LESSONS
61–90

UNIT
3

Simply Good and Beautiful

MATH 7

COURSE BOOK 3

The Good and the Beautiful
CURRICULUM

COURSE BOOK 3

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LESSONS 61–90

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- Alternate exterior angles
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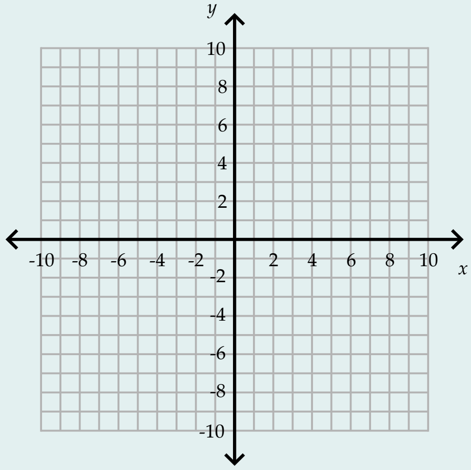
Slope of a Line

WARM-UP

Plot the ordered pairs on the coordinate plane.

a. $(2,5)$ b. $(-3,-1)$

c. $(-8,9)$ d. $(6,-4)$

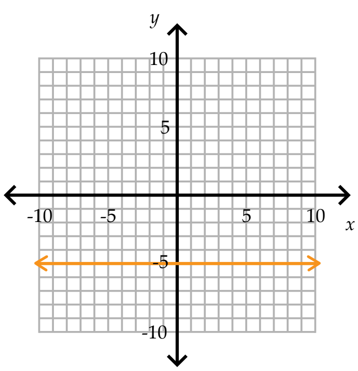


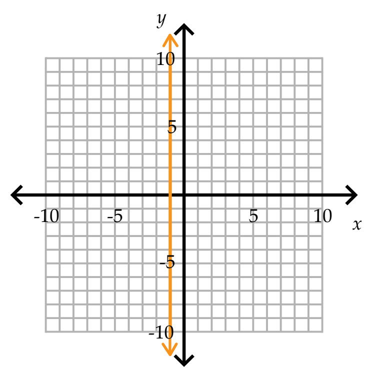
LESSON

Use the app to watch the video lesson. Complete problems when instructed during the video in the Video Notes section. Optionally, read the Lesson Overview in place of the video or after the video if more instruction is needed.

Home School App

VIDEO NOTES



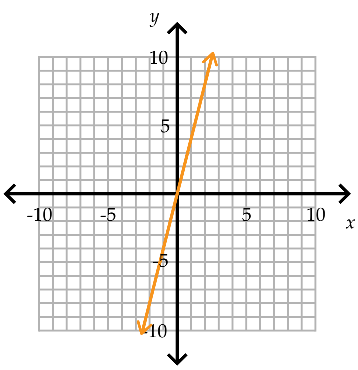


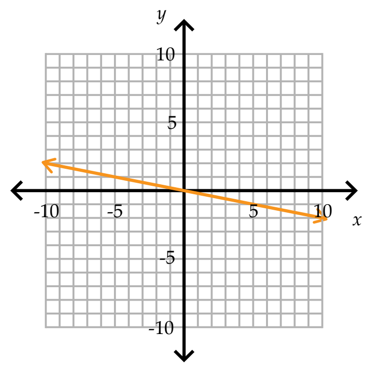
Positive slope

Negative slope

Undefined slope

Slope of zero

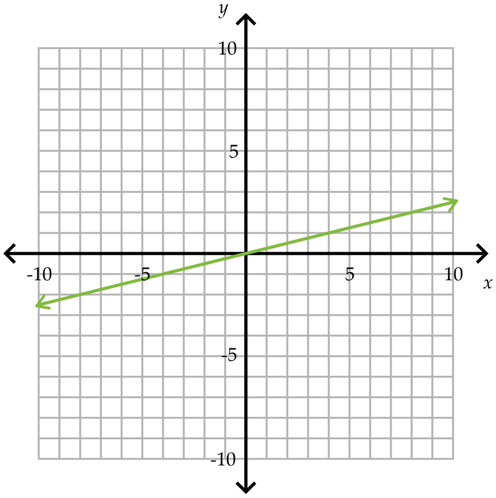




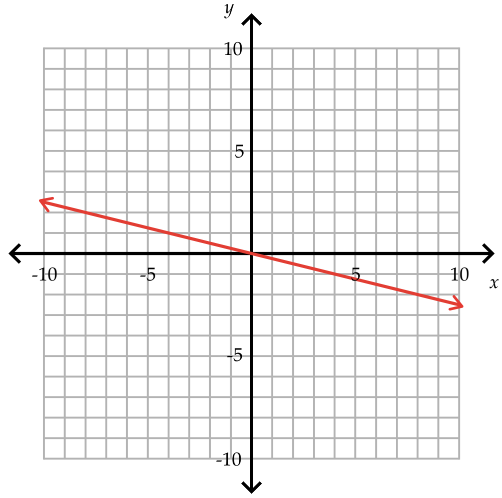
LESSON OVERVIEW

Types of Slope

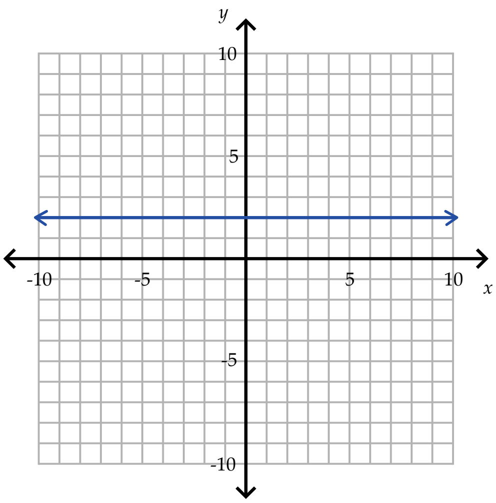
The ***slope*** of a line is the numerical change in y-values divided by the numerical change in x-values. Slope is also referred to as *rise* over *run*, where the *rise* is the *vertical* change in y-values and the *run* is the *horizontal* change in x-values. The slope of a line can be thought of as the steepness of the line.



This graph has a positive slope. A positive slope is seen when the slant of the line goes upward from left to right. As the x-values increase, the y-values also increase.

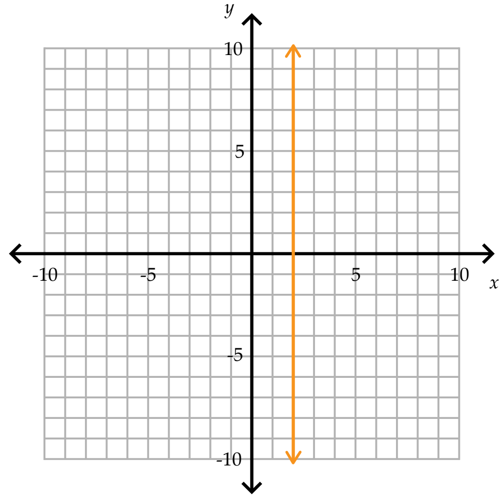


This graph has a negative slope. A negative slope is seen when the slant of the line goes downward from left to right. As the x-values increase, the y-values decrease.



This graph has a slope of zero. Any horizontal line (flat across, no slant) has a slope of zero. As the x-values increase, the value of y does not change.

This graph has no slope, which also means the slope is undefined. A line with an undefined slope is a vertical line (up and down). The value of x stays the same for all y-values.



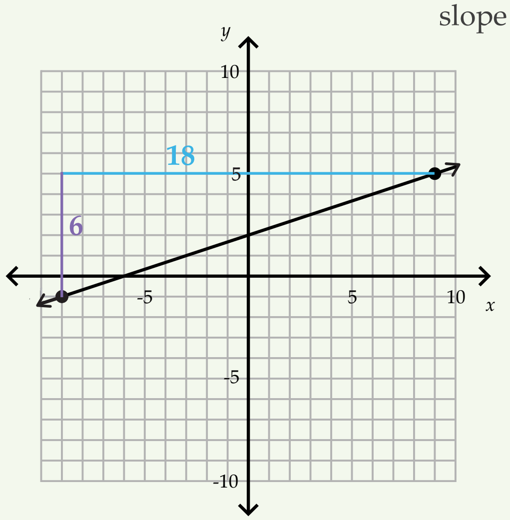
Calculating Slope

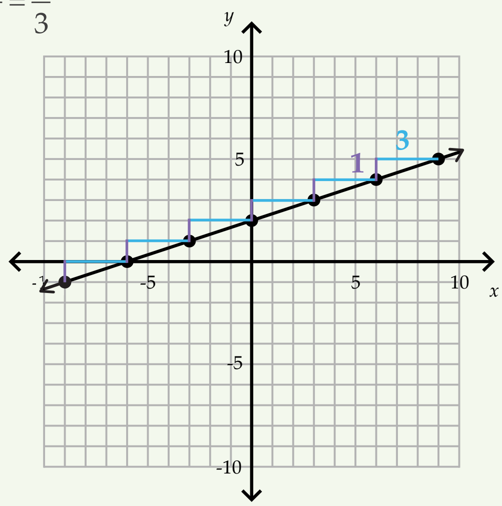
Slope can be calculated on a graph by counting the rise (vertical distance) and run (horizontal distance) between *any* two points on the line. When counting rise and run, start with a point on the left and count as you move toward a point on the right. Write the slope as a fraction of rise over run and simplify.

Positive Slope

Look at the graph on the left below. Start at the ordered pair $(-9,-1)$. Count units going *up* (rise) until the height of the next point is reached. The rise is 6. Then count units going *right* (run) until the point is reached. The run is 18. The slope is the fraction formed by the rise divided by the run.

$$\text{slope} = \frac{\text{rise}}{\text{run}} = \frac{6}{18} = \frac{1}{3}$$



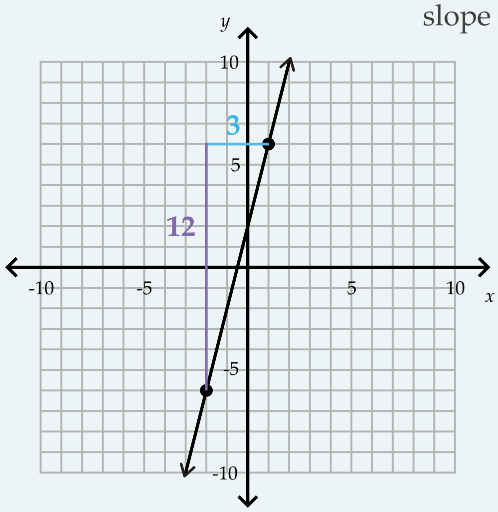


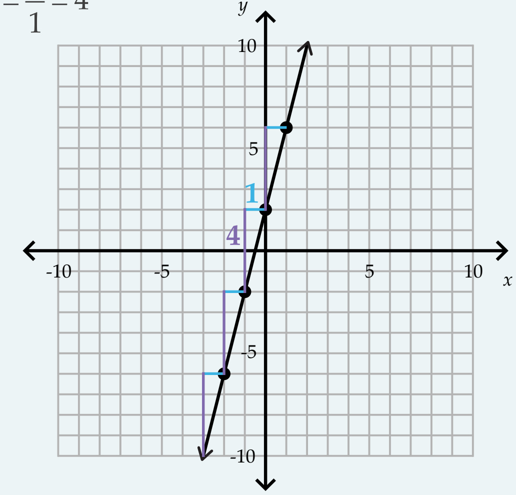
The slope of $\frac{1}{3}$ can be seen in the graph on the right. For each rise of 1, there is a run of 3. The slope between any two points will simplify to $\frac{1}{3}$.

