Summer Solutions.

Minutes a Day–Mastery for a Lifetime!

Level 7

Problem Solving

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Vocabulary	
acute angle	an angle measuring less than 90°
circumference	the distance around the outside of a circle
composite	a number with more than 2 factors Example: 10 has factors of 1, 2, 5, and 10. Ten is a composite number.
congruent	figures with the same shape and the same size
equation	a math "sentence" that uses numbers, math symbols, and an "=" sign
equilateral	a triangle in which all 3 sides are of equal length
expression	a mathematical phrase formed from numbers, variables, and operation symbols
factors	numbers or variables multiplied together to get a product Example: The product of 5 and 2 is 7.
greatest common factor (GCF)	the highest factor that 2 numbers have in common Example: The factors of 6 are 1, 2, **3**, and 6. The factors of 9 are 1, **3**, and 9. The GCF of 6 and 9 is 3.
integer	a whole number including positive, negative, and zero
isosceles	a triangle that has 2 sides of equal length and 2 angles with the same measure
improper fraction	a fraction in which the numerator is larger than the denominator Example: $\frac{9}{4}$
least common multiple (LCM)	the smallest multiple that 2 numbers have in common Example: Multiples of 3 are 3, 6, 9, **12**, 15... Multiples of 4 are 4, 8, **12**, 16... The LCM of 3 and 4 is 12.
mean	the average of a group of numbers; found by finding the sum of a group of numbers, then dividing the sum by the number of members in the group Example: The average of 12, 18, 26, 17, and 22 is 19. $\frac{12 + 18 + 26 + 17 + 22}{5} = \frac{95}{5} = 19$
median	the middle value in a group of numbers. The median is found by listing the numbers in order from least to greatest, and finding the one that is in the middle of the list. If there is an even number of members in the group, the median is the average of the two middle numbers. Example: The median of 14, 17, 24, 11, and 26 is **17**. 11, 14, **17**, 24, 26
mixed number	the sum of a whole number and a fraction. Example: $5\frac{1}{4}$
mode	the number that occurs most often in a group of numbers. The mode is found by counting how many times each number occurs in the list. The number that occurs more than any other is the mode. Some groups of numbers have more than one mode. Example: The mode of 77, 93, 85, 93, 77, 81, 93, and 71 is 93. (93 occurs more than the others.)

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Vocabulary	
multiples	numbers that can be evenly divided Example: 5, 10, 15, and 20 are multiples of 5.
obtuse angle	an angle measuring more than 90°
outcome	a possible result of an event
percent (%)	the ratio of any number to 100. Example: 14% means 14 out of 100, or $\frac{14}{100}$.
prime number	a number with exactly 2 factors (the number itself and 1) Example: 7 has factors of 1 and 7. Seven is a prime number.
probability	the likelihood of an event occurring
proportion	a statement that two ratios (or fractions) are equal, as in $\frac{1}{2} = \frac{3}{6}$
range	the difference between the greatest and the least in a set of numbers
ratio	a comparison of two numbers by division; as in $\frac{2}{5}$, 2:5, or 2 to 5.
reflection	a tranformation that makes a mirror image of a figure on the opposite side of a line; a flip
reciprocal	a fraction in which the numerator and denominator are interchanged; the product of a fraction and its reciprocal is always 1. Example: The reciprocal of $\frac{3}{5}$ is $\frac{5}{3}$. $\frac{3}{5} \times \frac{5}{3} = \frac{15}{15} = 1$
repeating decimal	a decimal which has a number or a series of numbers continuing on and on; it is shown with a bar over the repeating digits Example: 2.3333... → $2.\overline{3}$, 4.151515... → $4.\overline{15}$, 7.1255125512 55... → $7.\overline{1255}$, etc.
right angle	an angle measuring exactly 90°
rotation	a turn of a figure on a point
scalene	a triangle that has three unequal sides
similar	figures with the same shape but different sizes
straight angle	an angle measuring exactly 180°
transformation	a change in the position of a geometric figure or shape
translation	the movement of every point in a figure the same distance in the same direction; a slide
variable	a symbol or letter that can stand for a number in an expression or equation
volume	the number of cubic units needed to fill a solid

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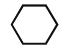
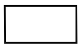
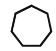
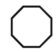
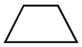
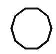
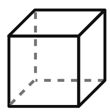
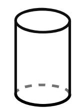
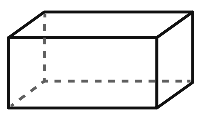
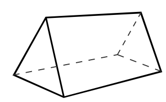
2-Dimensional Shapes

