Name: ..... Date: ..... Period: .....

Additional Practice 3.11

1. Which equation represents the line that passes through points $(-8, 12)$ and $(4, 6)$?

A. $y = \frac{1}{2}x + 8$

B. $y = -\frac{1}{2}x + 8$

C. $y = \frac{1}{2}x - 2$

D. $y = -\frac{1}{2}x - 2$

2. Lin is writing an equation of the line that passes the point $(4, 24)$ and has a slope of 3. Her unfinished work is shown:

Lin's work:

$y = 3x + b$ $\qquad m = 3$

$24 = 3(4) + b$

Finish Lin's work by solving the equation for b and writing the final equation for the line in the form $y = mx + b$. Show your thinking.

3. Write the equation of the line that passes through each pair of points. Show or explain your thinking.

a $(4, 18)$ and $(8, 34)$

b $(-4, 14)$ and $(2, 2)$

4. Diego is finding the slope of the line that passes through the points $(10, 8)$ and $(14, 10)$. His work is shown. Review his work. Find and fix any errors.

Diego's work:

Slope $= \frac{10 - 8}{10 - 14} = \frac{2}{-4} = -\frac{1}{2}$

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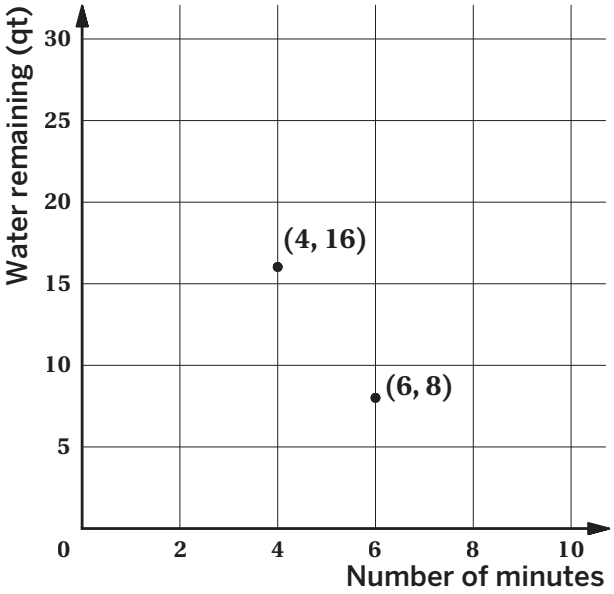
Name: Date: Period:

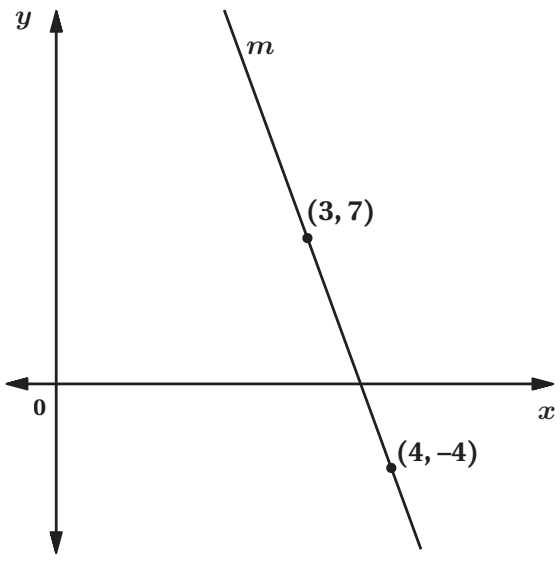
5. A cooler of water is draining. After 4 minutes, there are 16 qt remaining. After 6 minutes, there are 8 quarts remaining. Write an equation for the amount of water remaining y in the cooler after x minutes.



6. The table gives the x- and y-coordinates of points on a line. Without graphing, write an equation for the line that passes through the points. Show or explain your thinking.

x	-4	4	8
y	14	2	-4

7. Consider line m with the two labeled points as shown. Kiran missed today's lesson and does not understand how he can write the equation of the line without seeing the vertical intercept. Help Kiran understand how to write the equation for the line in the form $y = mx + b$.



Name: ..... Date: ..... Period: .....

Additional Practice 3.12

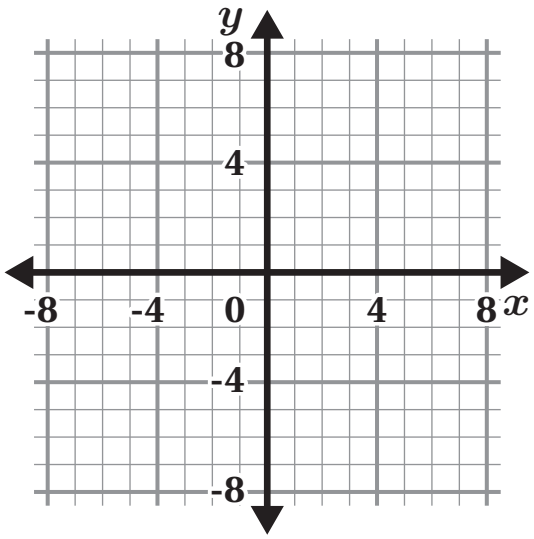
1. Select *all* of the ordered pairs that are solutions to the linear equation $3x - 2y = 4$.

- ☐ **A.** $(0, -2)$
- ☐ **B.** $(2, -1)$
- ☐ **C.** $(-2, -5)$
- ☐ **D.** $(-4, 6)$
- ☐ **E.** $(4, 4)$

2. The graphs of a linear equation passes through the points $(-1, 2)$ and $(2, 8)$.

Select all the points that are also solutions to this equation. Use the graph if it helps with your thinking.

- ☐ **A.** $(0, -4)$
- ☐ **B.** $(1, 6)$
- ☐ **C.** $(-1, 2)$
- ☐ **D.** $(-2, 3)$
- ☐ **E.** $(-4, 4)$



3. Match each equation with its three solutions.

Equation	Solutions
a. $2x + y = 5$	..... $(9, 3), (5, -1), (8, 2)$
b. $y = \frac{1}{2}x - 1$	..... $(3, 2), (0, 0), (-6, -4)$
c. $x - y = 6$	..... $(1, 3), (-2, 9), (3, -1)$
d. $2x = 3y$	..... $(-4, -1), (4, 1), (16, 4)$
e. $y = \frac{1}{4}x$	..... $(2, 0), (4, 1), (-2, -3)$

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4. Kiran is determining if the ordered pair $(2, -1)$ is a solution to the equation $3x + y = 5$. His work is shown. Is he correct? Explain your thinking.

Kiran's work:

$3x + y = 5$

$3(-1) + 2 = 5$

$-3 + 2 = 5$

$-1 \neq 5$

The point $(2, -1)$ is *not* a solution to the equation.

5. Determine whether the following statement is *true* or *false*. Explain your thinking. The ordered pairs $(10, 28)$, $(-12, -17)$, and $(14, 45)$ all lie on the line whose equation is $y = \frac{5}{2}x + 13$.

Problems 6–7: Complete each table.

6. $y = -\frac{4}{5}x$

x	y
-10	
	4

7. $x + 2y = 7$

x	y
-1	
	2

Name: ..... Date: ..... Period: .....

Additional Practice 3.13

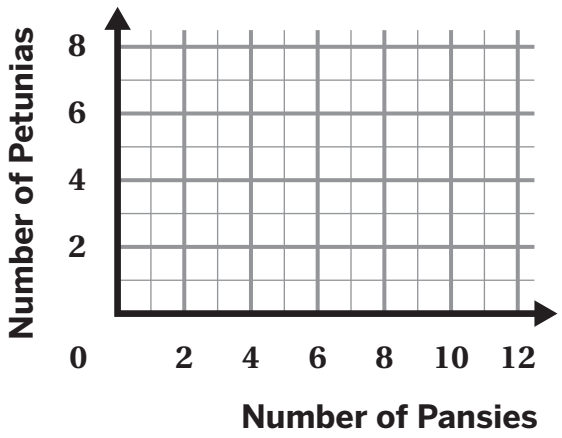
Problems 1–5: Maria has $48 to spend on flowers for her garden. A pack of pansies costs $4 each and a pack of petunias costs $6 each.

1. Complete the table to show some possible combinations of packs of pansies and packs of petunias that will cost a total of $48.

Number of Packs of Pansies	Number of Packs of Petunias

2. Write an equation that represents the relationship between the number of packs of pansies, x, and the number of packs of petunias, y, that Maria can buy.

3. Graph all possible combinations of packs of pansies and packs of petunias that will cost a total of $48.



4. What is the slope of the line? What does it tell you about this situation?

5. What are the x- and y-intercepts of the line? What do they represent in this situation?

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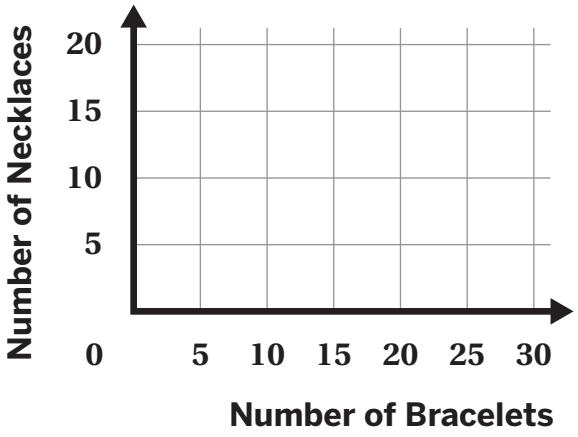
Name: ..... Date: ..... Period: .....

Problems 6–8: Jada made bracelets and necklaces to sell at the craft show. She sold her bracelets for $3 each and her necklaces for $6 each. She earned $96 in sales at the craftshow.

6. Give two possible combinations of the number of bracelets and necklaces sold that earn a total of $96 in sales.

7. Write an equation that represents the relationship between the number of bracelets, x, and the number of necklaces, y, that Jada sold.