Integer Slope (Positive or Negative)

Look at the graph on the left below. Going up from the point $(-2,-6)$, the rise is 12. Going to the right to the point $(1,6)$, the run is 3. In this example the slope reduces to an integer.

$$\text{slope} = \frac{\text{rise}}{\text{run}} = \frac{12}{3} = \frac{4}{1} = 4$$



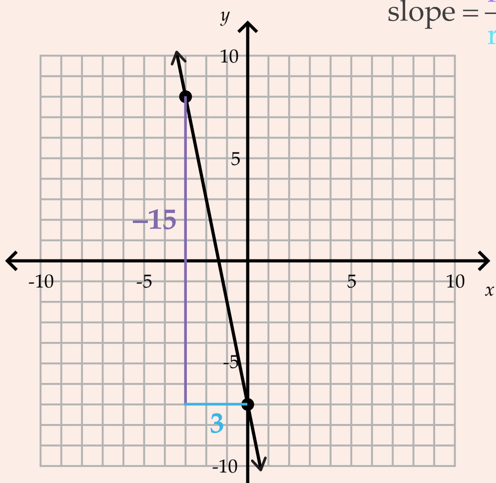


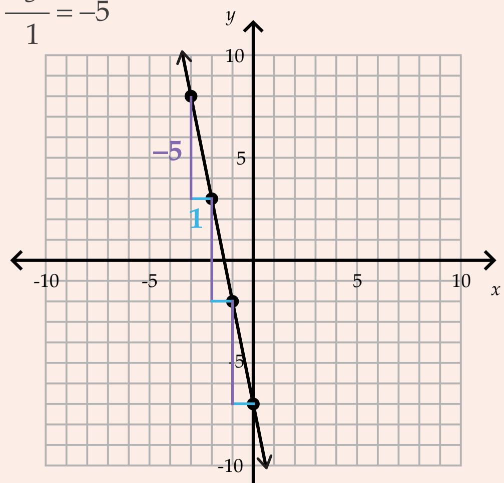
The slope of 4 can be seen in the graph on the right. For each rise of 4, there is a run of 1. The slope between any two points will simplify to 4.

Negative Slope

The rise and run of negative slopes can be counted down and to the right. Look at the graph on the left below. Start at $(-3,8)$ and count *down* (rise) to the next point. The rise is negative because we are counting units moving down the graph. The rise is –15. Count to the *right* (run) until the next point is reached. The run is 3. The slope (rise over run) is negative because a negative number divided by a positive number is a negative number.

$$\text{slope} = \frac{\text{rise}}{\text{run}} = \frac{-15}{3} = \frac{-5}{1} = -5$$



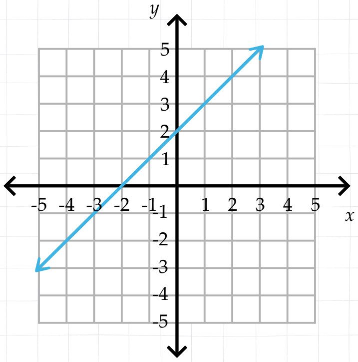
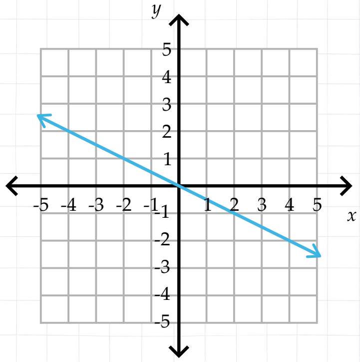
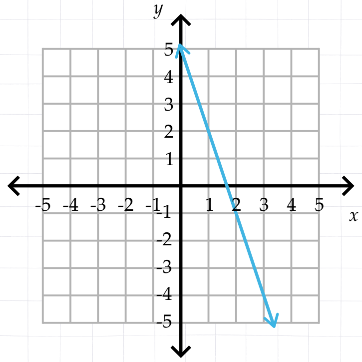
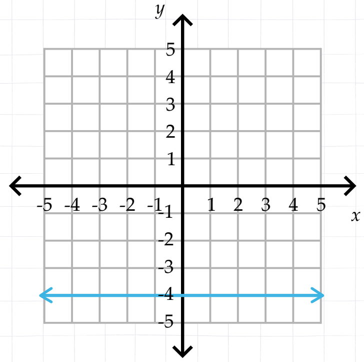


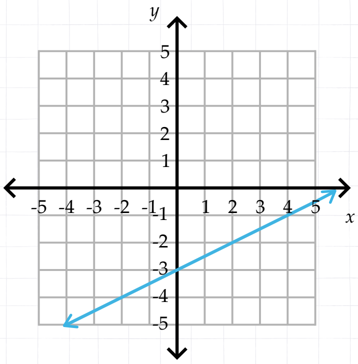
The slope of –5 can be seen in the graph on the right. For each rise of –5, there is a run of 1. The slope between any two points will simplify to –5.

Note that a line with a negative rise and a positive run will always have a negative slope. For example, a rise of –4 and a run of 3 will produce a slope of $\frac{-4}{3}$, which can be written as $-\frac{4}{3}$. Since the slope is useful as a fraction, never write the slope as a mixed number. If the slope is an improper fraction, like this one, leave it as an improper fraction.

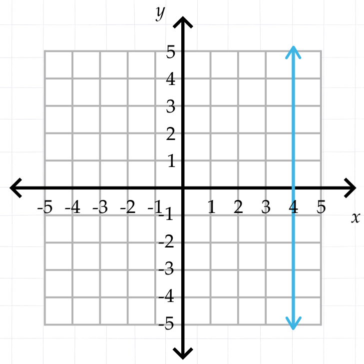
PRACTICE

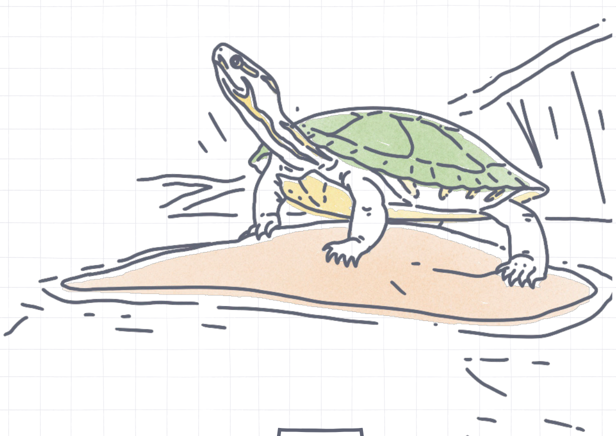
1. Draw a line to match each graph with a slope.



Positive Negative Zero Undefined

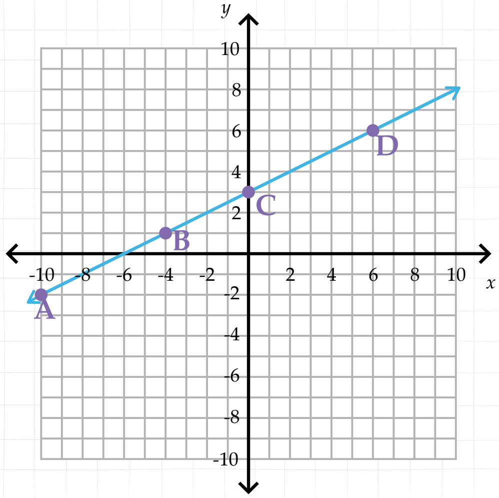




For each of the graphs below, calculate the slope of the line by following the steps.

✦ Hint: Remember to simplify the slope. The slope between any two points on a line is the same!

2.



a. Draw a vertical line that shows the rise between Points A and B.

The rise is ____.

b. Draw a horizontal line that shows the run between Points A and B.

The run is ____.

c. The slope of the line using Points A and B is ____.

d. Draw a vertical line that shows the rise between Points C and D.

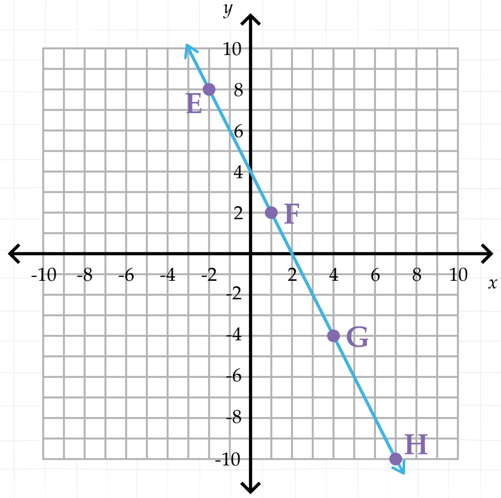
The rise is ____.

e. Draw a horizontal line that shows the run between Points C and D.

The run is ____.

f. The slope of the line using Points C and D is ____.

3.



a. Draw a vertical line that shows the rise between Points E and H.

The rise is ____.

b. Draw a horizontal line that shows the run between Points E and H.

The run is ____.

c. The slope of the line using Points E and H is ____.

d. Draw a vertical line that shows the rise between Points F and G.

The rise is ____ .

e. Draw a horizontal line that shows the run between Points F and G.

The run is ____.

f. The slope of the line using Points F and G is ____.

4. Use the clues to fill in the blanks and find the missing words in the word search below. If you need help, refer to the Lesson Overview.

a. The vertical change in y-values is the ____________.

b. The ____________ is the horizontal change in x-values.

c. The steepness and direction of the line are given by its ____________. It is defined as the change in y-values divided by the change in x-values.

d. A ____________ slope shows y-values decreasing as x-values increase.

e. A ____________ slope shows y-values increasing as x-values increase.

f. A horizontal line has a slope equal to ____________.

g. A ____________ line has a slope that is undefined.