Number of Sides	Name	Number of Sides	Name
3 	triangle	6 	hexagon
4 	quadrilateral	7 	heptagon
4 	parallelogram	8 	octagon
4 	trapezoid	9 	nonagon
5 	pentagon	10 	decagon

3-Dimensional Shapes

cube a shape with six square faces 	**cylinder** a shape with two circular bases connected by a smooth, round face 
rectangular prism a six-sided shape with rectangular faces 	**triangular prism** a shape with two triangular bases and rectangular sides 

Measurement — Relationships

Volume

8 ounces = 1 cup

3 teaspoons = 1 tablespoon

2 cups = 1 pint

2 pints = 1 quart

4 quarts = 1 gallon

Distance

12 inches = 1 foot

36 inches = 1 yard

1,760 yards = 1 mile

5,280 feet = 1 mile

100 centimeters = 1 meter

1,000 millimeters = 1 meter

Weight

16 ounces = 1 pound

2,000 pounds = 1 ton

Time

10 years = 1 decade

100 years = 1 century

Temperature

0° Celsius → freezing point of water

100° Celsius → boiling point of water

32° Fahrenheit → freezing point of water

212° Fahrenheit → boiling point of water

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Expressions

An **expression** is a number, a variable, or any combination of these, along with operation signs (+, –, ×, ÷) and grouping symbols. An expression never includes an equal sign.
Five examples of expressions are 5, x, $(x+5)$, $(3x+5)$, and $(3x^2+5)$.

When evaluating a numerical expression containing multiple operations, use a set of rules called the Order of Operations. The **Order of Operations** determines which operations, and in which order, they should be performed. (Which operation should be done first, second, etc.)
The Order of Operations is as follows:

1. **P**arentheses
2. **E**xponents
3. **M**ultiplication/**D**ivision (left to right in the order that they occur)
4. **A**ddition/**S**ubtraction (left to right in the order that they occur)

If parentheses are enclosed within other parentheses, work from the inside out. To remember the order, use the mnemonic device "**P**lease **E**xcuse **M**y **D**ear **A**unt **S**ally."

The following examples demonstrate how to use the Order of Operations.

Example: $2 + 6 \cdot 5$

To evaluate this expression, work through the steps using the Order of Operations.

1. Since there are no parentheses or exponents in the expression, skip steps 1 and 2.
2. According to step 3, do multiplication and division. → $6 \cdot 5 = 30$
3. Next, step 4 says to do addition and subtraction. → $2 + 30 = 32$

The answer is 32.

Example: $42 \div 6 \cdot 3 + 4 - 16 \div 2$

$42 \div 6 \cdot 3 + 4 - 16 \div 2$ ← ❶
$7 \cdot 3 + 4 - 16 \div 2$
$21 + 4 - 16 \div 2$
$21 + 4 - 8$ ← ❷
$25 - 8$
17 ✓

1. Do multiplication and division first (in the order they occur).
2. Do addition and subtraction next (in the order they occur).

Example: $5(2 + 4) + 15 \div (9 - 6)$

$5(2 + 4) + 15 \div (9 - 6)$ ← ❶
$5(6) + 15 \div (3)$ ← ❷
$30 + 5$ ← ❸
35 ✓

1. Do operations inside of parentheses first.
2. Do multiplication and division first (in the order they occur).
3. Do addition and subtraction next (in the order they occur).

Example: $4[3 + 2(7 + 5) - 7]$

$4[3 + 2(7 + 5) - 7]$ ← ❶
$4[3 + 2(12) - 7]$ ← ❷
$4[3 + 24 - 7]$
$4[27 - 7]$
$4[20]$
80 ✓

1. Brackets are treated as parentheses. Start from the innermost parentheses first.
2. Then work inside the brackets.

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Expressions (continued)

Often a relationship is described using words. In order to work with the relationship, first **translate it into an algebraic expression or equation**. In most cases, word clues will be helpful. Some examples of phrases and their corresponding algebraic expressions or equations are written below.