8. Graph this relationship on the coordinate plane.

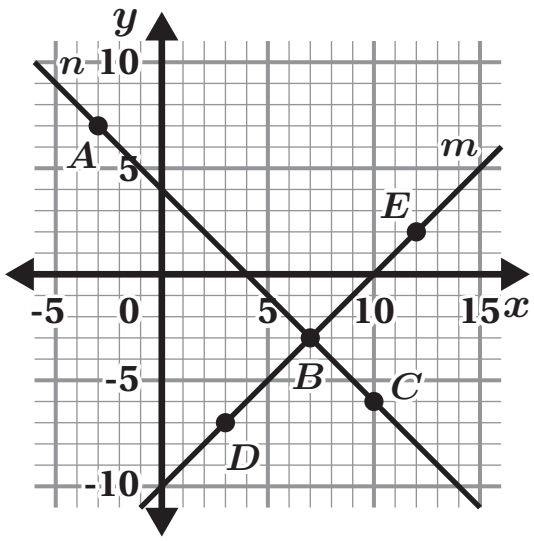


9. What are the x- and y-intercepts of the line? What do they represent in this situation?

Name: ..... Date: ..... Period: .....

Additional Practice 4.09

Problems 1–5: Here is a coordinate plane.



1. Which line represents this condition:
The coordinates of each point have a sum of 4?

Which line represents this condition:
The y-coordinate of each point is 8 less than the x-coordinate.

3. Select *all* the points whose coordinates have a sum of 4.

- ☐ **A.** Point *A*
- ☐ **B.** Point *B*
- ☐ **C.** Point *C*
- ☐ **D.** Point *D*
- ☐ **E.** Point *E*

4. Select *all* the points whose y-coordinate is 8 less than the x-coordinate.

- ☐ **A.** Point *A*
- ☐ **B.** Point *B*
- ☐ **C.** Point *C*
- ☐ **D.** Point *D*
- ☐ **E.** Point *E*

5. Select *all* the points whose coordinates have a sum of 4 and the y-coordinate is 8 less than the x-coordinate.

- ☐ **A.** Point *A*
- ☐ **B.** Point *B*
- ☐ **C.** Point *C*
- ☐ **D.** Point *D*
- ☐ **E.** Point *E*

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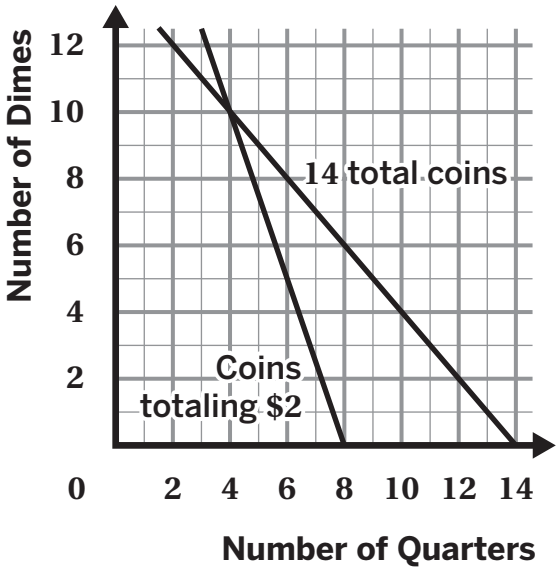
Problems 6–8: On the coordinate plane shown, one line represents combinations of dimes and quarters that have a total value of $2. The other line represents combinations of dimes and quarters when the total number of coins is 14.



6. Select *all* the combinations of coins that have a total value of $2.

- ☐ **A.** 14 quarters and 0 dimes
- ☐ **B.** 4 quarters and 10 dimes
- ☐ **C.** 6 quarters and 8 dimes
- ☐ **D.** 8 quarters and 0 dimes
- ☐ **E.** 2 quarters and 12 dimes

7. Select *all* combinations of quarters and dimes that have a total of 14 coins.

- ☐ **A.** 10 quarters and 4 dimes
- ☐ **B.** 8 quarters and 0 dimes
- ☐ **C.** 4 quarters and 10 dimes
- ☐ **D.** 2 quarters and 12 dimes
- ☐ **E.** 4 quarters and 8 dimes

8. What combination of quarters and dimes would equal both 14 coins and total $2?

- **A.** 10 quarters and 4 dimes
- **B.** 8 quarters and 0 dimes
- **C.** 2 quarters and 12 dimes
- **D.** 4 quarters and 10 dimes

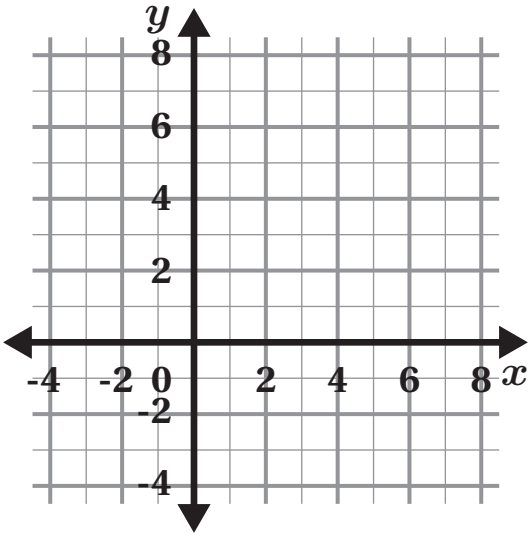
Name: ..... Date: ..... Period: .....

Additional Practice 4.10

1. Jack and Yusef are gaining weight for football. Jack weighs 205 pounds and is gaining 2 pounds per week. Yusef weighs 195 pounds and is gaining 3 pounds per week. Is there a week when they will weigh the same amount? Explain your thinking.

2. Draw a graph to determine x- and y-values that make both of the equations

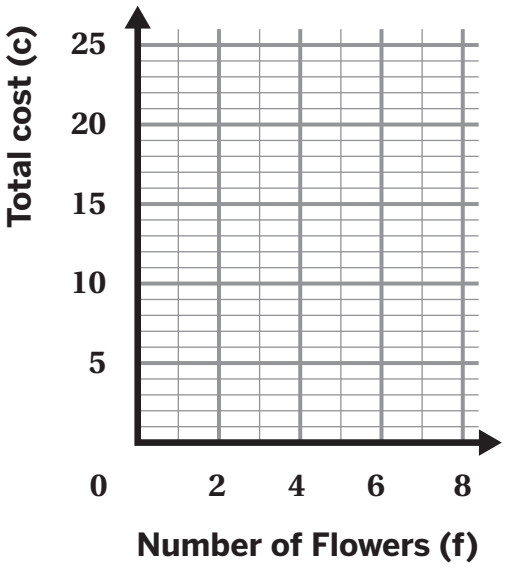
$y = 2x + 1$ and $y = -\frac{1}{2}x + 6$ true.



Problems 3–4: Trevor and Angela each bought an arrangement of flowers in a vase. The cost, c, of f flowers for Trevor's arrangement is represented by the equation $c = 2.5f + 8$. The cost, c, of f flowers in dollars for Angela's arrangement is represented by the equation c = $2f + 10$.

3. Graph the equations for the cost of each arrangement of flowers on the same coordinate plane.

4. Identify the point of intersection. What does the intersection point mean in this context?



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Problems 5–6: Han and Elena are hosting a school bake sale.

Before the sale, Han received $\$5$ in donations and will earn $\$2.50$ per baked good sold.

The table shown represents the amount of money Elena raised, where b represents the number of baked goods sold and t represents the total amount of money raised.

Number of Baked Goods Sold (b)	Total Money Raised (t)
2	14
3	16
10	30

5. How many baked goods must be sold before they raise the same amount of money? Show or explain your thinking.

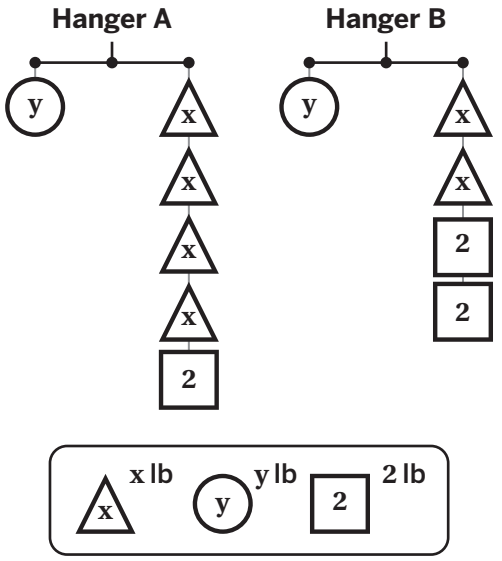
6. How much will each of them have earned at that time? Show or explain your thinking.

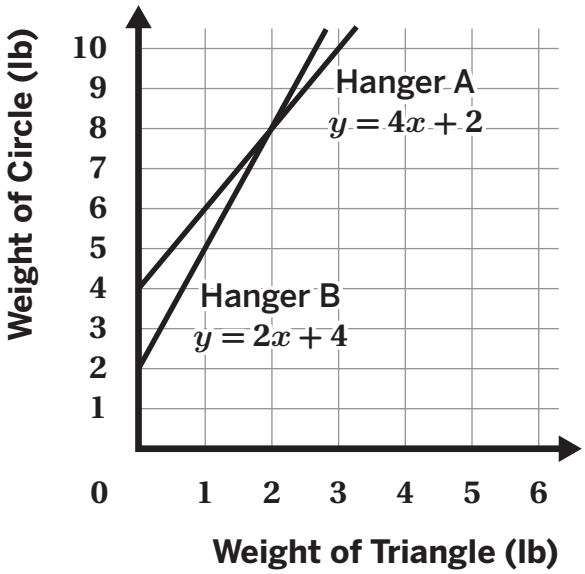
7. The point where the graphs of two equations intersect has a y-coordinate of -6.
One equation is $y = 2x - 4$.
Determine the other equation if its graph has a slope of -3.
Show or explain your thinking.

Name: ..... Date: ..... Period: .....

Additional Practice 4.11

Problems 1–2: The hangers and the graph represent the same system of equations.