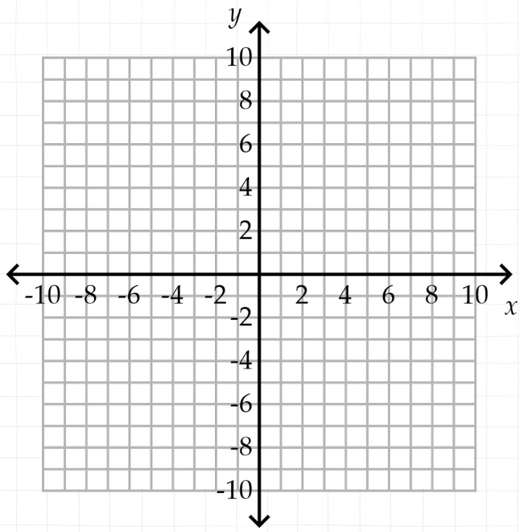
V	J	N	U	L	M	M	X	X	N
Z	E	A	E	R	S	L	O	P	E
E	H	R	R	G	U	W	X	P	N
R	X	P	T	I	A	K	M	F	T
O	R	A	R	I	S	T	H	E	M
A	U	H	N	H	C	E	I	C	X
V	N	U	M	S	H	A	C	V	U
Y	Q	X	I	K	H	V	L	M	E
R	W	O	H	V	T	X	K	R	Y
J	O	P	O	S	I	T	I	V	E

REVIEW

1. Complete the T-chart by substituting the given x-values in the equation. Then use the ordered pairs from the T-chart to graph the line that represents the equation. L65

$y = 3x - 2$

x	y
–2	
0	
2	
4	



2. Janessa buys a ski coat with an original price of \$112. The coat is marked 60% off, and sales tax in Janessa's town is 7%. Find the sale price and total cost of the coat. L47, L48

Sale price: __________ Total cost: __________

3. Debra is creating a scale drawing of her bedroom using a scale of 1 in : 1 ft. Her bed is 42 inches wide and 78 inches long. What should the width and length of her bed be on her scale drawing? L54, L61

✦ Hint: Convert the dimensions of the bed to feet first.

Width: __________ Length: __________

4. Mentally find 25% of each number by dividing by 4.

✦ Tip: Sometimes dividing by 4 is easiest to complete mentally by dividing by 2 twice.

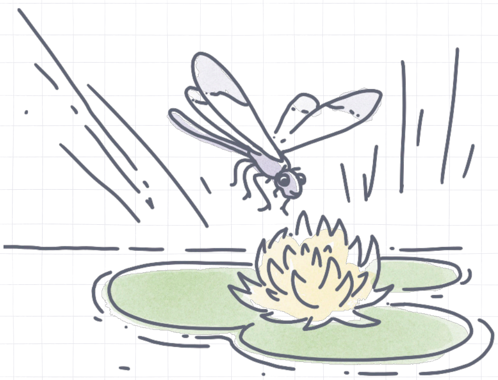
a. 440 ________

b. 72 ________

c. 1,400 ________

d. 36 ________

e. 900 ________



Graphing Functions

WARM-UP

MENTAL MATH: Complete the problems below mentally.

1. Write the integer that represents each phrase.

   a. A drop of 12 degrees ______ b. A deposit of $50 ______ c. 450 feet below sea level ______

2. Complete each problem.

   a. $5 \bullet (-2) \bullet 3 \bullet (-4) =$ ______ b. $-3 \bullet 4 \bullet (-3) \bullet (-2) =$ ______

LESSON

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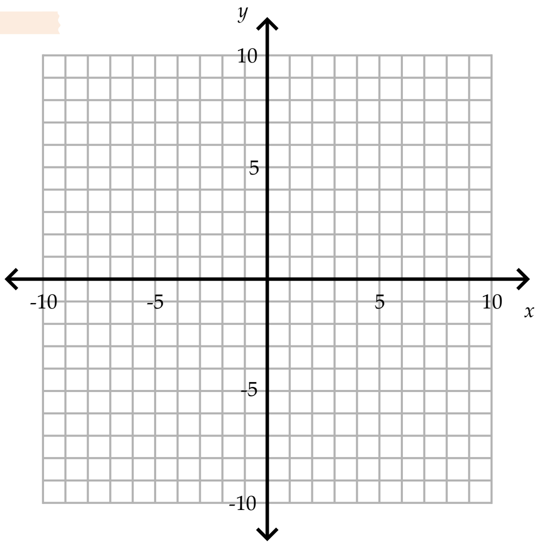
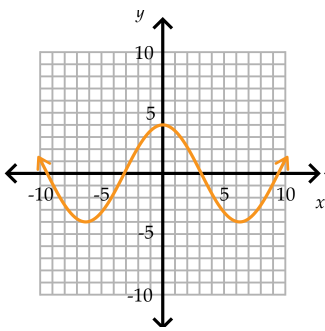
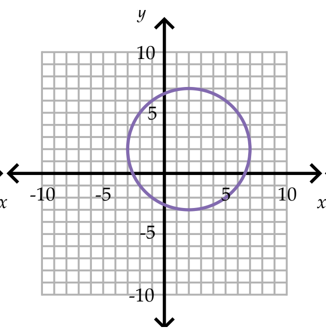
VIDEO NOTES

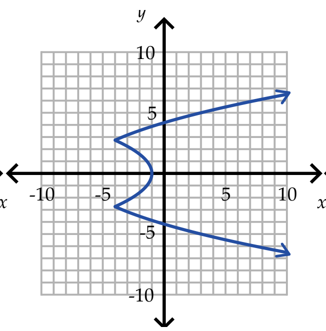
$y = x^2 - 3$

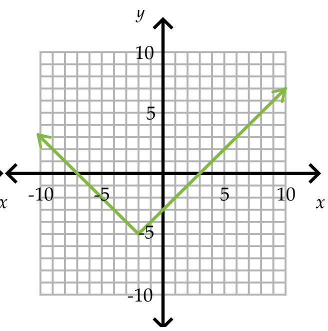
x	y	
–3	6	$(-3, 6)$
–2	1	$(-2, 1)$
–1	–2	$(-1, -2)$
0		(____, ____)
1		(____, ____)
2		(____, ____)
3		(____, ____)











LESSON OVERVIEW

Nonlinear Functions

When the graph of a function is not a straight line, the function is considered nonlinear. Nonlinear functions can be graphed with a T-chart just like linear functions. Input/output tables can form curves when graphed.

Substitute x-values into the function and perform operations to find the corresponding y-values. Graph the ordered pairs created by x and y. Connect the points to represent the function on the graph. If the points do not form a straight line, draw a curved line as the points are connected. Draw arrows at the ends to show that the relationship between x and y continues.

Example 1: Graph $y = x^2 - 1$.

Substitute the given values of x into the equation and solve for y. Then graph the x- and y-values as ordered pairs. Connect with a curve.

x	y
–3	8
–2	3
–1	0
0	–1
1	0
2	3
3	8

When $x = -3$, $y = (-3)^2 - 1 = 9 - 1 = 8$.

When $x = -2$, $y = (-2)^2 - 1 = 4 - 1 = 3$.

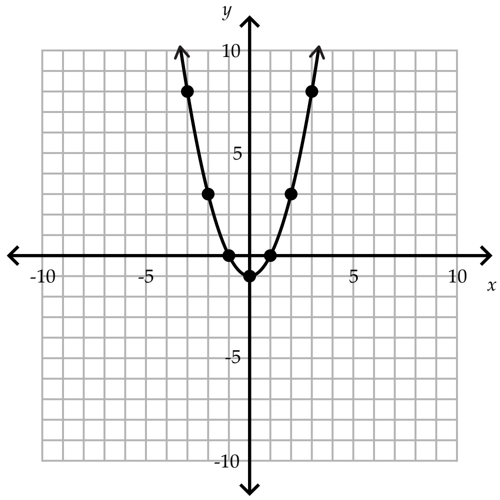
When $x = -1$, $y = (-1)^2 - 1 = 1 - 1 = 0$.

When $x = 0$, $y = 0^2 - 1 = -1$.

When $x = 1$, $y = 1^2 - 1 = 0$.

When $x = 2$, $y = 2^2 - 1 = 3$.

When $x = 3$, $y = 3^2 - 1 = 8$.



Example 2: Graph $y = x^2 + 4$.

Substitute the given values of x into the equation and solve for y. Then graph the x- and y-values as ordered pairs. Connect with a curve.

x	y
–2	8
–1	5
0	4
1	5
2	8

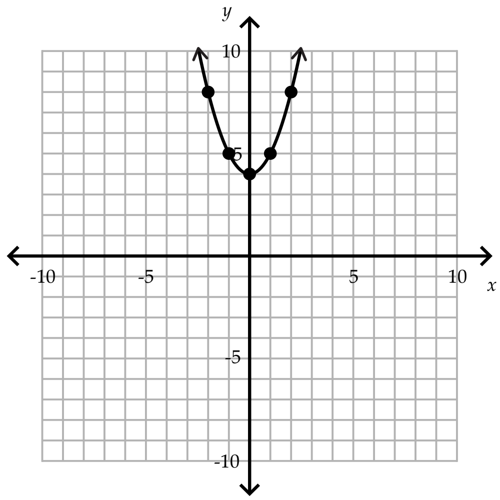
When $x = -2$, $y = (-2)^2 + 4 = 4 + 4 = 8$.

When $x = -1$, $y = (-1)^2 + 4 = 1 + 4 = 5$.

When $x = 0$, $y = 0^2 + 4 = 0 + 4 = 4$.