Phrase	Algebraic Expression
Ten more than a number	$x + 10$
The sum of a number and five	$x + 5$
A number increased by seven	$x + 7$
Six less than a number	$x - 6$
A number decreased by nine	$x - 9$
The difference between a number and four	$x - 4$
The difference between four and a number	$4 - x$
Five times a number	$5x$
Eight times a number, increased by one	$8x + 1$
The product of a number and six is twelve.	$6x = 12$
The quotient of a number and 10	$\frac{x}{10}$
The quotient of a number and two, decreased by five	$\frac{x}{2} - 5$

In most problems, the word "is" indicates an equal sign. When working with fractions and percents, the word "of" generally means multiply. Look at the example below.

One half <u>of</u> a number <u>is</u> fifteen.

Think of it as "one half <u>times</u> a number <u>equals</u> fifteen."

When written as an algebraic equation, it is $\frac{1}{2}x = 15$.

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Factors and Multiples

The **Greatest Common Factor (GCF)** is the largest factor that 2 numbers have in common.

Example: Find the Greatest Common Factor of 32 and 40.

The factors of 32 are 1, 2, 4, (8), 16, 32.

The factors of 40 are 1, 2, 4, 5, (8), 10, 20, 40.

The GCF of 32 and 40 is 8.

1. First list the factors of each number.
2. Find the largest number that is in both lists.

Fractions

When **adding fractions that have different denominators** first change the fractions so they have a common denominator.
Finding the **Least Common Denominator (LCD)**:
The LCD of the fractions is the same as the Least Common Multiple of the denominators. Sometimes, the LCD will be the product of the denominators.

Example: Find the sum of $\frac{3}{8}$ and $\frac{1}{12}$.

$$\begin{array}{r|l} 2 & 8,\ 12 \\ 2 & 4,\ 6 \\ 2 & 2,\ 3 \\ 3 & 1,\ 3 \\ & 1,\ 1 \end{array}$$

$2 \times 2 \times 2 \times 3 = 24$
The LCM is 24.

$$\frac{3}{8} = \frac{9}{24}$$
$$+\ \frac{1}{12} = \frac{2}{24}$$
$$\frac{11}{24}$$

1. First, find the LCM of 8 and 12.
2. The LCM of 8 and 12 is 24. This is also the LCD of these two fractions.
3. Find an equivalent fraction for each that has a denominator of 24.
4. When they have a common denominator, the fractions can be added.

Add $\frac{1}{4}$ and $\frac{1}{5}$.

$4 \times 5 = 20$
The LCM is 20.

$$\frac{1}{4} = \frac{5}{20}$$
$$+\ \frac{1}{5} = \frac{4}{20}$$
$$\frac{9}{20}$$

To **multiply fractions**, simply multiply the numerators together to get the numerator of the product. Then multiply the denominators together to get the denominator of the product. Make sure the answer is in simplest form.

Examples: Multiply $\frac{3}{5}$ by $\frac{2}{3}$.

$$\frac{3}{5} \times \frac{2}{3} = \frac{6}{15} = \frac{2}{5}$$

1. Multiply the numerators.
2. Multiply the denominators.
3. Simplify the answer.

Multiply $\frac{5}{8}$ by $\frac{4}{5}$.

$$\frac{5}{8} \times \frac{4}{5} = \frac{20}{40} = \frac{1}{2}$$

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Fractions (continued)

Another way to multiply fractions is to use the canceling out method. Look at the examples again.

$$\frac{\overset{1}{\cancel{3}}}{5} \times \frac{2}{\underset{1}{\cancel{3}}} =$$

The 3s have a common factor of 3. Divide both of them by 3.

Since, 3 ÷ 3 = 1, cross out the 3s and write 1 in its place.

Now multiply the fractions. In the numerator, 1 × 2 = 2. In the denominator, 5 × 1 = 5.

The answer is $\frac{2}{5}$.

1. Are there any numbers in the numerator and the denominator that have common factors?
2. If so, cross out the numbers, divide both by that factor, and write the quotient.
3. Then, multiply the fractions as described above, using the quotients instead of the original numbers.

Remember: Cancel up and down or diagonally, but NEVER sideways.

$$\frac{\overset{1}{\cancel{5}}}{8} \times \frac{4}{\underset{1}{\cancel{5}}} =$$

$$\frac{\overset{1}{\cancel{5}}}{\underset{2}{\cancel{8}}} \times \frac{\overset{1}{\cancel{4}}}{\underset{1}{\cancel{5}}} =$$

As in the other example, the 5s can be canceled. But here, the 4 and the 8 also have a common factor of 4.

8 ÷ 4 = 2 and 4 ÷ 4 = 1.

