>
</tbody>
</table>

The conversion rate of interest is: \(1 \text{ min} = 60 \text{ s}\).

You are going from \text{minutes} to \text{seconds}, so the number of \text{seconds} will be larger than 11 by a factor of 60.

Multiply the \text{number given} by the \text{conversion formula}.

\[
\text{s} \\
11 \text{ min} = 11 \text{ min} \times \frac{60 \text{ s}}{1 \text{ min}} = 660 \text{ s}
\]
Multiple Choice:
✔ Ok. I have studied this example and am ready to get a new problem.

119) Problem #PRACFSJ "PRACFSJ - 60263 - Conversion: x Quart to Pint"
How many pints are in 4 quarts?
Algebraic Expression:
✔ 8

Scaffold:
Here is a complete explanation:

The typical conversion formulae used in modern times for the old English system of measurement are:

<table>
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<td>2 pint = 1 quart</td>
</tr>
<tr>
<td></td>
<td></td>
<td>4 quarts = 1 gallon</td>
</tr>
</tbody>
</table>

The conversion rate of interest is 2 pint = 1 quart.

You are going from quarts to pints, so the number of pints is greater than 4 by a factor of 2.

Multiply the given number by the conversion formula.

\[
\text{pints} \\
4 \text{ quarts} = 4 \text{ quarts} \times \frac{2 \text{ pints}}{1 \text{ quart}} = 8 \text{ pints}
\]

Multiple Choice:
✔ Ok. I have studied this example and am ready to get a new problem.

120) Problem #PRACFM8 "PRACFM8 - 60256 - Conversion: x In to Ft"
How many feet is 132 inches?
Algebraic Expression:
✔ 11

Scaffold:
Here is a complete explanation:
The typical conversion formulae used in modern times for the old English system of measurement are:

<table>
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<tr>
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<td></td>
<td></td>
<td>4 quarts = 1 gallon</td>
</tr>
</tbody>
</table>

The conversion rate of interest is: 12 in. = 1 ft.

You are going from inches to feet, so the number of feet will be smaller than 132 by a factor of 12.

Divide the number given by the conversion formula.

\[
\frac{1 \text{ ft}}{132 \text{ in}} = \frac{132 \text{ in} \times 1 \text{ ft}}{12 \text{ in}} = 11 \text{ ft}
\]

Multiple Choice:

✓ Ok. I have studied this example and am ready to get a new problem.

121) Problem #PRACFMZ "PRACFMZ - 62169 - Conversion: x Ft to Mi"

How many miles are 5280 ft?

You may use the conversion formula 1 mi = 5280 ft

Algebraic Expression:

✓ 1

Scaffold:

Here is a complete explanation:

Use the given conversion formula: 5280 ft. = 1 mi.

Since you are going from feet to miles, the number of miles is smaller than 5280 by a factor of 5280.

Divide the given number by the conversion formula.

\[
\frac{1 \text{ mi}}{5280 \text{ ft}} = \frac{5280 \text{ ft}}{5280 \text{ ft}} = 1 \text{ mi}
\]
Ok. I have studied this example and am ready to get a new problem.

How many grams are in 4 kilograms?

**Algebraic Expression:**

- 4000

**Scaffold:**

**Here is a complete explanation:**

The metric system is based on powers of ten. This can be visualized with the following stair-step pattern:

\[
\begin{align*}
\text{kg} &= 1000 \text{ g} \\
\text{hg} &= 100 \text{ g} \\
\text{dag} &= 10 \text{ g} \\
\text{g} &= 1 \text{ g} \\
\text{dg} &= 0.1 \text{ g} \\
\text{cg} &= 0.01 \text{ g} \\
\text{mg} &= 0.001 \text{ g}
\end{align*}
\]

The number of steps you go down equals the power of 10 you multiply the original number by. The number of steps you go up equals the power of 10 you divide by.

In general the prefixes determine the power of 10 the base unit is multiplied by to get the size of the new unit. The prefixes are listed on the table below.

The power indicates the number of times to multiply by 10 where negative powers indicate division instead of multiplication.

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</table>
From kg to g is three steps down, so the number of grams is 1000 or $10^3$ times the number of kilograms.

Multiply the number given by 1000 or $10^3$.

When multiplying by powers of ten, move the decimal point to the right ($\rightarrow$) a number of places equal to the power of ten. Since here you need 3 powers of ten, move the decimal point over 3 places to the right.

$$4 \, \text{kg} = 4000 \, \text{g}$$

**Multiple Choice:**

✓ Ok. I have studied this example and am ready to get a new problem.

---

123) Problem #PRACFM4 "PRACFM4 - 60256 - Conversion: x In to Ft"

How many feet is 114 inches?

**Algebraic Expression:**

✓ $9.5$

**Scaffold:**

Here is a complete explanation:

The typical conversion formulae used in modern times for the old English system of measurement are:

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<th>Volume</th>
</tr>
</thead>
<tbody>
<tr>
<td>12 in = 1 ft</td>
<td>16 oz. = 1 lb.</td>
<td>3 tsp. = 1 tbsp.</td>
</tr>
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<td>3 ft = 1 yd</td>
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</tr>
<tr>
<td></td>
<td></td>
<td>2 cup = 1 pint</td>
</tr>
<tr>
<td></td>
<td></td>
<td>2 pint = 1 quart</td>
</tr>
<tr>
<td></td>
<td></td>
<td>4 quarts = 1 gallon</td>
</tr>
</tbody>
</table>

The conversion rate of interest is: 12 in. = 1 ft.