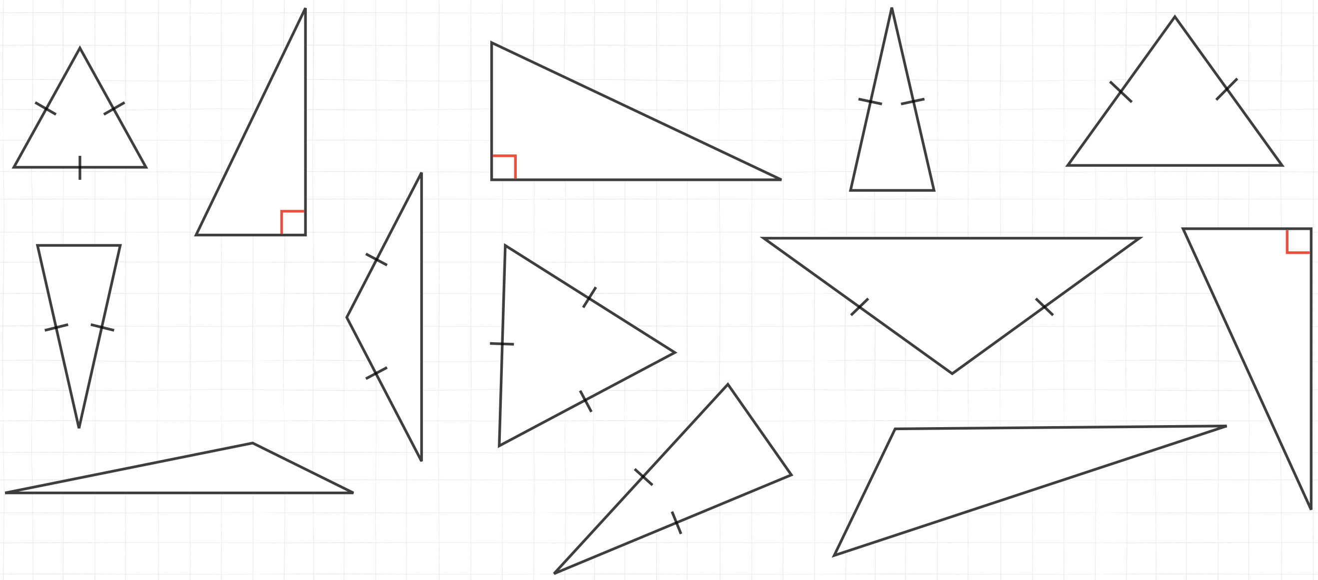
When $x = 1$, $y = 1^2 + 4 = 1 + 4 = 5$.

When $x = 2$, $y = 2^2 + 4 = 4 + 4 = 8$.



PRACTICE

1. Color all scalene triangles blue, all isosceles triangles orange, and all equilateral triangles green. Then circle all right triangles, box in all obtuse triangles, and cross out all acute triangles.



2. Color each triangle description and the missing interior angle(s) with the same color. An example is shown.

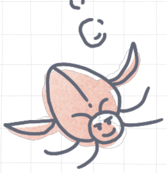
A triangle has two angles measuring 40°. What is the measure of the third angle?	74°	A right triangle has an angle measuring 36°. What is the measure of the third angle?	80°
60°	What are each of the angle measures in an equilateral triangle?	An isosceles triangle has one angle that measures 20°. What is the measure of each of the two congruent angles?	What is the measure of each of the non-right angles of an isosceles right triangle?
45°	A triangle has two angles measuring 35° and 71°. What is the third angle measure?	100°	54°

3. Recall that in every triangle, the sum of ANY two side lengths must be greater than the length of the third side. Determine if the following side lengths form a triangle. Write *yes* or *no* on the line. If the side lengths do not form a triangle, give the sides that do not meet the criteria. An example is given.

Example: 4, 9, 4 ___no___

4 + 4 is not greater than the third side of 9.

a. 3, 4, 5 ______ b. 3, 5, 3 ______ c. 4, 6, 11 ______



Figures can be rotated around any point. The coordinate plane below shows a heart being rotated 90° counterclockwise around the point $(8,8)$. It can help to see the rotation by placing the tip of a pencil on the point $(8,8)$ and rotating the paper.

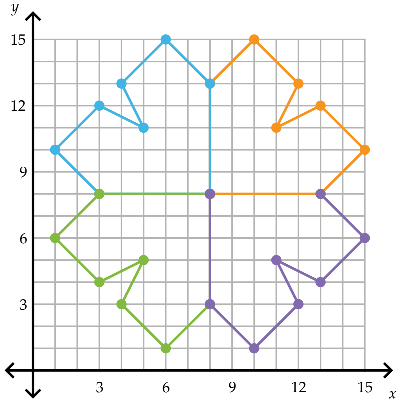
The orange heart is the preimage.

The blue heart shows a 90° counterclockwise turn around the point.

The green heart shows a 180° counterclockwise turn around the point.

The purple heart shows a 270° counterclockwise turn around the point.

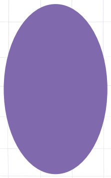
A 360° turn around the point would result in the original orange heart.



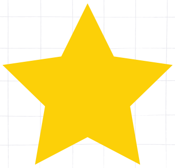
PRACTICE

1. For each image, draw all the lines of symmetry. Write the number of lines of symmetry in the blank.

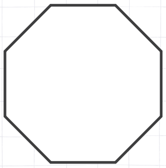
a. Number of lines of symmetry: ______



b. Number of lines of symmetry: ______



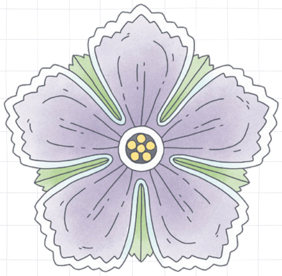
c. Number of lines of symmetry: ______



2. For each figure, find the order of rotational symmetry.

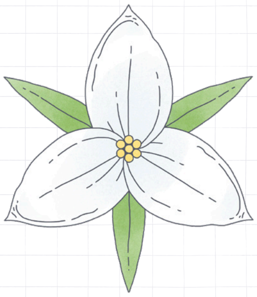
Hint: Find the number of times a shape can be rotated and look the same as the original orientation.

a.



Order of rotational symmetry: ____

b.



Order of rotational symmetry: ____

3. Follow the instructions to create a design on the rectangle below.

Note: Erase your compass arcs after bisecting any segments or angles so the image doesn't get too cluttered.

a. Bisect line segment $\overline{AB}$. Label the point where the bisector intersects $\overline{AB}$ as E.

b. Use a straightedge to draw a line segment from E to C and from E to D.

c. Bisect $\angle ECD$. Draw the bisector long enough that it touches the edge of the rectangle.

d. Bisect $\angle EDC$. Draw the bisector long enough that it touches the edge of the rectangle.

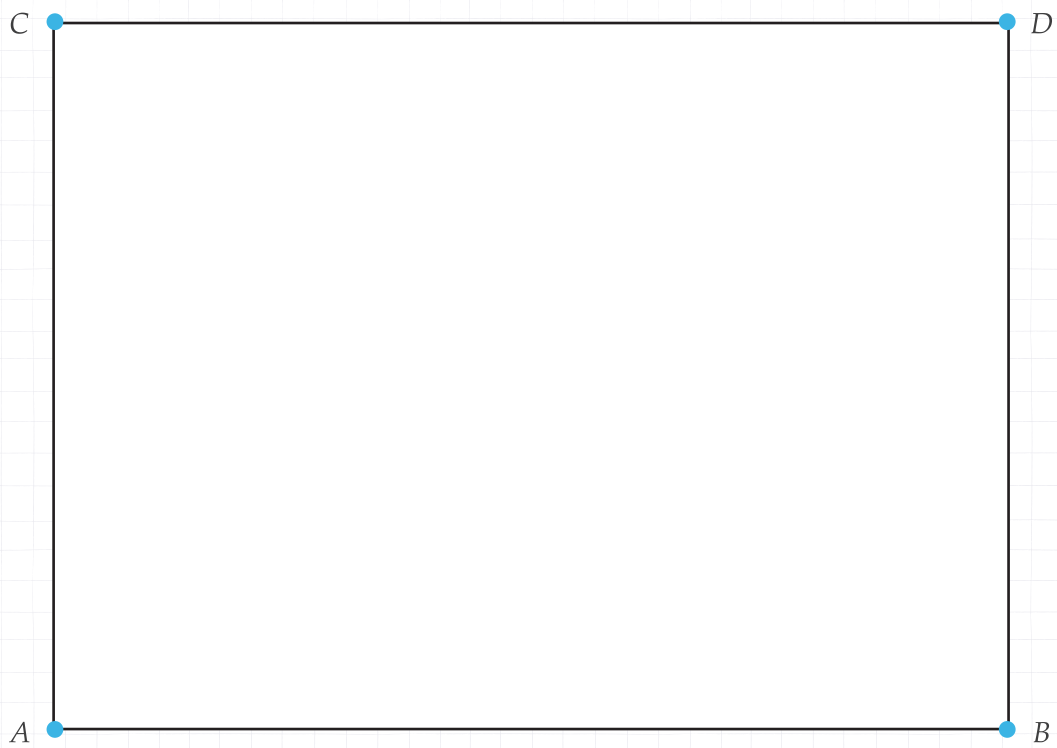
e. Label the point where the two bisectors from Parts C and D cross each other as F.

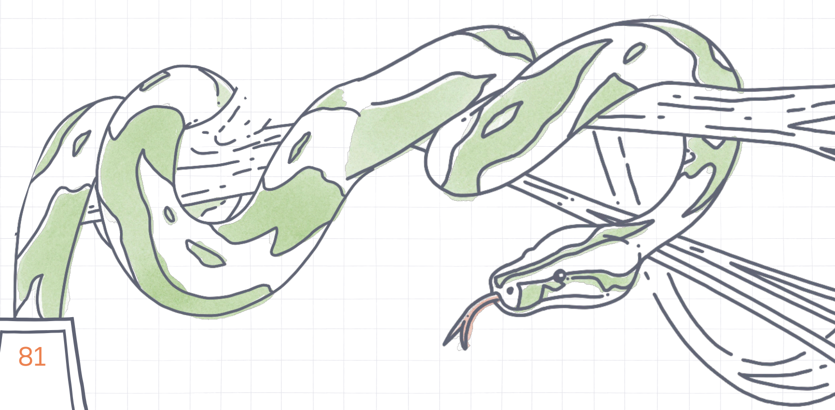
f. Use a straightedge to draw a line segment from E to F.

g. Bisect $\overline{EF}$ and label the point where the bisector intersects $\overline{EF}$ as G.

h. Use a straightedge to draw a line segment from G to A and from G to B.

Now color in the design you created!





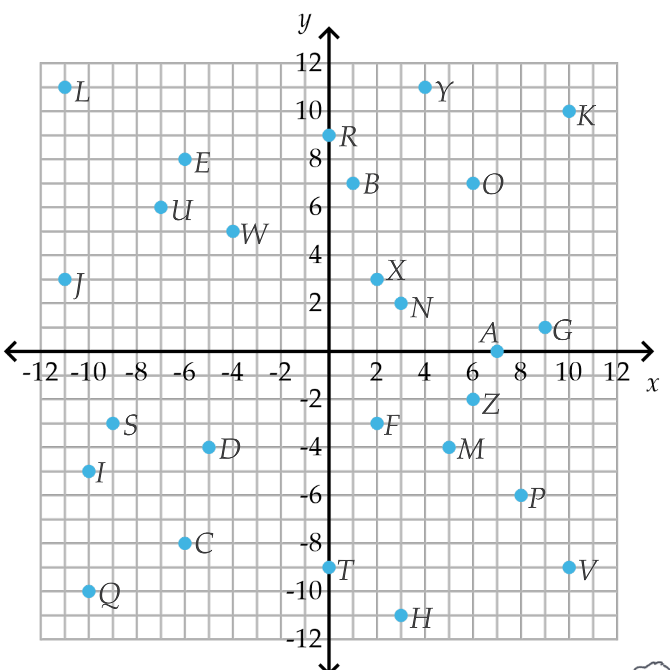
Logic Lesson 3

Spring is a busy season on a farm! Baby animals are born, fields and gardens are prepared, and crops are planted. Barns, stalls, coops, and other animal homes are built or repaired. These tasks can be enjoyable, but they can also require thinking outside the box—and so will the puzzles you complete today! There is no video or review for this lesson.