After canceling both of these, multiply the fractions.

The answer is $\frac{1}{2}$.

Ratio and Proportion

A **ratio** is used to compare two numbers. There are three ways to write a ratio comparing 5 and 7.

1. Word form 5 to 7
2. Fraction form $\frac{5}{7}$
3. Ratio form 5:7

You must make sure that all ratios are written in simplest form. (Just like fractions!)

A **proportion** is an equation that shows two equal ratios. There are two ways to solve a proportion when a number is missing.

1. One way to solve a proportion is already familiar to you. You can use the equivalent fraction method.

$$\frac{5}{8} = \frac{n}{64} \quad (\times 8 \text{ on top and bottom})$$

$n = 40$

So, $\frac{5}{8} = \frac{40}{64}$

2. Another way to solve a proportion is by using cross-products.

<u>To use Cross-Products:</u>
1. Multiply downward on each diagonal.
2. Make the product of each diagonal equal to each other.
3. Solve for the missing variable.

$$\frac{14}{20} = \frac{21}{n}$$

$$21 \times 20 = n \times 14$$

$$420 = 14n$$

$$\frac{420}{14} = \frac{\cancel{14}n}{\cancel{14}}$$

$$30 = n$$

So, $\frac{14}{20} = \frac{21}{30}$

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Decimals

When **multiplying a decimal by a whole number**, the process is similar to multiplying whole numbers.

1. Line up the numbers on the right.
2. Multiply. Ignore the decimal point.
3. Place the decimal point in the product. (The total number of decimal places in the product must equal the total number of decimal places in the factors.)

Examples: Multiply 3.42 by 4.

$$\begin{array}{r} 3.42 \\ \times \quad 4 \\ \hline 13.68 \end{array}$$

3.42 → 2 decimal places
× 4 → 0 decimal places
13.68 → Place decimal point so there are 2 decimal places.

Find the product of 2.3 and 2.

$$\begin{array}{r} 2.3 \\ \times \quad 2 \\ \hline 4.6 \end{array}$$

2.3 → 1 decimal place
× 2 → 0 decimal places
4.6 → Place decimal point so there is 1 decimal place.

The process for **multiplying two decimal numbers** is similar to the example above.

Examples: Multiply 0.4 by 0.6.

$$\begin{array}{r} 0.4 \\ \times \ 0.6 \\ \hline 0.24 \end{array}$$

0.4 → 1 decimal place
× 0.6 → 1 decimal place
0.24 → Place decimal point so there are 2 decimal places.

Find the product of 2.67 and 0.3.

$$\begin{array}{r} 2.67 \\ \times \ 0.3 \\ \hline 0.801 \end{array}$$

2.67 → 2 decimal places
× 0.3 → 1 decimal place
0.801 → Place decimal point so there are 3 decimal places.

Sometimes it is necessary to add zeros in the product as placeholders in order to have the correct number of decimal places.

Example: Multiply 0.03 by 0.4.

$$\begin{array}{r} 0.03 \\ \times \ 0.4 \\ \hline 0.012 \end{array}$$

0.03 → 2 decimal places
× 0.4 → 1 decimal place
0.012 → Place decimal point so there are 3 decimal places.

It is necessary to add a zero in front of the 12 so there are 3 decimal places in the product.

The process for **dividing a decimal number by a whole number** is similar to dividing whole numbers.

1. Set up the problem for long division.
2. Place the decimal point in the quotient directly above the decimal point in the dividend.
3. Divide. Add zeros as placeholders if necessary. (See examples below.)

Examples: Divide 6.4 by 8.

$$\begin{array}{r} 0.8 \\ 8\overline{)\,6.4} \\ -\,6\,4 \\ \hline 0 \end{array}$$

Find the quotient of 20.7 and 3.

$$\begin{array}{r} 6.9 \\ 3\overline{)\,20.7} \\ -\,18 \\ \hline 27 \\ -\,27 \\ \hline 0 \end{array}$$

Examples: Divide 4.5 by 6.

$$\begin{array}{r} 0.75 \\ 6\overline{)\,4.50} \\ -\,4\,2\downarrow \\ \hline 30 \\ -\,30 \\ \hline 0 \end{array}$$

Find the quotient of 3.5 and 4.

$$\begin{array}{r} 0.875 \\ 4\overline{)\,3.500} \\ -\,3\,2\downarrow\downarrow \\ \hline 30\downarrow \\ -\,28\downarrow \\ \hline 20 \\ -\,20 \\ \hline 0 \end{array}$$