1. Determine the solution to the systems of equations.

2. What does the solution tell you about the weight of a triangle and the weight of a circle that will balance the hanger?

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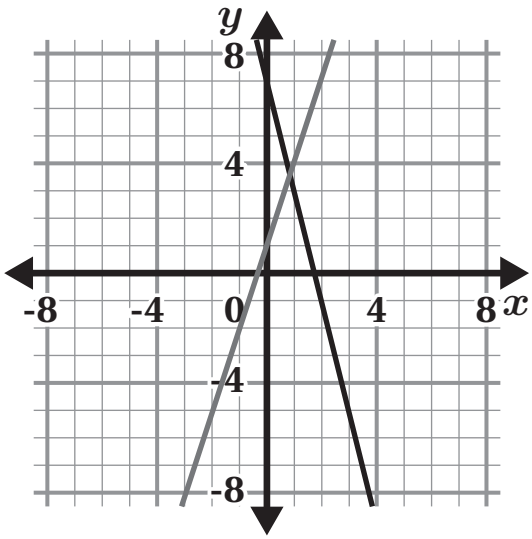
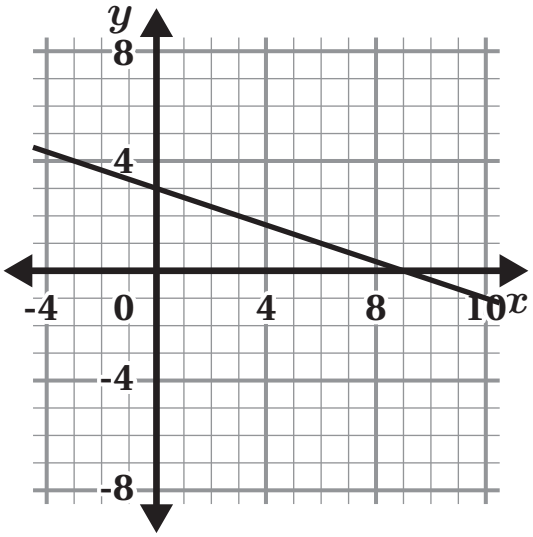
Problems 3–4: Here is a graph.



3. Write an equation that can represent each line.

4. Estimate the solution to the system.

Problems 5–7: Here is a graph that represents one equation in a system of equations.



5. Write a second equation for the system so that it has *infinitely many solutions*.

6. Write a second equation whose graph goes through $(0, -2)$ so that the system has *no solution*.

7. Write a second equation whose graph goes through $(0,-4)$ so that the system has one solution $(6, 0)$. Show or explain your thinking.

Name: ..... Date: ..... Period: .....

Additional Practice 4.12

1. What is the solution to the system of equations below?

$$y = 6$$
$$y = -\frac{1}{2}x + 4$$

A. $(6, -4)$

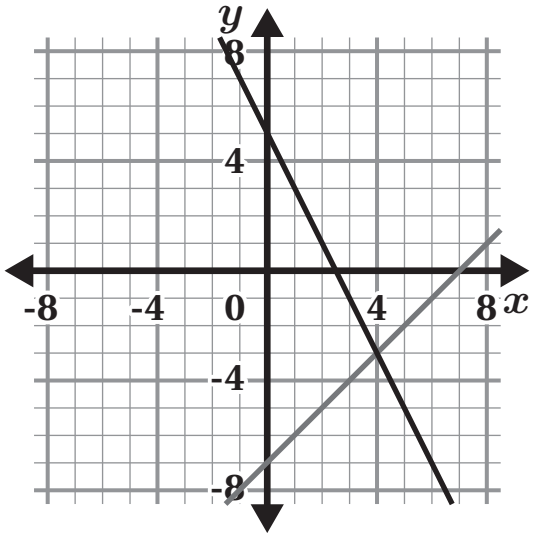
B. $(-4, -6)$

C. $(4, 6)$

D. $(-4, 6)$

Problems 2–3: Here is a graph of the systems of equations:

$$y = x - 7$$
$$y = -2x + 5$$



2. How can you determine the solution to this system of equations by looking at the graph?

3. What is the solution to the system of equations?

Problems 4–5: Solve each system of equations. Show your thinking.

4. $y = 2x + 5$
$x = -3$

5. $y = 2x - 4$
$y = -2x + 12$

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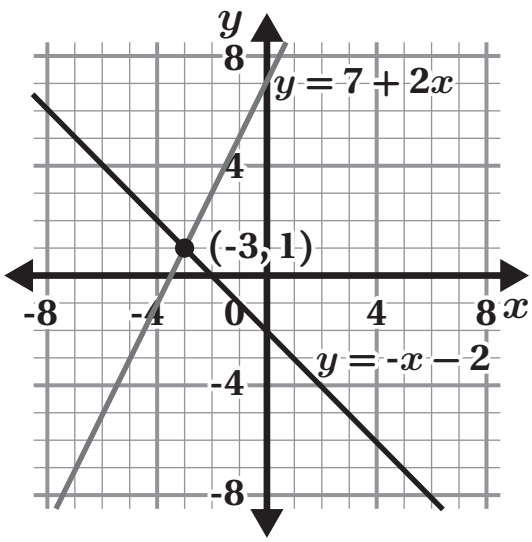
Problems 6–8: Use the lines in the graph to decide whether each statement is true or false. Show your thinking.

6. The solution to the equation $7 + 2x = -x - 2$ is $x = 1$.



7. The point $(-3, 1)$ is the solution to the following systems of equations:

$y = 7 + 2x$

$y = -x - 2$

8. The point $(0, -2)$ is a solution to the equation $y = -x - 2$.

9. The solution to a system of equations is $(-1, -4)$. Select *two* equations that might make up the system. Show or explain your thinking.

- ☐ **A.** $y = 2x + 5$
- ☐ **B.** $y = x - 3$
- ☐ **C.** $y = 3x - 1$
- ☐ **D.** $y = x + 3$
- ☐ **E.** $y = -\frac{1}{2}x + 1$

Name: ..... Date: ..... Period: .....

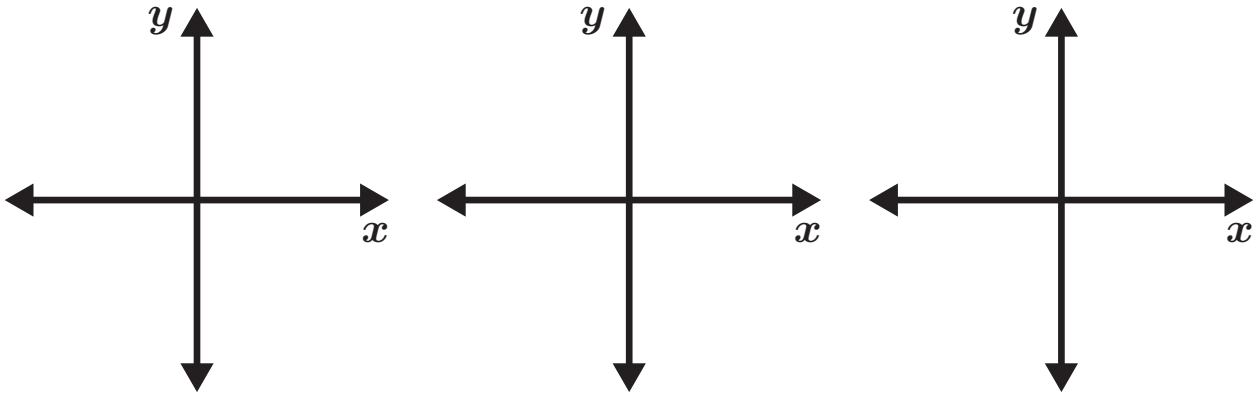
Additional Practice 4.13

Problems 1–3: Sketch two lines that match each description. Then describe the number of solutions for each system of equations.

1. Two lines with different slopes but the same y-intercept.

2. Two lines with the same slope and the same y-intercept.

3. Two lines with the same slope and different y-intercepts.



4. Which equation, together with the equation $y = -8x + 4$, creates a system with no solution? Select all that apply.

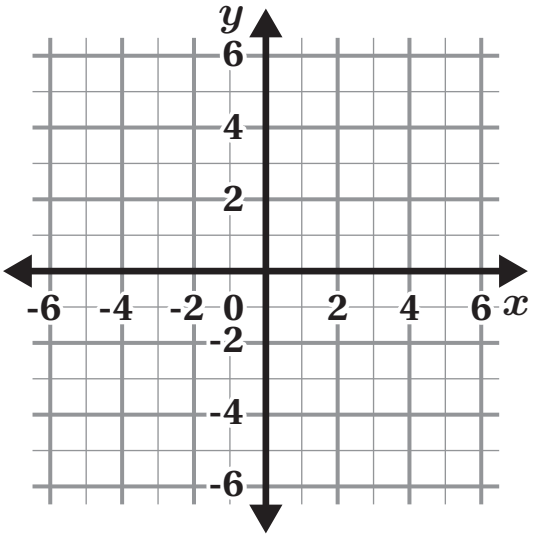
- ☐ **A.** $y = 2(4x + 2)$
- ☐ **B.** $y = 8x - 4$
- ☐ **C.** $y = -2(4x + 2)$
- ☐ **D.** $y = -8(x - \frac{1}{2})$
- ☐ **E.** $y = 4(-2x - 1)$

5. How many solutions does this system have? A graph is provided to help with your thinking, if needed.

$$y = \frac{2}{3}x - 4$$

$$y = \frac{1}{3}(2x - 6)$$

Show or explain your thinking.



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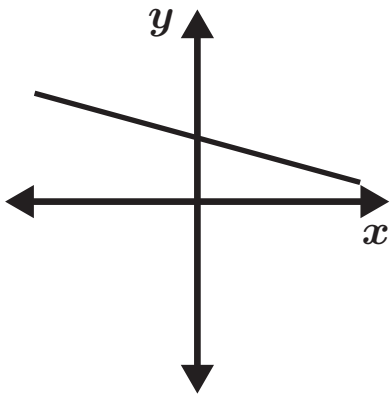
Problems 6–7: A graph of a system of equations is provided.