Who's New on the Farm?

Babies of different animals have special names. For example, a baby goat is called a kid, and a baby cow is called a calf. Use the coordinate plane and the instructions below to decipher the names of other baby farm animals.

Instructions: Locate the letter using the given coordinate. Then go BACKWARD three letters in the alphabet and write that letter on the blank above the given coordinate. Think of the alphabet as a cycle, with *A* following *Z*. For example, if the coordinate (1,7) is given, locate the letter at that point. The letter is *B*. Now go backward three letters in the alphabet. The letter *A* is one letter back, the letter *Z* is two letters back, and the letter *Y* is three letters back. Write the letter *Y* on the blank above the coordinate (1,7).



a. A baby turkey of either gender is called a

___ (−9,−3) ___ (0,9) ___ (2,3) ___ (6,7) ___ (−4,5),

but a male can be called a

___ (5,−4) ___ (−5,−4) ___ (3,2) ___ (3,−11),

and a female can be called a

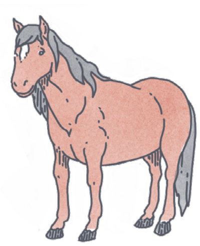
___ (5,−4) ___ (3,−11) ___ (−10,−10) ___ (−10,−10) ___ (1,7).

b. A baby llama or alpaca is called a

___ (2,−3) ___ (−7,6) ___ (−11,11) ___ (−5,−4).

c. A baby horse of either gender is called a

___ (−10,−5) ___ (0,9) ___ (−5,−4) ___ (6,7),



but a male can be called a

___ (2,−3) ___ (0,9) ___ (6,7) ___ (−4,5),

and a female can be called a

___ (−10,−5) ___ (−11,11) ___ (6,7) ___ (6,7) ___ (1,7).

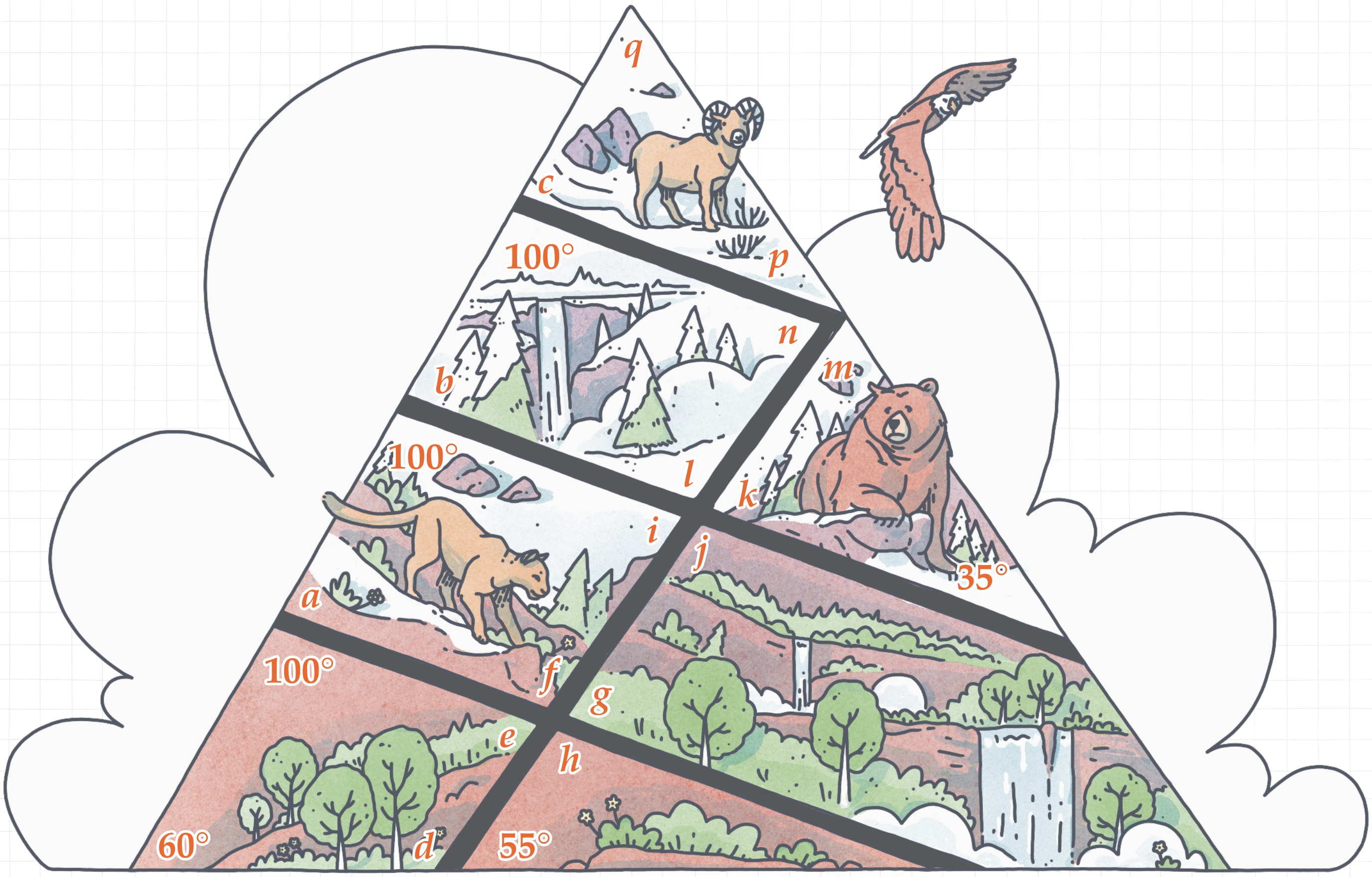
d. The Ugly Duckling was actually a baby swan, or a

___ (2,−3) ___ (1,7) ___ (−11,3) ___ (−10,−10) ___ (3,−11) ___ (−4,5).

e. Mary had a little lamb. A lamb raised as a pet is sometimes called a

___ (2,−3) ___ (0,9) ___ (10,−9) ___ (10,−9) ___ (3,−11) ___ (−4,5).

5. The mountain peak below contains interior angle measures of polygons, complementary and supplementary angles, and vertical angles. Work your way up the mountain to find the measure of the mountain peak!



✦ Hint: The internal angle sum of a triangle is 180°, and the internal angle sum of a quadrilateral is 360°. Some angles may need to be found before others.

$a =$ ______	$b =$ ______	$c =$ ______	$d =$ ______
$e =$ ______	$f =$ ______	$g =$ ______	$h =$ ______
$i =$ ______	$j =$ ______	$k =$ ______	$l =$ ______
$m =$ ______	$n =$ ______	$p =$ ______	$q =$ ______ (measure of the mountain peak)

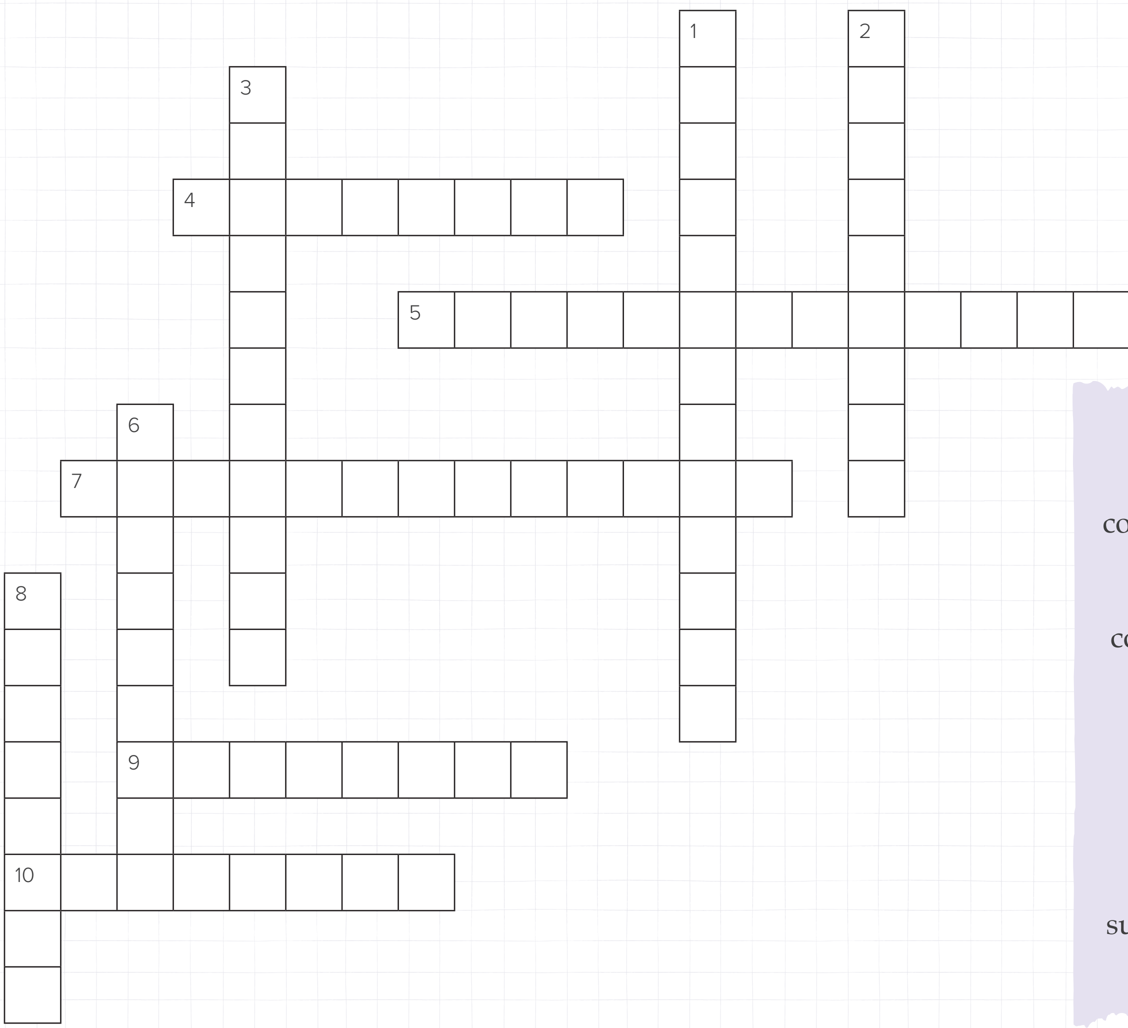
5. Use the hints to solve the crossword puzzle. Use the word bank provided.