← Add zero(s). →

← Bring zero down. Keep dividing. →

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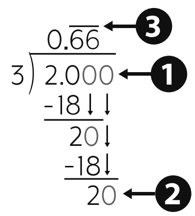
Decimals (continued)

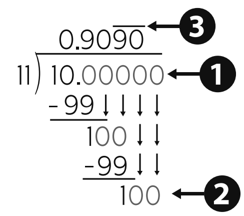
Fractions can be renamed as decimals by dividing. To rename a fraction as a decimal, divide the numerator by the denominator. The quotient resulting from this division may be a **repeating decimal**. A repeating decimal is a decimal fraction in which one or more digits repeat indefinitely.

Examples: Divide 2 by 3.



1. Add zeroes as needed.
2. This pattern begins to repeat itself (with the same remainder).
3. To write the final answer, put a bar in the quotient over the digits that repeat.

Divide 10 by 11.



Percent

To **change a fraction to a percent and/or decimal**, first find an equivalent fraction with 100 in the denominator. The equivalent fraction can easily be written as a decimal. To change the decimal to a percent, move the decimal point 2 places to the right and add a % sign.

Example: Change $\frac{2}{5}$ to a percent and then to a decimal.

1. Find an equivalent fraction with 100 in the denominator.

F	D	P
$\frac{2}{5}$		

$\frac{2}{5} = \frac{?}{100}$ (× 20) ? = 40

2. From the equivalent fraction above, the decimal can easily be found. Say the name of the fraction: "forty hundredths." Write this as a decimal: 0.40.

F	D	P
$\frac{2}{5} = \frac{40}{100}$	0.40	

$\frac{40}{100} = 0.40$

3. To change 0.40 to a percent, move the decimal two places to the right. Add a % sign.

F	D	P
$\frac{2}{5} = \frac{40}{100}$	0.40	40%

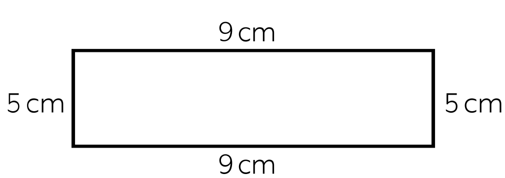
0.40 = 40%

Geometry

The **perimeter** of a polygon is the distance around the outside of the figure. To find the perimeter, add the lengths of the sides of the figure. Be sure to label the answer.

Perimeter = sum of the sides

Example: Find the perimeter of the rectangle below.



Perimeter = 5 cm + 9 cm + 5 cm + 9 cm

Perimeter = 28 cm

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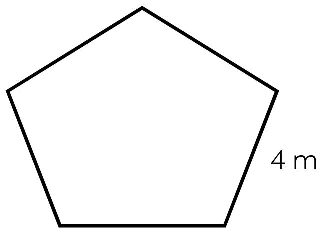
Geometry (continued)

Perimeter is the sum of the length of the sides of a shape.

Example: Find the perimeter of the regular pentagon below.



A pentagon has 5 sides. Each of the sides is 4 m long.

P = 4 m + 4 m + 4 m + 4 m + 4 m

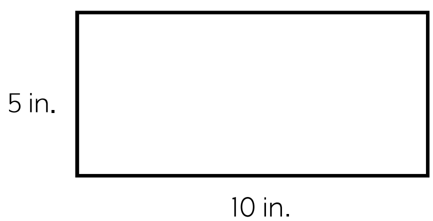
P = 5 × 4 m

P = 20 m

Area is the size of a surface. To find the area of a rectangle or a square, multiply the length by the width. The area is expressed in square units (ft^2, $in.^2$, etc.).

Area of rectangle = length × width or $A = l \times w$

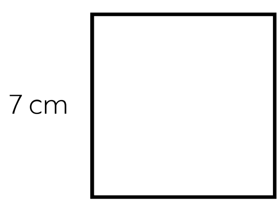
Examples: Find the area of the figures below.



Area = length × width

A = 10 in. × 5 in.

A = 50 $in.^2$ ➔ Say "50 square inches."



A square has 4 equal sides, so its length and its width are the same.