6. Select ***two*** of the equations below that the systems of equations shown on the graph.



- ☐ **A.** $y = -\frac{1}{2}x + 4$
- ☐ **B.** $y = -\frac{1}{2}(x + 4)$
- ☐ **C.** $y = -\frac{1}{2}(x + 16)$
- ☐ **D.** $y = -\frac{1}{2}(x - 8)$
- ☐ **E.** $y = -4 - \frac{1}{2}x$

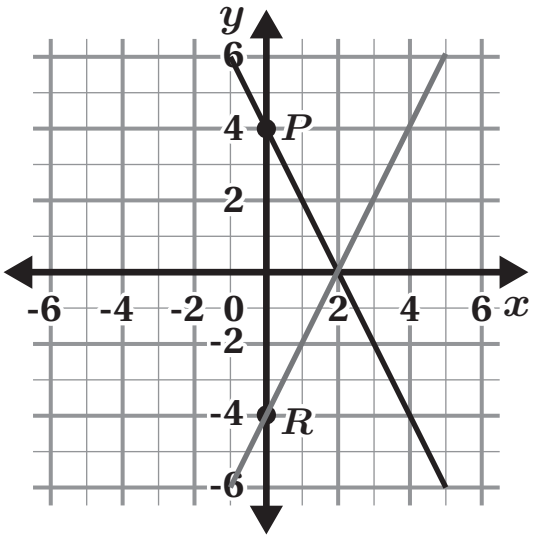
7. How many solutions does this system of equations have? Explain your thinking.

Problems 8–9: Alex graphed this system:

$$y = 2x - 4$$

$$y = -2x + 4$$

He marked its solutions with points P and R.



8. Which statement describes Alex's solutions?

- **A.** His solutions are correct.
- **B.** He marked the y-intercepts instead of the x-intercepts.
- **C.** He marked only the y-intercepts instead of the x- and y-intercepts.
- **D.** He marked the y-intercepts instead of the intersection point of the two lines.

9. What is the solution to the system of equations?

Name: ..... Date: ..... Period: .....

Additional Practice 4.14

Problems 1–6: Solve each system of equations. Show your thinking.

1. $y = -2x$
$3x + y = 10$

2. $y = 2x$
$x = 4y - 14$

3. $y = 6x + 10$
$y = -2x - 14$

4. $y = -3x + 12$
$y = 5x - 8$

5. $x = -3$
$y = 4x + 8$

6. $y = 12$
$y = \frac{1}{2}x - 4$

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Problems 7–9: Here is an incomplete system of equations.

$$y = \frac{4}{5}x + 6$$
$$y = ???$$

7. Create a second equation so that the system has no solution. Show or explain your thinking.

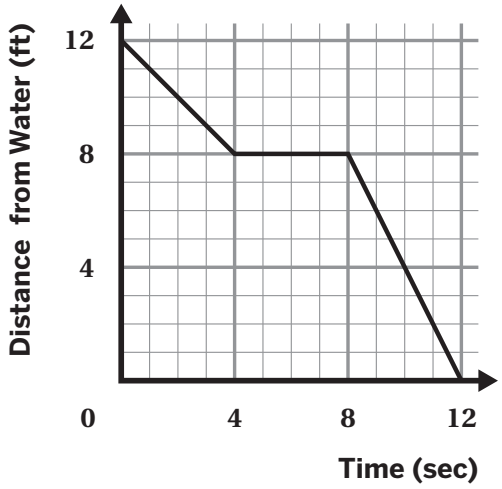
8. Create a second equation so that the system has an infinite number of solutions. Show or explain your thinking.

9. Create a second equation so that the system has a solution of $(10, 14)$.

Name: ..... Date: ..... Period: .....

Additional Practice 5.01

Problems 1–3: This graph shows a turtle's journey towards the ocean. Determine whether each statement is true or false. If the statement is false, explain your thinking.



1. The turtle was 4 feet from the water at 4 seconds.

2. The turtle was 12 feet from the water at 0 seconds.

3. The turtle's distance from the water did not change from 4 to 9 seconds.

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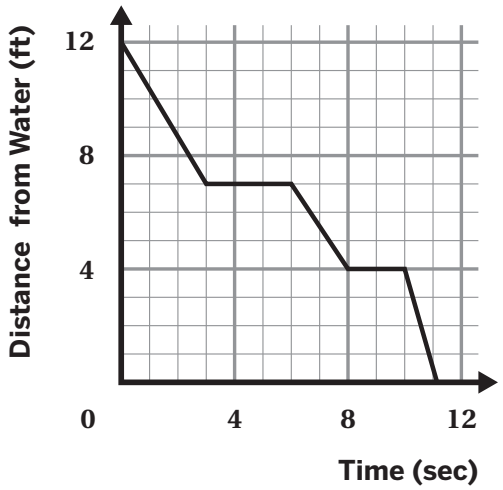
Problems 4–6: This graph represents another turtle walking across the sand towards the water.



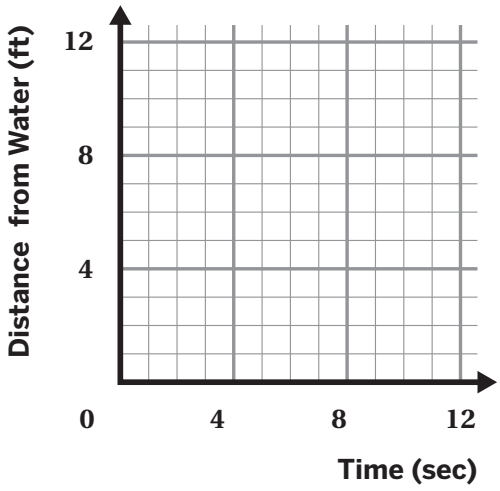
4. What story does the graph tell about the turtle's journey?

5. How far was the turtle from the water after 5 seconds?

6. After how many seconds is the turtle's distance 4 feet from the water?

A. 3 seconds **B.** 6 seconds **C.** 8 seconds **D.** 11 seconds

7. A turtle started their journey towards the ocean. When the turtle started their journey, they were 6 feet from the water. The turtle traveled for 4 seconds. When the turtle was 4 feet from the water, they rested for 4 seconds. Then, the turtle kept traveling towards the water. They reached the water at 12 seconds. Sketch a graph that could represent the turtle's distance from the water.



Name: ..... Date: ..... Period: .....

Additional Practice 5.02

1. Each table shows a set of input values with their corresponding output values. Determine whether each table could represent a function. Explain your thinking.

a

Input	Output
4	6
5	7
6	8
4	9
7	10

b

Input	Output
−4	17
−2	5
0	0
2	5
3	17

2. A birthstone is a gemstone that represents the month in which you were born. Both tables show a relationship between birthday and birthstone. For each table, the input is shown on the left, and the output is shown on the right.

Table A

Birthdate	Gemstone
October 16	Opal
July 5	Ruby
March 20	Aquamarine
June 22	Pearl
October 26	Opal

Table B

Gemstone	Birthdate
Opal	October 16
Ruby	July 5
Aquamarine	March 20
Pearl	June 22
Opal	October 26

Which table(s) represent a function?

A. Table A **B.** Table B **C.** Neither **D.** Both

3. Kiran earns an hourly wage. Determine whether each statement is *true* or *false*. Explain your thinking.

a Kiran's earnings are a function of his hours worked.

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b Kiran's hours worked are a function of his earnings.

c Kiran's earnings are a function of the number of people working.

4. A partially completed input-output table is shown. Complete the table so that it represents a function.

Input	Output
−5	25
	9
−1	1
	4
5	
10	

5. Diego wants to know if it is possible for a function to have more than one input value, but only one output value. What would you tell Diego? Explain your thinking.

Input			
Output			

6. Identify a possible rule for the table shown.

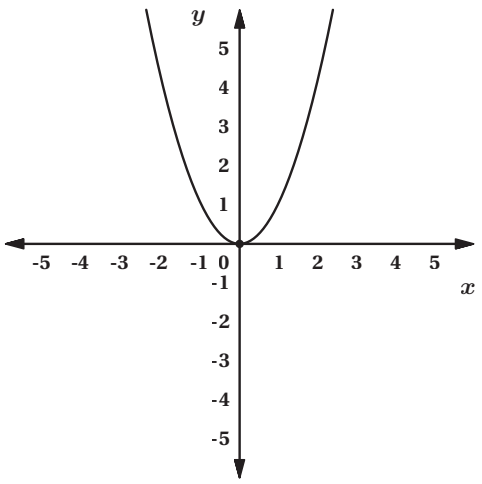
Input	Output
1	1
2	1
0	No output
−1	0
−2	0

Name: ..... Date: ..... Period: .....

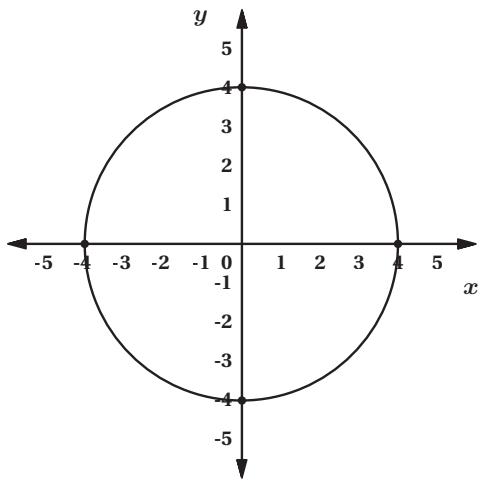
Additional Practice 5.03

1. Which graph represents y as a function of x?

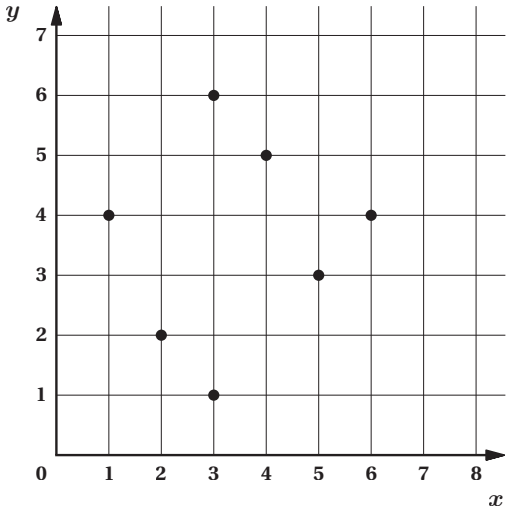
A.