DOWN

1. Angles that add to 90° are called ________________ angles.
2. Interior angles on opposite sides of the transversal are called ________________ interior angles.
3. A ____________ is a line that intersects two or more lines.
6. Corresponding angles on parallel lines are ____________.
8. Alternate exterior angles are located on __________ sides of the transversal.

ACROSS

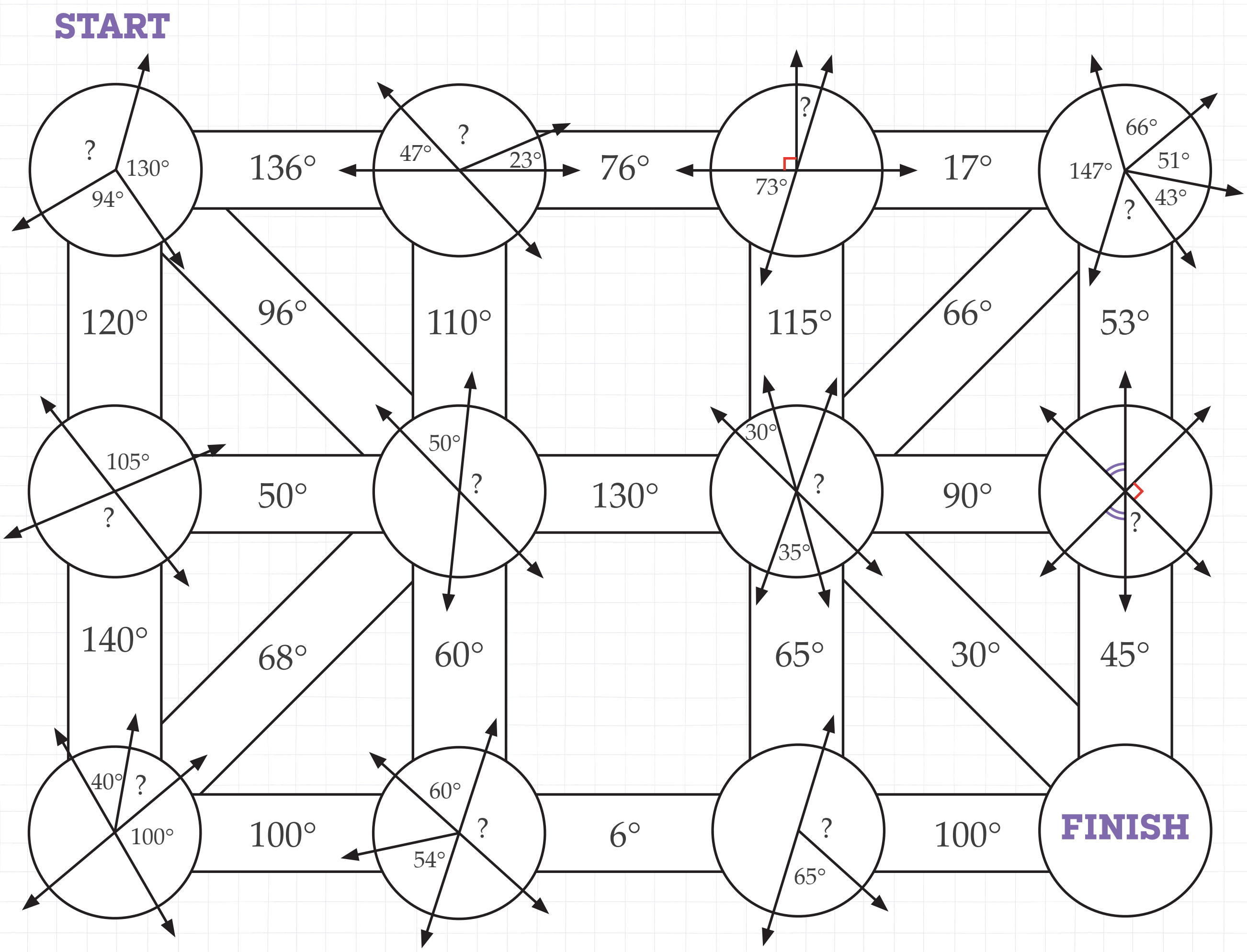
4. __________ lines are lines that never intersect and are always the same distance apart.
5. Angles that add to 180° are called ____________________ angles.
7. Angles that are located in the same position on parallel lines are called ________________ angles.
9. Angles that are outside of the parallel lines are called __________ angles.
10. __________ angles are angles that are between the parallel lines.

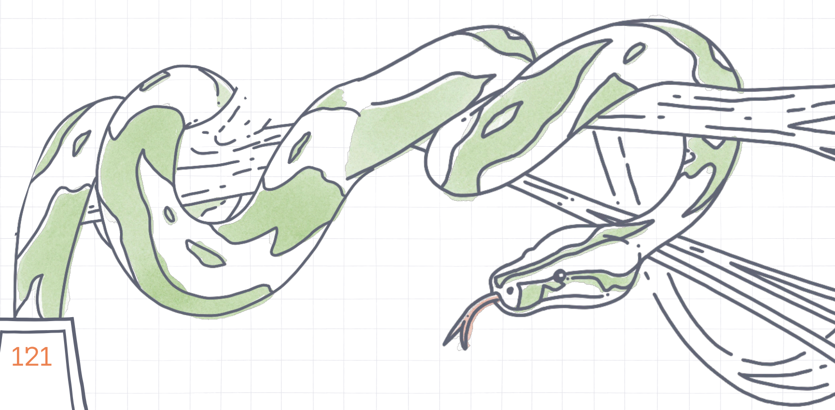


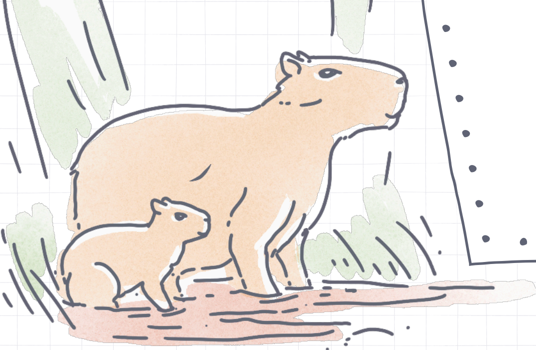
Word Bank

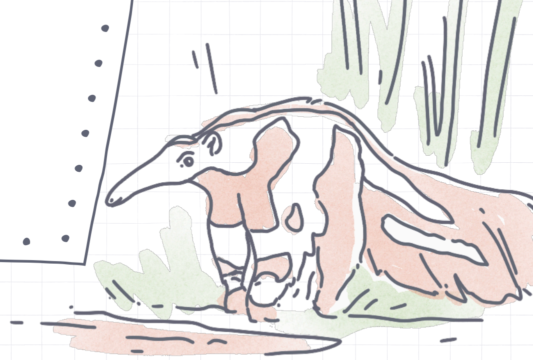
alternate
complementary
congruent
corresponding
exterior
interior
opposite
parallel
supplementary
transversal

4. Begin at START and find each missing angle measure to make your way through the maze.









UNIT 3 | LESSON 81

Pythagorean Theorem

SUPPLIES: highlighter

WARM-UP

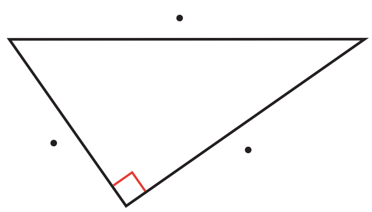
Evaluate.

a. $\sqrt{121}$ ______ b. 8^2 ______ c. $\sqrt{169}$ ______

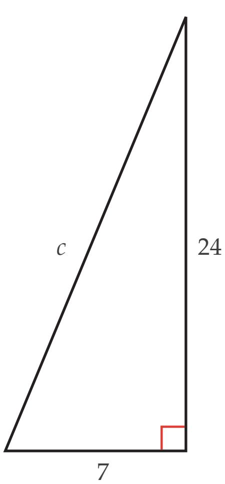
LESSON

Use the app to watch the video lesson. Complete problems when instructed during the video in the Video Notes section. Optionally, read the Lesson Overview in place of the video or after the video if more instruction is needed.

VIDEO NOTES



leg hypotenuse leg



______ + ______ = ______

______ + ______ $= c^2$

______ + ______ $= c^2$

______ $= c^2$

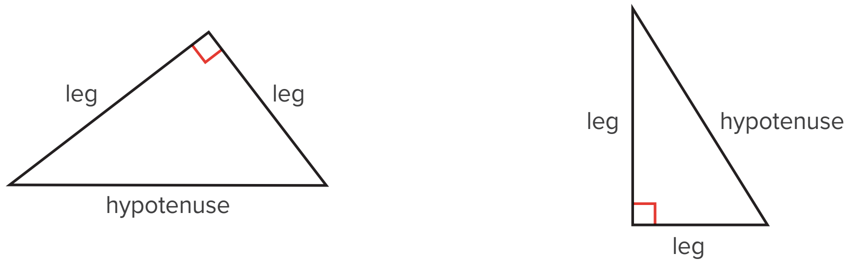
______ $= c$

LESSON OVERVIEW

Defining the Pythagorean Theorem

Right triangles appear in things like buildings, art, and navigation. Knowing how to calculate the length of a missing side on a right triangle is a foundational piece of mathematics.

The longest side of a right triangle is called the ***hypotenuse***. The hypotenuse is across from, or opposite, the right angle. The other two sides of a right triangle, the sides adjacent to the right angle, are called the ***legs***. Two right triangles are shown below.

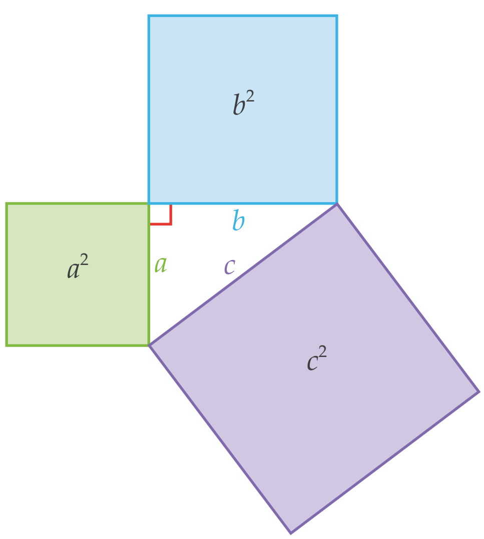


The ***Pythagorean Theorem***, named for the Greek philosopher Pythagoras, states that the square of the hypotenuse of a right triangle is equal to the sum of the squares of the other two side lengths. This relationship can be represented using this equation:

$$a^2 + b^2 = c^2$$

In the Pythagorean Theorem, a and b represent the lengths of the legs, and c represents the length of the hypotenuse of a right triangle.