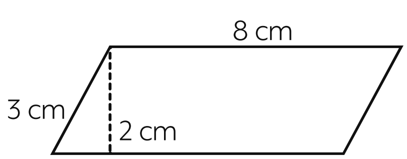
A = 7 cm × 7 cm

A = 49 cm^2

Finding the **area of a parallelogram** is similar to finding the area of any other quadrilateral. The area of the figure is equal to the length of its base multiplied by the height of the figure.

Area of parallelogram = base × height or $A = b \times h$

Example: Find the area of the parallelogram below.



1. Find the length of the base. (8 cm)
2. Find the height. (It is 2 cm. The height is always straight up and down, never slanted.)
3. Multiply to find the area. (16 cm^2)

So, A = 8 cm × 2 cm = 16 cm^2.

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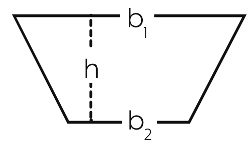
Geometry (continued)

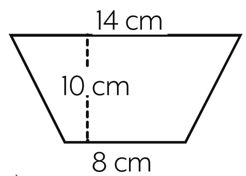
Finding the **area of a trapezoid** is a little different than other quadrilaterals. Trapezoids have 2 bases of unequal length. To find the area, first find the average of the lengths of the 2 bases. Then, multiply that average by the height.

Area of trapezoid = $\frac{\text{base}_1 + \text{base}_2}{2} \times \text{height}$ or $A = (\frac{b_1 + b_2}{2})h$



The bases are labeled b_1 and b_2. The height, h, is the distance between the bases.

Example: Find the area of the trapezoid.



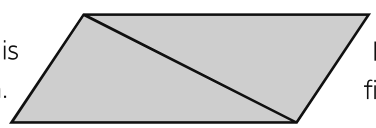
1. Add the lengths of the two bases. (22 cm)
2. Divide the sum by 2. (11 cm)
3. Multiply that result by the height to find the area. (110 cm^2)

$\frac{14\text{ cm}+8\text{ cm}}{2} = \frac{22\text{ cm}}{2} = 11\text{ cm}$

$11\text{ cm} \times 10\text{ cm} = 110\text{ cm}^2 = \text{Area}$

To find the **area of a triangle**, it is helpful to recognize that any triangle is exactly half of a parallelogram.

The whole figure is a parallelogram.

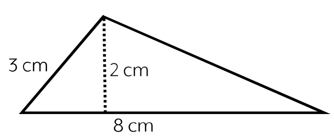


Half of the whole figure is a triangle.

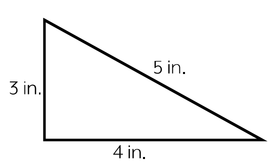
So, the triangle's area is equal to half of the product of the base and the height.

Area of triangle = $\frac{1}{2}$(base × height) or $A = \frac{1}{2}b \times h$

Examples: Find the area of the triangles below.



1. Find the length of the base. (8 cm)
2. Find the height. Measure height straight up and down, never slanted. (2 cm)
3. Multiply them together and divide by 2 to find the area.
4. $A = 8\text{ cm} \times 2\text{ cm} \times \frac{1}{2} = 8\text{ cm}^2$

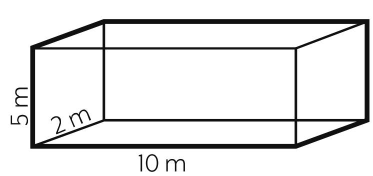


The base of this triangle is 4 inches long. Its height is 3 inches. (Remember the height is always straight up and down!)

$A = 4\text{ in.} \times 3\text{ in.} \times \frac{1}{2} = 6\text{ in.}^2$

To find the **volume of a solid figure**, multiply the area of the base times the height. (Remember, volume is measured in cubic units.)

Volume of rectangular prism = area of base × height or $V = l \times w \times h$



The volume of this rectangular prism is found by multiplying the area of its base (10 m × 2 m = 20 m^2) by the height (5 m).

$20\text{ m}^2 \times 5\text{ m} = 100\text{ m}^3$

Help Pages

Compound Probability

The **probability of two or more independent events** occurring together can be determined by multiplying the individual probabilities together. The product is called the compound probability.

Probability of A and B = (Probability of A) × (Probability of B)

or P(A and B) = P(A) × P(B)

Example: What is the probability of rolling a 6 and then a 2 on two rolls of a die? [P(6 and 2)]

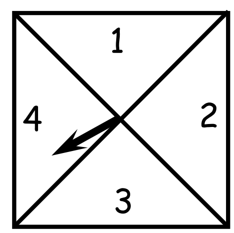
A) First, find the probability of rolling a 6. [P(6)] Since there are 6 numbers on a die and only one of them is a 6, the probability of getting a 6 is $\frac{1}{6}$.