B.



2. Refer to the graph. Which point on the graph could you remove so that y is a function of x?



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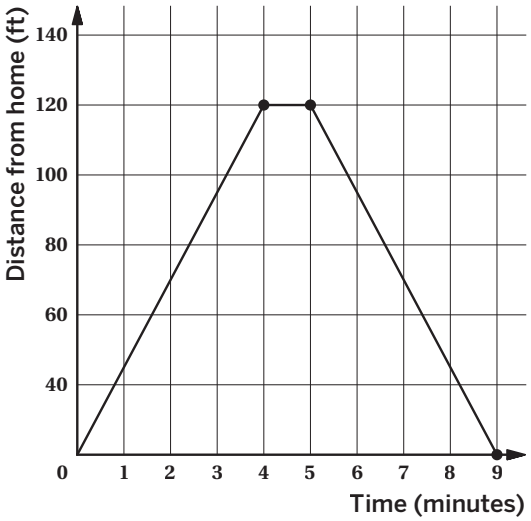
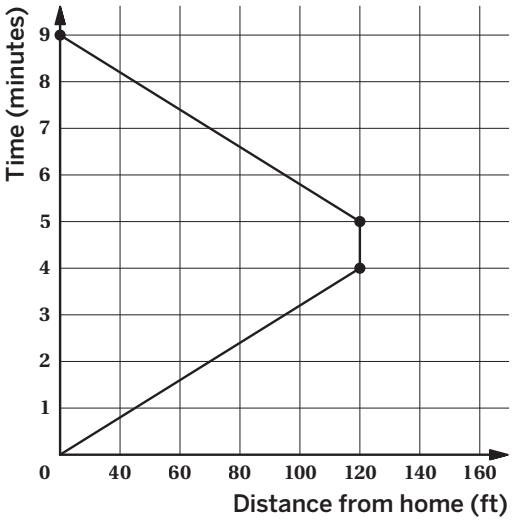
Name: ..... Date: ..... Period: .....

3. Clare rode her bike to her friends house and back. Both graphs show the relationship between her time and the distance from the starting point.

Graph A



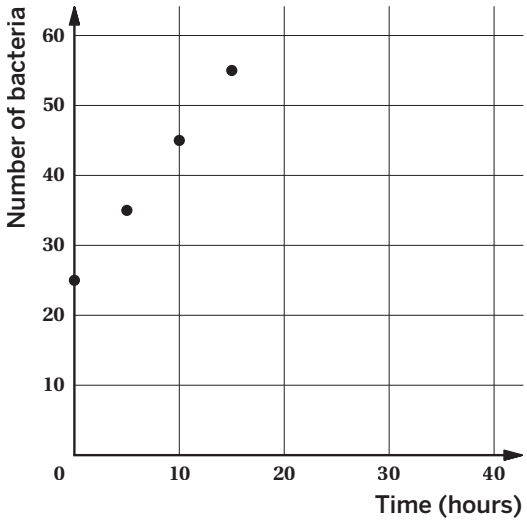
Graph B



Which graph represents Clare's distance from her house as a function of time? Explain your thinking.

A. Graph A **B.** Graph B **C.** Both graphs **D.** Neither graph

4. A scientist graphs the growth of a strain of bacteria. The graph represents a function. Suppose there was the same number of bacteria at 20 and 22 hours. Would the graph still be a function? Explain your thinking.



Name: ..... Date: ..... Period: .....

Additional Practice 5.04

1. Which equation expresses the output as a function of the input for the following scenario?

The amount your school charges c for t tickets to the school play that cost $\$4$ each.

A. $c = \frac{1}{4}t$

B. $t = \frac{1}{4}c$

C. $c = 4t$

D. $t = 4c$

2. Refer to the real-world description in Problem 1. Identify the independent variable and dependent variable.

a amount your school charges or c

b tickets or t

3. For each description, write an equation that expresses the output as a function of the input. Then determine the independent and dependent variables.

a The circumference C, of a circle with diameter, d.

Equation:

Independent variable:

Dependent variable:

b The selling price p, after a markup of 15% is applied to the original price of an item r.

Equation:

Independent variable:

Dependent variable:

c The area A, of a square with a side length s.

Equation:

Independent variable:

Dependent variable:

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4. Han's family car averages 25 miles per gallon when driven. Han writes the equation $y = 25x$ to represent the distance, in miles, his family has traveled on a certain number of gallons of gasoline.

a Based on the equation, which variable represents the independent variable? Which variable represents the dependent variable?

b What do the independent variable and dependent variable represent in this situation?

5. Mai is buying vegetable plants for her garden. Tomato plants cost \$3 each and pepper plants cost \$1 each. Mai has \$24 to spend on these plants. Let t represent the number of tomato plants Mai buys and p represent the number of pepper plants Mai buys.

a Write an equation relating the two variables.

b Rewrite the equation so that it expresses p as the dependent variable in terms of t as the independent variable.

c Rewrite the equation so that it expresses t as the dependent variable in terms of p as the independent variable.

6. To determine the number of degrees Fahrenheit of a temperature given in degrees Celsius, you multiply the degrees Celsius by $\frac{9}{5}$ and add 32. For each description, write an equation that expresses the output as a function of the input. Then determine the independent and dependent variables.

a The temperature in degrees Celsius C, based on the temperature in degrees Fahrenheit F.

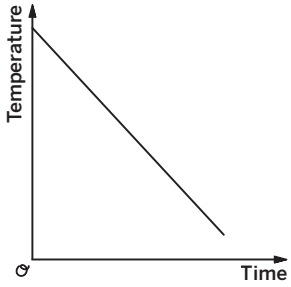
b The temperature in degrees Fahrenheit F, based on the temperature in degrees Celsius C.

Name: ..... Date: ..... Period: .....

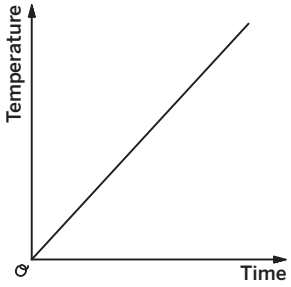
Additional Practice 5.05

1. Which graph(s) represents an increasing function? Select *all* that apply.

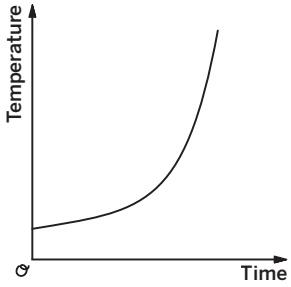
☐ A



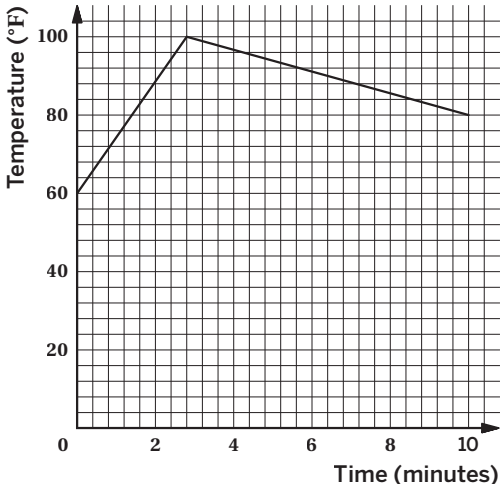
☐ B



☐ C



2. The graph shows the temperature of a liquid in a mug over time. Which best describes the graph of the function?



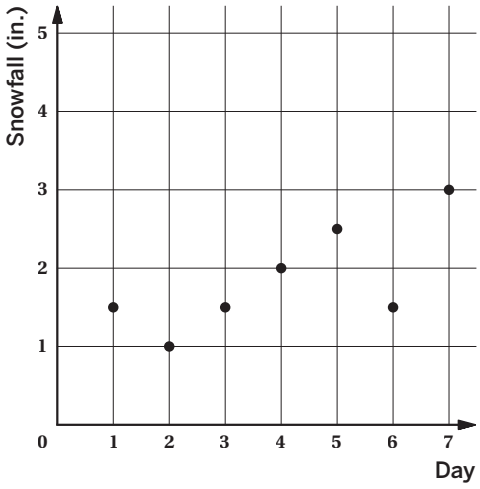
A. The temperature of the liquid slowly increases, and then slowly decreases over time.

B. The temperature of the liquid quickly decreases, and then slowly increases over time.

C. The temperature of the liquid quickly increases, and then decreases even faster over time.

D. The temperature of the liquid quickly increases, and then decreases more slowly over time.

3. The graph shows the total amount of snow that fell each day over a 7-day period.



a What was the amount of snowfall for Day 2?

b On which day(s) was the amount of snowfall 1.5 in.?

c Is the amount of snowfall a function of the day or is the day a function of the amount of snowfall? Explain your thinking. Then determine the independent and dependent variables.

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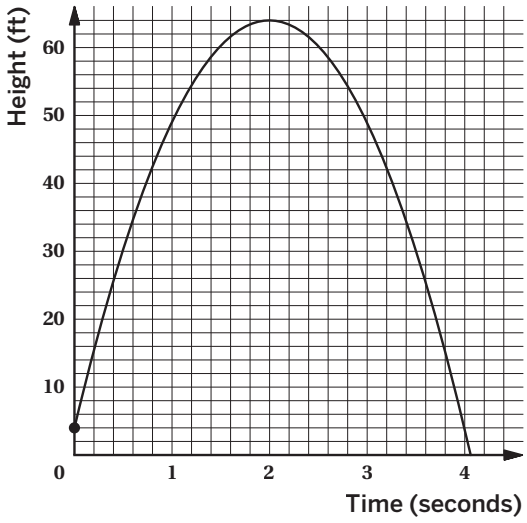
4. Andre's science class is launching model rockets from a picnic table. The graph represents a model rocket that is launched upward, that then falls to the ground.