The Pythagorean Theorem can be thought of as representing the area of two squares having side lengths a and b being added to equal the area of a third square with side length c. The areas of squares a^2 and b^2 add to equal the area of the third square, c^2.



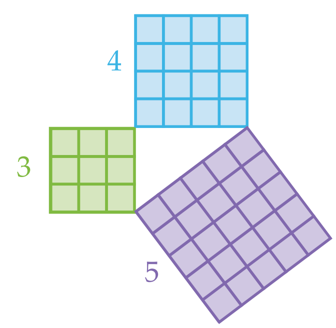
To illustrate this, let $a = 3$, $b = 4$, and $c = 5$.

Squaring each value gives the area of each square.

$a^2 = 3^2 = 9$ $\quad$ $b^2 = 4^2 = 16$ $\quad$ $c^2 = 5^2 = 25$

The sum of the two smaller areas is equal to the third area. $9 + 16 = 25$

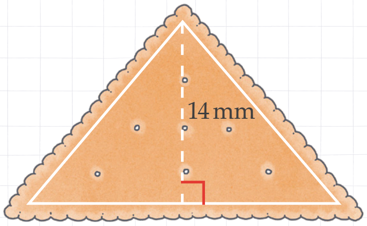
Therefore, $a^2 + b^2 = c^2$.



Sets of integers that satisfy the Pythagorean Theorem are called ***Pythagorean triples***. The smallest integers that form a Pythagorean triple are 3, 4, and 5, as shown above.

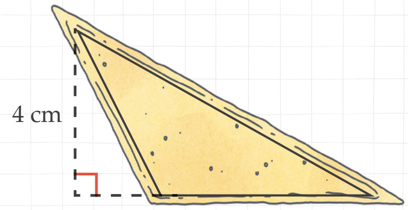
2. After learning about areas of polygons, Margie sat down for lunch and realized that much of her food was shaped like polygons! She decided to find the approximate area of some of her food before eating it. What is the area of each shape shown below? Be sure to include units.

a.



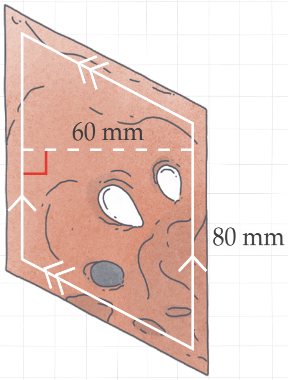
The area of the shape shown on the cracker is _________.

b.



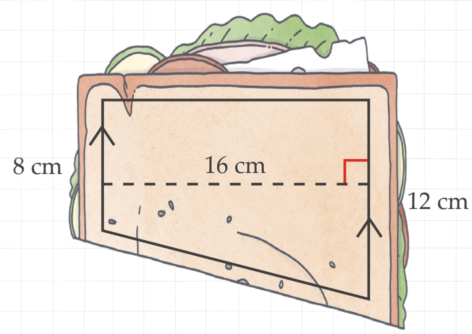
The area of the shape on the tortilla chip is _________.

c.



The area of the shape in the watermelon piece is _________.

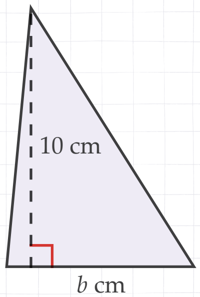
d.



The area of the shape in the sandwich is _________.

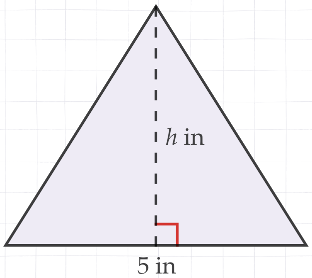
3. Find the missing measurement on each figure.

a. The area of the triangle is 35 cm^2.



The base is _________.

b. The area of the triangle is 10 in^2.

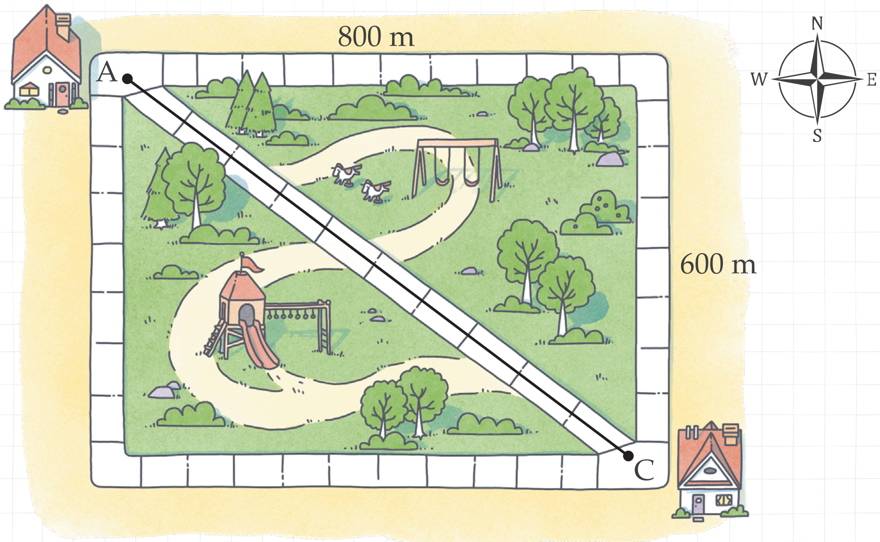


The height is _________.

REVIEW

Refer to the information and diagram below for all problems in this review.

Jayda lives near the northwest corner (Point A) of the park shown below. Her friend Emily lives near the southeast corner (Point C). There is a sidewalk around the entire perimeter of the park, as well as one across the park connecting Point A to Point C. Jayda and Emily often meet at the park to roller skate on the sidewalks.



1. If Jayda roller skates east and then south around the outside of the park, what distance will she travel to reach Emily's house? L82

____

2. If Jayda roller skates across the park directly to where Emily is, what distance will she travel? L81

____

3. Suppose that yesterday Jayda roller skated east and then south to meet Emily (refer to Problem 1), and today she roller skated directly across the park (refer to Problem 2) instead. What is the percent decrease in the distance Jayda traveled to meet Emily? Round to the nearest percent. L48

____

4. What is the area of the park in square meters? L83

____

5. Jayda's friend Kevin mows the grass at the park. If $\frac{4}{5}$ of the park is covered with grass, how many square meters of grass does Kevin mow? L43

Hint: Find $\frac{4}{5}$ of the area found in Problem 4.

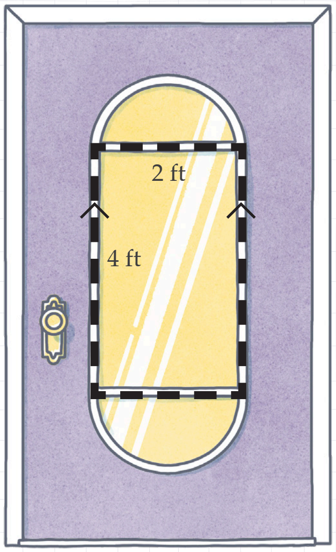
____

6. Convert the area of the park (found in Problem 4) to square kilometers. L55

____

3. A door maker is trying to choose between two different window designs on his doors. Find the approximate perimeter of each window so he knows how much molding each requires. Then find the approximate area of each window to the nearest hundredth so he knows how much light it will let through.

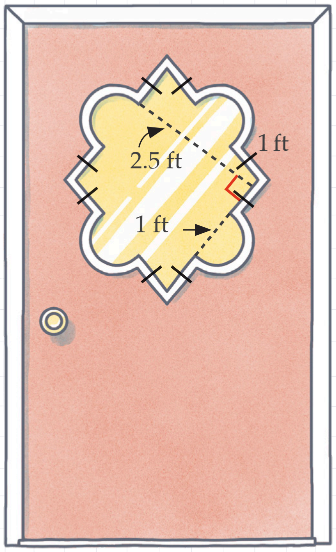
a.



Perimeter: __________

Area: __________

b.



Note: This window is a parallelogram with four semicircles. The height of the parallelogram is given, and the base can be found by adding two sides with tick marks to the diameter of the semicircle.

Perimeter: __________

Area: __________

REVIEW

1. Ruby and Indy are repainting their bedroom walls. Their room is 12 feet long by 13 feet wide, and the walls are 8 feet high.

a. What is the total area of the walls in the bedroom? L83

____

b. The girls will use two coats of paint on each wall. One gallon of paint covers 400 square feet. How many gallons of paint will Ruby and Indy use? L43

✦ Hint: Multiply the area of the walls from Part A by two, since two coats of paint will be used. Then use the fact that one gallon covers 400 square feet to write and solve a proportion to find the answer.

____

2. A triangle is translated left three units and down four units on a coordinate plane. The coordinates of the preimage are given. Write the coordinates of the image. L72

Preimage	(–1,1)	(4,8)	(3,–5)
Image			

Mixed Review

This lesson is a mixed review. There is no video, practice, or review section.

SHARPEN YOUR SKILLS!

Functions can be represented in multiple ways. A function can be represented as an equation, a graph, or a table. Each representation can emphasize different features of the function. Seeing all the representations together is helpful in becoming more familiar with the properties of functions.

Function 1:

Jude is working with his dad over the summer repairing and filling swimming pools. His first job is assisting his dad in filling up a brand-new kiddie pool in their backyard. Water fills up the pool at a rate of 3 gallons per minute.

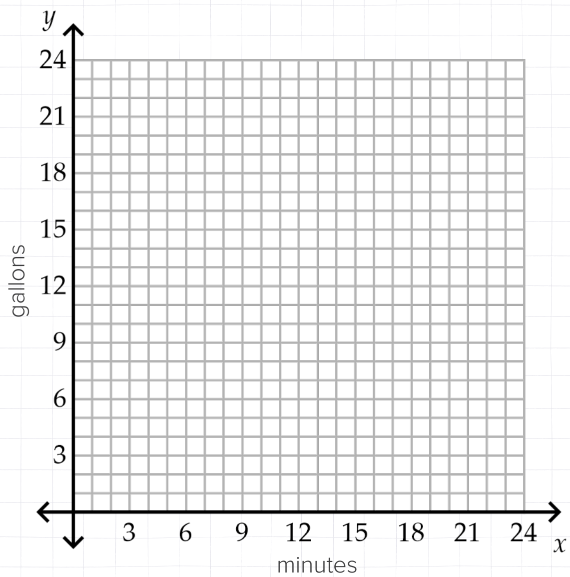
Fill in the y-values in the table by multiplying each x-value by 3. Two examples are given.

x (minutes)	y (gallons)
0	0
1	3
2	______
3	______
4	______
5	______
6	______
7	______

Now write an equation in slope-intercept form that represents the amount of water in the kiddie pool as time passes. The rule is "Multiply the input by 3." Then identify the slope and y-intercept.