B) Then find the probability of rolling a 2. [P(2)] Since there are 6 numbers on a die and only one of them is a 2, the probability of getting a 2 is $\frac{1}{6}$.

So, P(6 and 2) = P(6) × P(2) = $\frac{1}{6} \times \frac{1}{6} = \frac{1}{36}$.

There is a 1 in 36 chance of getting a 6 and then a 2 on two rolls of a die.

Example: What is the probability of getting a 4 and then a number greater than 2 on two spins of this spinner? [P(4 and greater than 2)]



A) First, find the probability of getting a 4. [P(4)] Since there are four numbers on the spinner and only one of them is a 4, the probability of getting a 4 is $\frac{1}{4}$.

B) Then, find the probability of getting a number greater than 2 [P(greater than 2)]. Since there are four numbers on the spinner and two of them are greater than 2, the probability of getting a number greater than 2 is $\frac{2}{4}$.

So, P(4 and greater than 2) = P(4) × P(greater than 2) = $\frac{1}{4} \times \frac{2}{4} = \frac{2}{16} = \frac{1}{8}$.

There is a 1 to 8 chance of getting a 4 and then a number greater than 2 on two spins of a spinner.

Example: On three flips of a coin, what is the probability of getting heads, tails, heads? [P(H,T,H)]

A) First, find the probability of getting heads. [P(H)] Since there are only 2 sides on a coin and only one of them is heads, the probability of getting heads is $\frac{1}{2}$.

B) Then, find the probability of getting tails. [P(T)] Again, there are only 2 sides on a coin and only one of them is tails. The probability of getting tails is also $\frac{1}{2}$.

So, P(H,T,H) = P(H) × P(T) × P(H) = $\frac{1}{2} \times \frac{1}{2} \times \frac{1}{2} = \frac{1}{8}$.

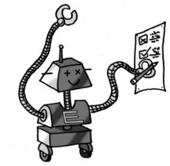
There is a 1 to 8 chance of getting heads, tails, and then heads on 3 flips of a coin.

Help Pages

Problem Solving Strategies

Guess and Check

Some math problems ask you to think like a detective. Detectives follow clues to solve a "case." Guess and check as you work with one clue at a time. When the final answer fits every clue, you have solved the case.

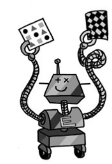


Work Backward

Some math problems tell you the end of a story. Your task is to discover the beginning of the story. To use this strategy start with the answer and do the math steps in reverse.

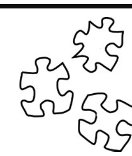
Look for a Pattern

Some math problems ask you to write what comes next. In a pattern, numbers go in order according to a rule. The numbers in a pattern may be getting larger or smaller. This strategy helps you think about the rule a pattern is following.



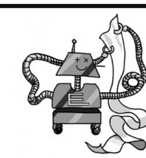
Use Logical Reasoning

Some math problems are like puzzles. *If* this piece goes here, *then* this other piece must go there. Use logic to work in little bits until you see the whole answer.



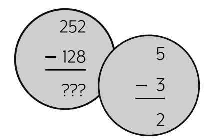
Make an Organized List

Some math problems ask for a list of all possible correct answers. This strategy helps you organize all of your ideas without repeating any answers.



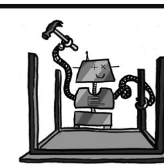
Solve a Simpler Problem

Some math problems have numbers that seem too big. This strategy helps you find a basic fact you already know. You can use what you know to tackle the bigger numbers.



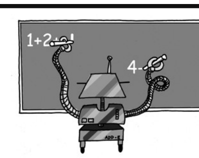
Use a Table/Make a Table

Some math problems give lots of information. Tables have rows, columns, and labels. A table helps you organize the information and see patterns.



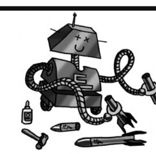
Write an Equation

Word problems can become numbers and math symbols (+ − ÷ × = < >). These numbers and math signs help you solve the problem.



Make a Model

Some math problems describe a scene that you begin to imagine. Make a model to help you act out the problem with objects.



Draw a Picture or Diagram

Some math problems are easier to understand through pictures. Draw a picture to act out the problem on paper.