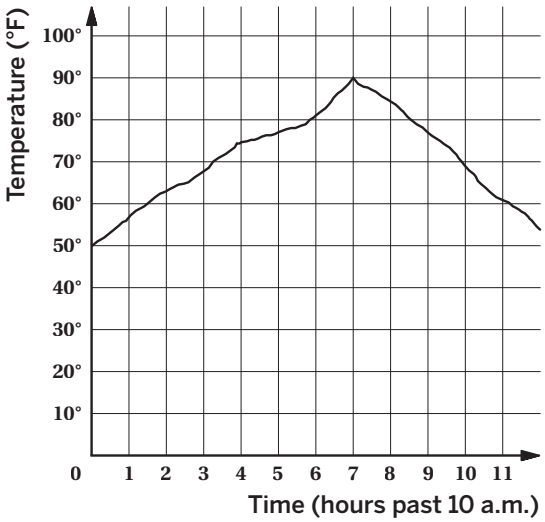
a What is the height at which the model rocket was launched?

b Plot the point that represents the greatest height of the model rocket. How long did it take for the model rocket to reach that height?

c Determine one time interval when the height of the object was increasing.

d Determine one time interval when the height of the object was decreasing.

5. The graph shows the temperature between 10 a.m. and 10 p.m. for one day in the city in which Lin lives.

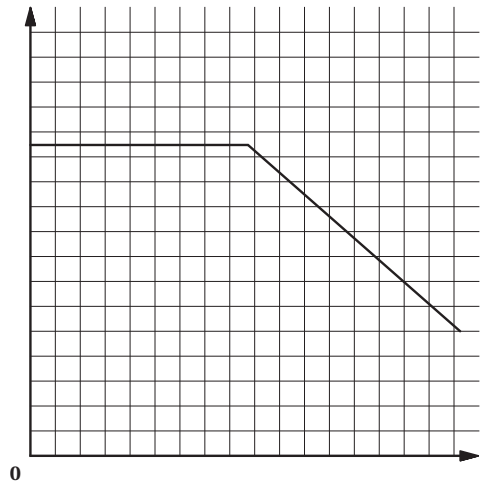


a When the input is 7, what is the output? What does that tell you about the time and temperature?

b Determine one time interval when the height of the object was increasing.

c Determine one time interval when the height of the object was decreasing.

6. Describe a real-world situation that would represent the graph. Label your axis.



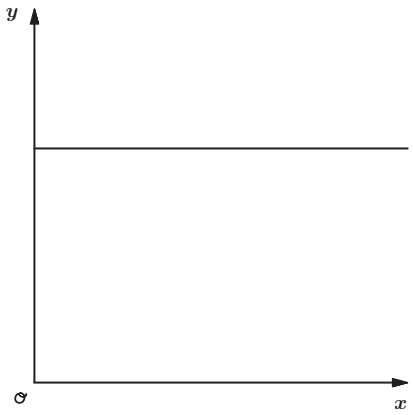
Name: ..... Date: ..... Period: .....

Additional Practice 5.06

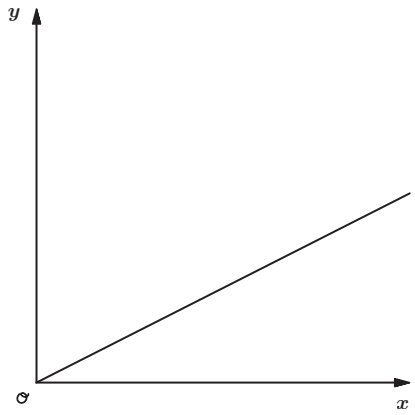
1. Which graph represents the following scenario?

Noah walks from his home to the park at a steady pace without stopping.

Graph A



Graph B



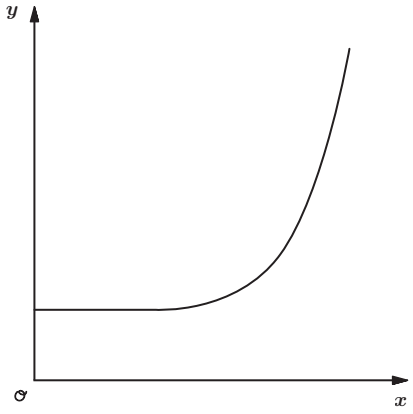
2. Refer to the scenario in Problem 1. Indicate whether the variable described is the possible *independent* or *dependent* variable.

a Distance from home

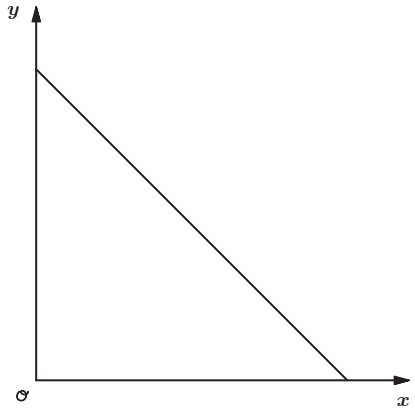
b Time

3. For each scenario, determine which graph best represents it. Then identify the possible independent and dependent variables and how you would label the axes.
Note: You may select a graph more than once.

Graph 1



Graph 2



a Mai has some money saved and starts spending the same amount each week.

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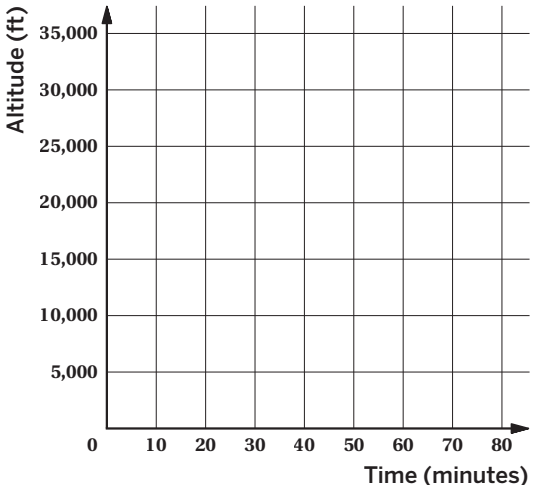
b The day started cold, but then it got warmer.

c The attendance at fitness class was low and consistent, and then started increasing each week.

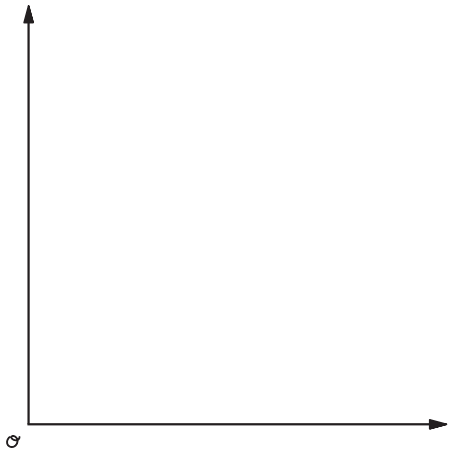
4. An airplane was at an altitude of 5,000 ft. It took the airplane 30 minutes to go from an altitude of 5,000 ft to 30,000 ft. Once at that altitude, the airplane flew for 20 minutes. Then it took the plane 20 minutes to reach an altitude of 10,000 ft.

Sketch a graph that represents this situation.



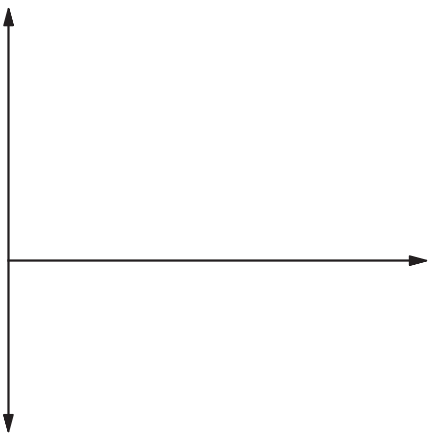
5. Tyler got on his rollerblades. He was slowing increasing his speed but then fell down. He got up and continued rollerblading, gradually increasing his speed.

Sketch a graph that corresponds with Tyler's speed, in miles per hour, after several minutes. Be sure to label the axes.



6. Kiran was on a water slide. He slid down the slide and dove into the water. He was below the surface water and immediately swam to the surface of the water. He swam at the surface of the water for a few minutes.

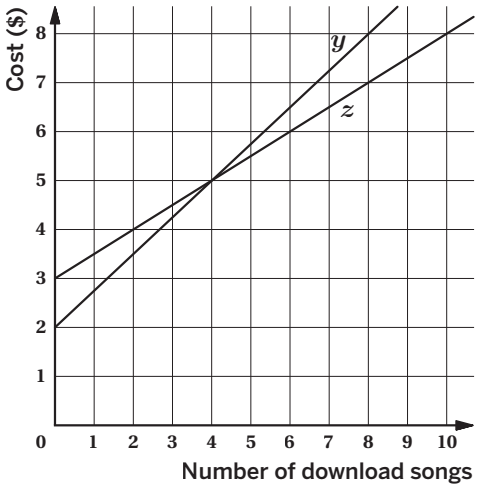
Sketch a graph that corresponds with Kiran's elevation at the distances from the edge of the pool. Be sure to label the axes.



Name: ..... Date: ..... Period: .....