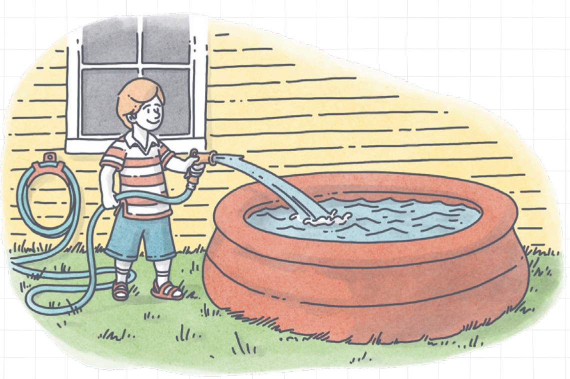
$y =$ ______________ $m =$ ______ y-intercept: (___, ___)

Draw a graph of the linear function.



Notice that the graph shows only the first quadrant. This is because including other quadrants would include negative numbers. Since it doesn't make sense to have negative time or a negative amount of water in the pool, it doesn't make sense to include the other quadrants in the graph.

Also notice that the graph has a positive slope. As the x-values increase, the y-values increase. That means as the number of minutes increases, the number of gallons increases.



UNIT 3 | LESSON 88

Unit 3 Review

Complete this Unit Review to prepare for the Unit Assessment. There is no video, lesson, or practice. Because Unit Reviews include practice for an entire unit, they may take longer than regular lessons, and students may decide to take two days to finish.

SUPPLIES: compass, protractor

Spring Cleaning

Spring cleaning and preparations are underway in the Reid household in Auckland, New Zealand.

Scale Drawings
Lesson 61

1. Mateo is mapping out the family garden. The garden plot is 45 meters long and 30 meters wide. His map of the garden is 15 centimeters long.
   a. What is the scale for his map?

   ____

   b. How wide is the garden on his map?

   ____

Direct and Inverse Proportions
Lessons 62–64

2. Aria works with Mateo to figure out how many kiwi vines they need. They know that each mature kiwi vine produces about 20 kg of fruit.
   a. Do kiwi vines and the fruit produced represent a direct or inverse proportion? Why?

   direct / *inverse* (Circle one.)

   ____

   ____

   ____

   b. How many vines should they plant if they want 100 kg of fruit once the plants mature?

   ____

   c. The amount of time it takes to prepare the garden plot decreases as the number of people working it increases. Assuming that everyone works at the same pace, does this represent a direct or inverse proportion? Why?

   direct / *inverse* (Circle one.)

   ____

   ____

   ____

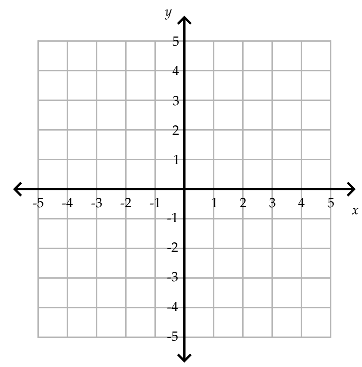
3. Each room in the house takes approximately 3 hours to fully clean.
   a. If x is the number of rooms in the house and y is the amount of time spent cleaning, what is the constant of proportionality for this direct proportion?

   $k =$ ______

   b. Write an equation to show the relationship between x and y.

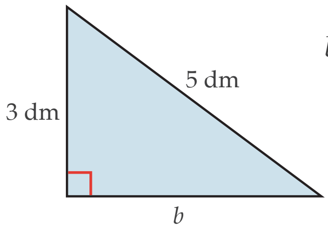
   ____

   c. Use the proportionality constant to draw a graph that represents this directly proportional relationship.

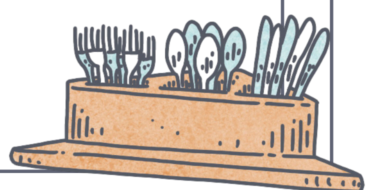


Pythagorean Theorem
Lesson 81

12. While cleaning out the kitchen, Mr. Reid decides to build a triangular corner shelf to hold some of their kitchen utensils. Use the Pythagorean Theorem to solve for the missing side length.



$b =$ ______

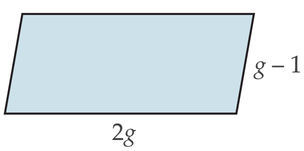


Perimeter and Area
Lessons 82–85

Back in the garden, Mrs. Reid is considering how to arrange the plots for two berry plants that are native to New Zealand: *kōtukutuku* and *tātarāmoa*.

13. The perimeter of the parallelogram-shaped garden plot is 46 m. Find the length and width of the plot.

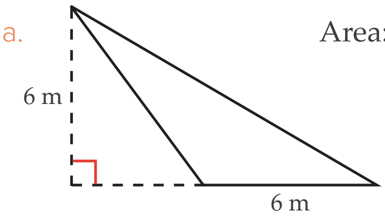
✦ Hint: The value of *g* is not a side length but must be found first.



Length: ______ Width: ______

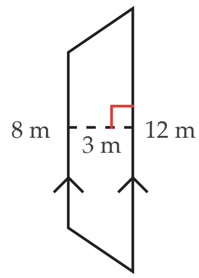
14. Mrs. Reid also wants to put two new plots in her garden for *horopito* and *kawakawa*, which are both used for traditional Māori medicines. Find the area of each plot below.

a.



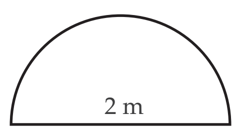
Area: ______

b.



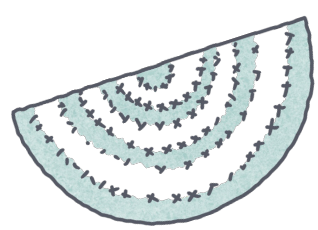
Area: ______

15. New Zealand is known for the high-quality wool it produces, which is extremely soft and also sustainable. Mrs. Reid is creating wool rugs for her home. Find the perimeter and area of the rug shown below, rounding to the nearest hundredth.



Area: ______

Perimeter: ______



Unit 3 Assessment

SUPPLIES: ruler, protractor, compass

- This assessment covers concepts taught in Unit 3. Problems are designed to assess multiple skills. Read the instructions carefully and do not rush through the problems.
- You may use the Reference Chart at the back of the book for the assessment. Calculators should be used only when noted.
- Lesson numbers are given by each problem so you can review lessons for any answers that are incorrect.

1. On a map, Los Angeles and New York City are 21 cm apart as the crow flies. The scale on the map is 1 cm : 117 mi. How many miles apart are Los Angeles and New York City? L61

____

2. For each table determine if x and y form a direct or inverse proportion. Then find k. L62, L63

a.

x	3	8	10	14
y	18	48	60	84

direct / *inverse* (Circle one.)

$k =$ _____

b.

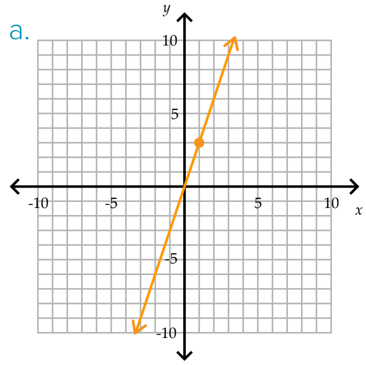
x	1	3	6	11
y	66	22	11	6

direct / *inverse* (Circle one.)

$k =$ _____

3. Determine if each graph is directly proportional. If it is, find k. L64

a.



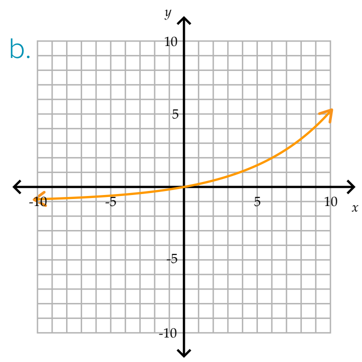
Is it directly proportional?

______

If yes, find k.

$k =$ ______

b.



Is it directly proportional?

______

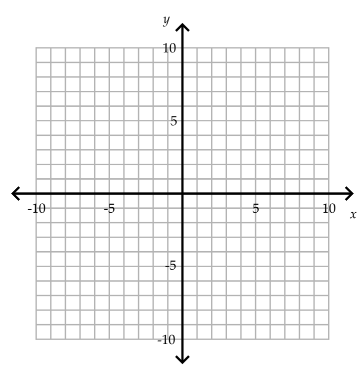
If yes, find k.

$k =$ ______

4. For each given equation, complete the T-chart and use the ordered pairs to graph the equation. L65, L70

a. $y = -3x + 1$

x	y
–2	
–1	
0	
1	
2	



Enrichment: Circumference and Diameter

This is an enrichment lesson. Mastery is not expected at this level. There is no video, practice, or review. A calculator may be used for this entire lesson.

Part 1: Exploring Circumference and Diameter

SUPPLIES: long piece of string, ruler or yardstick, marker or tape

In Part 1 you will explore the circumference and diameter of objects around your home. The ***diameter*** of a circle is the distance across a circle through the center. The ***circumference*** of a circle is the distance around a circle.

Step 1: Gathering Items

Find three items in your home that are shaped like circles and can be measured. Write the name of each item on the lines on the next page. Suggestions of items are given below:

toilet paper roll	jar or jar lid	clock	ring
circular window	bracelet	flying disk	mirror
water bottle	bucket	bowl	cup
food container	vase	roll of tape	can of food

Step 2: Finding the Circumference

a. Wrap the string around the edge of your first circular item.

b. Use a marker or a small piece of tape to mark the spot where the string meets and overlaps. This will represent the distance around your circular item.

c. Line the end of the string up with 0 on the ruler or yardstick and measure the length of the string to where you marked it to find the circumference.

d. Record the circumference of your first object to the nearest quarter of an inch. Write this measurement as a decimal number.

Step 3: Finding the Diameter

a. Use the ruler or yardstick to measure the diameter of your object. Be sure you measure across the center of the circle.

b. Record the diameter of your object to the nearest quarter of an inch. Write this measurement as a decimal number.

Step 4: Finding the Ratio of Circumference to Diameter

a. Write the ratio of circumference to diameter as a fraction using your measurements.

b. Use a calculator to divide the ratio, $C \div d$, and write the quotient rounded to the ten thousandths place (four decimal places).