You are going from inches to feet, so the number of feet will be smaller than 114 by a factor of 12.
Divide the number given by the conversion formula.

\[
\frac{1 \text{ ft}}{114 \text{ in}} = 114 \text{ in} \times \frac{1}{12 \text{ in}} = 9.5 \text{ ft}
\]

**Multiple Choice:**

✓ Ok. I have studied this example and am ready to get a new problem.

**Hints:**

The typical conversion formulae used in modern times for the old English system of measurement are:

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</table>
The conversion rate of interest is: 12 in. = 1 ft.

You are going from inches to feet, so the number of feet will be smaller than 114 by a factor of 12.

\[
114 \text{ in} = 114 \text{ in} \times \frac{1 \text{ ft}}{12 \text{ in}} = 9.5 \text{ ft}
\]
How many pints are in 15 quarts?

**Algebraic Expression:**

\[ 15 \text{ quarts} \times 2 = 30 \text{ pints} \]

**Scaffold:**

Here is a complete explanation:

The typical conversion formulae used in modern times for the old English system of measurement are:

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<td></td>
<td></td>
<td>4 quarts = 1 gallon</td>
</tr>
</tbody>
</table>

The conversion rate of interest is 2 pint = 1 quart.

You are going from quarts to pints, so the number of pints is greater than 15 by a factor of 2.

Multiply the given number by the conversion formula.

\[
\frac{15 \text{ quarts}}{1 \text{ quart}} \times 2 = 30 \text{ pints}
\]

**Multiple Choice:**

✔ Ok. I have studied this example and am ready to get a new problem.

---

125) Problem #PRACF22 "PRACF22 - 60278 - Conversion: x mm to cm"

How many centimeters are in 43 millimeters?

**Algebraic Expression:**

\[ 43 \text{ mm} \times \frac{1 \text{ cm}}{10 \text{ mm}} = 4.3 \text{ cm} \]

**Scaffold:**

Here is a complete explanation:

The metric system is based on powers of ten. This can be visualized with the following stair-step pattern:

\[
\begin{align*}
\text{km} &= 1000 \text{ m} \\
\text{hm} &= 100 \text{ m} \\
\text{dam} &= 10 \text{ m}
\end{align*}
\]
The number of steps you go down equals the power of 10 you multiply the original number by. The number of steps you go up equals the power of 10 you divide by.

In general the prefixes determine the power of 10 the base unit is multiplied by to get the size of the new unit. The prefixes are listed on the table below.

The power indicates the number of times to multiply by 10 where negative powers indicate division instead of multiplication.

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</tr>
<tr>
<td>deka-</td>
<td>da</td>
<td>$10^1$</td>
<td>ten</td>
</tr>
<tr>
<td>-------</td>
<td>--------------</td>
<td>----------</td>
<td>----------------------</td>
</tr>
<tr>
<td></td>
<td></td>
<td>$10^0$</td>
<td>one</td>
</tr>
<tr>
<td>deci-</td>
<td>d</td>
<td>$10^{-1}$</td>
<td>tenth</td>
</tr>
<tr>
<td>centi-</td>
<td>c</td>
<td>$10^{-2}$</td>
<td>hundredth</td>
</tr>
<tr>
<td>milli-</td>
<td>m</td>
<td>$10^{-3}$</td>
<td>thousandth</td>
</tr>
<tr>
<td>micro-</td>
<td>μ</td>
<td>$10^{-6}$</td>
<td>millionth</td>
</tr>
<tr>
<td>nano-</td>
<td>n</td>
<td>$10^{-9}$</td>
<td>billionth</td>
</tr>
<tr>
<td>pico-</td>
<td>p</td>
<td>$10^{-12}$</td>
<td>trillionth</td>
</tr>
</tbody>
</table>

From mm to cm is one step up, so the number of cm is $1/10$, 0.1 or $10^{-1}$ times the number of mm.

Divide the number given by 10 or multiply it by $10^{-1} = 1/10$.

When dividing by powers of ten, move the decimal point to the left (←) a number of places equal to the power of ten. Since here you need -1 power of ten, move the decimal point over 1 place to the left.

43 mm = 4.3 cm

Multiple Choice:

✔ Ok. I have studied this example and am ready to get a new problem.
How many feet is 156 inches?

**Algebraic Expression:**

13

**Scaffold:**

Here is a complete explanation:

The typical conversion formulae used in modern times for the old English system of measurement are:

<table>
<thead>
<tr>
<th>Distance</th>
<th>Mass</th>
<th>Volume</th>
</tr>
</thead>
<tbody>
<tr>
<td>12 in = 1 ft</td>
<td>16 oz. = 1 lb.</td>
<td>3 tsp. = 1 tbsp.</td>
</tr>
<tr>
<td>3 ft = 1 yd</td>
<td>2 tbsp. = 1 oz.</td>
<td>8 oz. = 1 cup</td>
</tr>
<tr>
<td>5280 ft. = 1 mi.</td>
<td>2 pint = 1 quart</td>
<td>4 quarts = 1 gallon</td>
</tr>
</tbody>
</table>

The conversion rate of interest is: 12 in. = 1 ft.

You are going from inches to feet, so the number of feet will be smaller than 156 by a factor of 12.

Divide the number given by the conversion formula.

\[
\frac{1 \text{ ft}}{156 \text{ in} \times \frac{1 \text{ ft}}{12 \text{ in}}} = 13 \text{ ft}
\]

**Multiple Choice:**

✅ Ok. I have studied this example and am ready to get a new problem.