Additional Practice 5.07

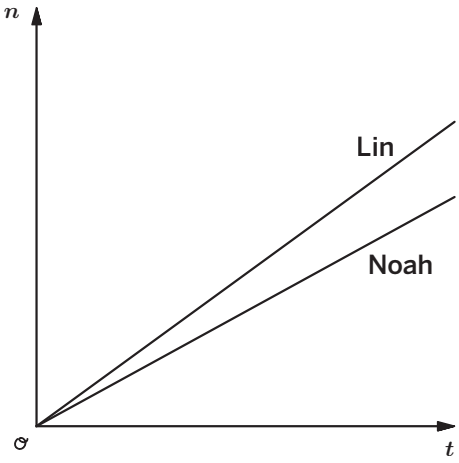
1. Andre is considering two online music subscriptions. Company A charges $\$3$ per month plus $\$0.50$ per downloaded song. Company B charges $\$2$ per month plus d dollars per downloaded song. Match the companies to the lines y and z shown on the graph.



Company A represents line .....

Company B represents line .....

2. Noah and Lin are having a typing contest. The graph shows the number of words typed n for each student from the start of the contest as a function of time t. Who is typing faster? Explain your thinking.



3. Mai and her sister each want to buy a new scooter and they plan to borrow money from their parents. They each plan to repay their parents the same amount of money every week, but Mai's scooter costs less than her sister's scooter. On a graph, the amount they owe their parents, in dollars, is a function of the time from when they begin paying their parents back the money they owe them.

a As you read the graphs from left to right, would you expect the lines to increase or decrease?

b What would you expect to be *different* about the lines representing the amount Mai owes her parents and the amount her sister owes her parents? Explain your thinking.

c What would you expect to be *similar* about the lines representing the amount Mai owes her parents and the amount her sister owes her parents? Explain your thinking.

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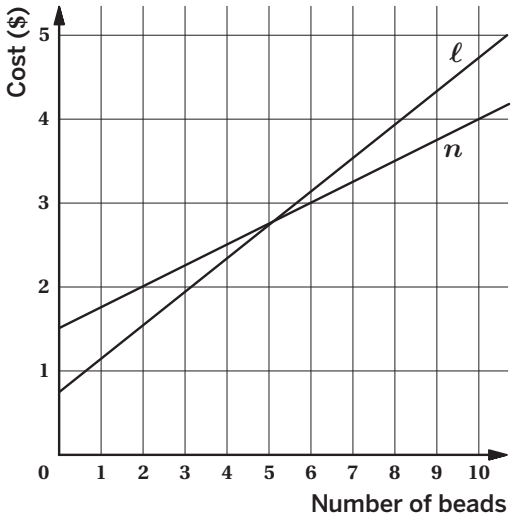
4. Shawn and Elena each sell customized bracelets. Shawn charges $\$0.75$ plus $\$0.40$ per bead added to the bracelet. Elena charges $\$1.50$ plus d dollars per bead added to the bracelet.

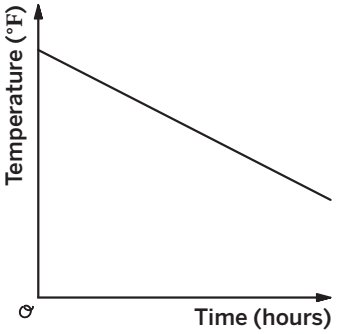


a Match each person to the lines ℓ and n shown on the graph.

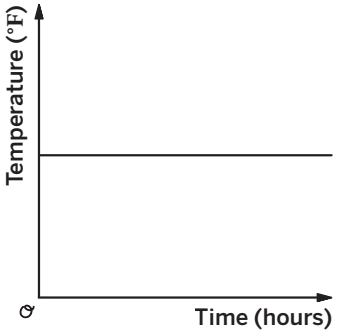
b For Elena, is the additional charge per bead greater than or less than $\$0.40$ per bead? Explain your thinking.

5. One day, a certain city's temperature steadily increased from noon to 6 p.m. Then from 6 p.m. until midnight its temperature steadily decreased.

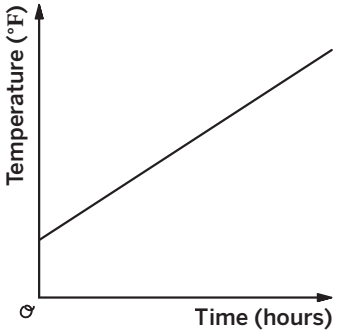
A.



B.



C.



a Which of the graphs is most likely to represent the temperature from noon to 6 p.m.? Explain your thinking.

b Which of the graphs is most likely to represent the temperature from 6 p.m. to midnight? Explain your thinking.

c Why does the other graph not likely represent the temperature during either time span? Explain your thinking.

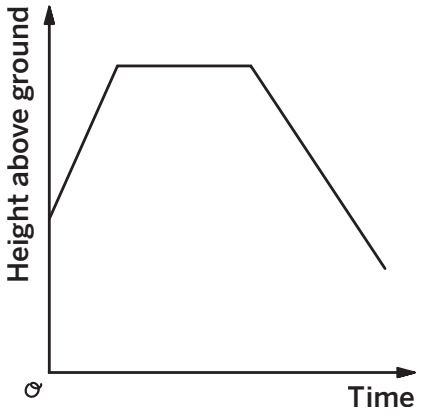
6. Fitness Center A charges $\$25$ per month plus $\$2$ per visit. The monthly cost of Fitness Center B is represented by $y = 2x + 20$ where x is the number of visits. What can you conclude about the monthly costs of the fitness centers? Explain your thinking.

Name: ..... Date: ..... Period: .....

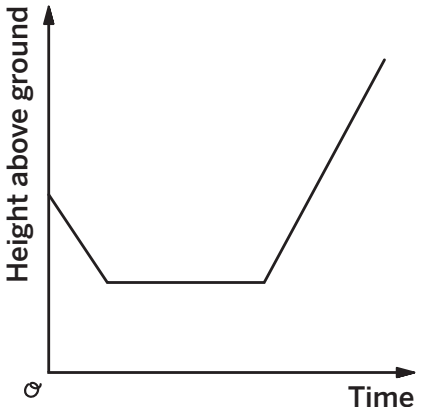
Additional Practice 5.09

1. The graph shows the height above ground of two elevators over time. Match each graph to the situation it represents.

Graph 1



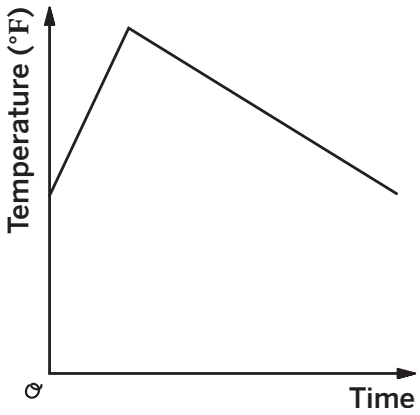
Graph 2



a The elevator starts at the fourth floor, then stops at the second floor, and then goes up to the seventh floor.

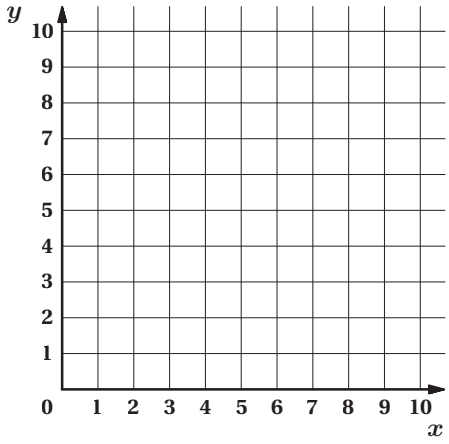
b The elevator starts at the third floor, then stops at the sixth floor, and then goes down to the second floor.

2. Mai had a teacup of water. The graph shows the temperature of water in a teacup. Describe a possible situation that could represent the graph.



3. The following statements are descriptions of the linear segments that make up a piecewise function. Draw a graph of the piecewise function described.

- Starts at the y-intercept 1.
- Increasing at its greatest constant rate from $x = 0$ to $x = 3$.
- Has a slope of 0 from $x = 3$ to $x = 6$.
- Decreasing at a constant rate from $x = 6$ to $x = 8$.
- Has a slope of 0 from $x = 8$ to $x = 10$.



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Name: ..... Date: ..... Period: .....

4. Clare walked her dog to the dog park and let the dog play at the park. Then she walked home.

a The graph shows her distance walked in yards, as a function of time, in minutes. Add the axes labels to the graph to show this.

b When did she reach the dog park?

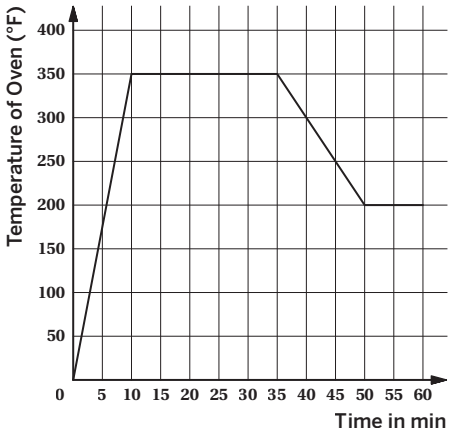
c How far did Clare walk to get to the dog park?

d How long were Clare and her dog at the dog park?

e At what rate did she walk to the dog park?

f At what rate did she walk home from the dog park?

5. Andre's dad is baking a casserole. He preheated the oven. The graph shows the temperature of the oven from when he turned the oven on.

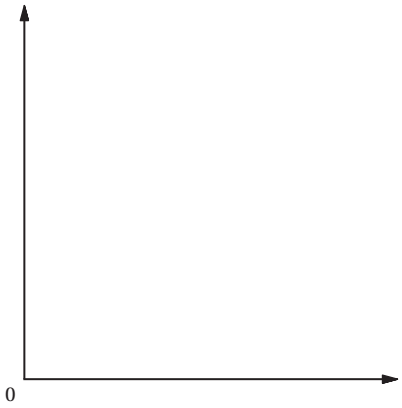


a When was the temperature of the oven increasing?

b What was happening from 10 minutes to 35 minutes after the stove was turned on?

c What rate did the temperature of the oven increase?

6. Noah graphed the growth of his flower. The flower grew at a steady rate until it reached its full height and then stopped growing.



a What does Noah's graph look like?

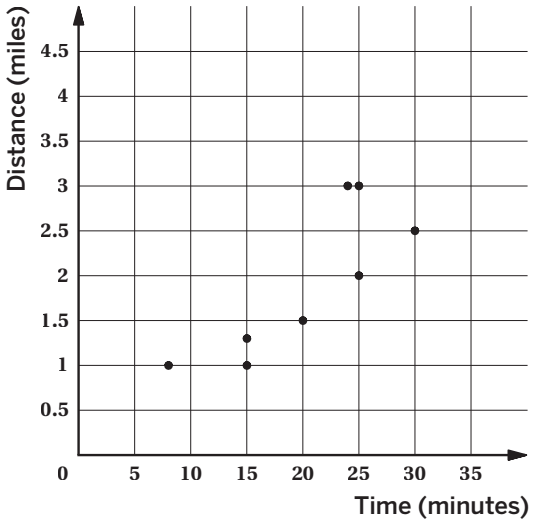
b Han suggested that Noah's flower had a constant growth rate during this time because all parts of the graph can be represented by straight lines. Is he correct? Explain your thinking.

Name: ..... Date: ..... Period: .....

Additional Practice 6.01

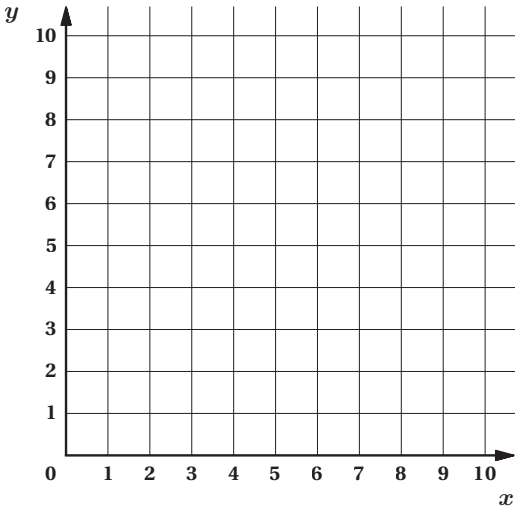
1. The graph shows the relationship between the amount of time, in minutes, and the distance, in miles, ran by eight different runners. Determine the coordinates for each point in the scatter plot.

Time (minutes) x	Distance (miles) y



2. Create a scatter plot from the data shown in the table.

x	y
3	2
4	4
2	5
7	5
4	3
3	6
1	8
6	6



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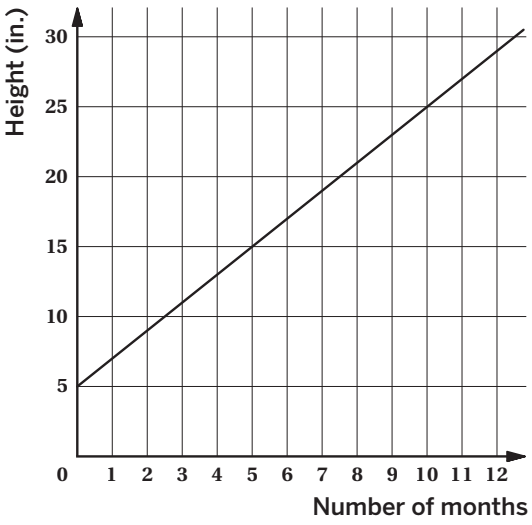
3. Refer to the scatter plot in Problem 1. What patterns, if any, do you see in the data? Explain your thinking.

4. When is it helpful to use a table to represent data instead of a scatter plot? Explain your thinking.

5. The graph shows the height h in inches of a house plant m months after it has been planted.

a Write an equation that gives the plant's height h after m months.

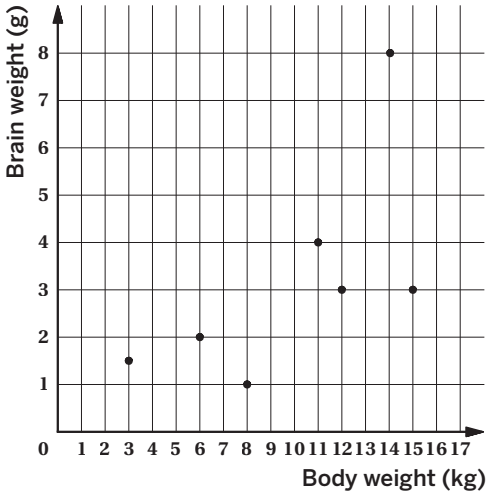
b After how many months will the plant be 95 in. tall? Show or explain your thinking.



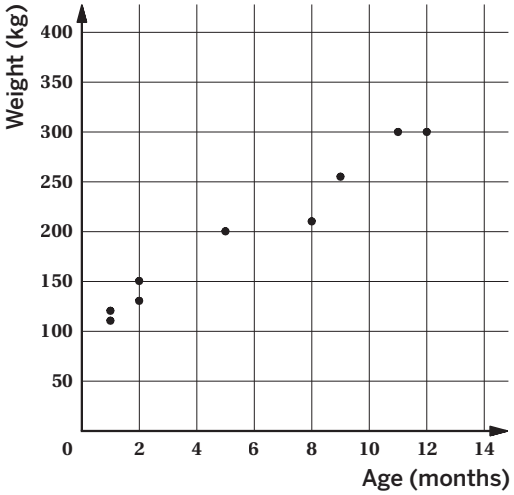
Name: ..... Date: ..... Period: .....

Additional Practice 6.02

1. The scatter plot shows the body weight and brain weight, in grams, of eight small animals. Circle the point that represents the animal with the lightest brain.

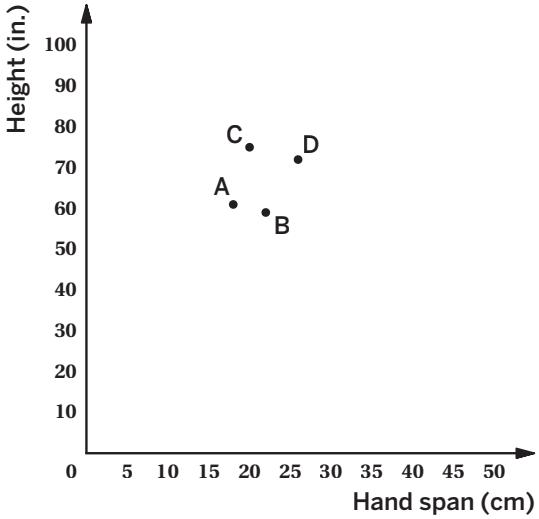


2. The scatter plot shows the age, in months, and weight, in kilograms, of nine elephants. Which elephant(s) weigh the most? Circle those points. Then list the age(s) and weight(s) of the elephant(s).



3. The table shows the hand span, in centimeters, and the height, in inches, of five middle school students. Add a point to the graph that represents Student E.

Student	Hand span (cm)	Height (in.)
A	18	61
B	22	59
C	20	75
D	26	72
E	20	72



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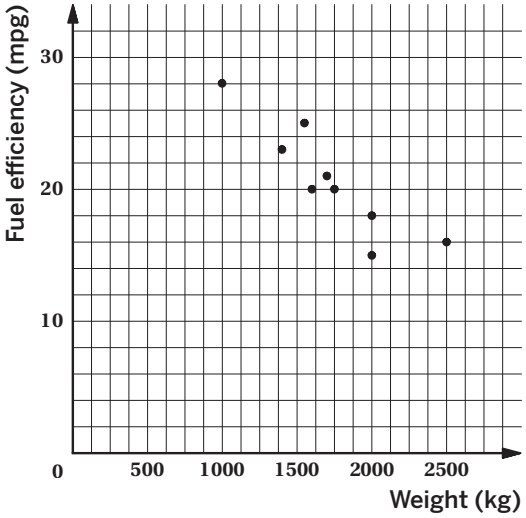
Name: ..... Date: ..... Period: .....

4. The fuel efficiency of a vehicle can be expressed as the distance traveled per unit of fuel used, e.g., miles per gallon (mpg). The scatter plot shows the weight and fuel efficiency of nine different cars.



a How much does the heaviest car weigh?

b What is the weight and fuel efficiency of the car with the highest fuel efficiency?

c Plot a point on the graph that represents a car that has a fuel efficiency less than 20 mpg and a weight of 1,500 kg.

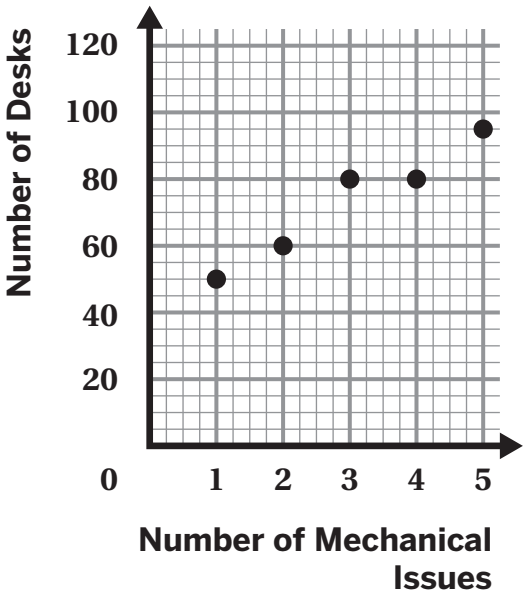
5. The table from a local clothing store compares the average monthly temperature, in degrees Celsius, to coat sales, in dollars. Elena plans to create a graph to represent this data. What does the point (13, 840) represent?

Temperature (degrees Celsius)	Coat sales (dollars)
1	1,245
3	1,040
7	1,115
13	840
24	235

Name: ..... Date: ..... Period: .....

Additional Practice 6.03

Problems 1–4: A factory produces wood desks for offices. This scatter plot shows the number of mechanical issues and the number of desks produced for five machines at a factory.



1. What is the number of desks produced at a machine with the most mechanical issues?

2. What is the number of mechanical issues for a machine that produces the least number of desks?

3. The number of desks produced at a machine that has 0 mechanical issues is 60 desks. Plot a point on the graph that represents this machine.

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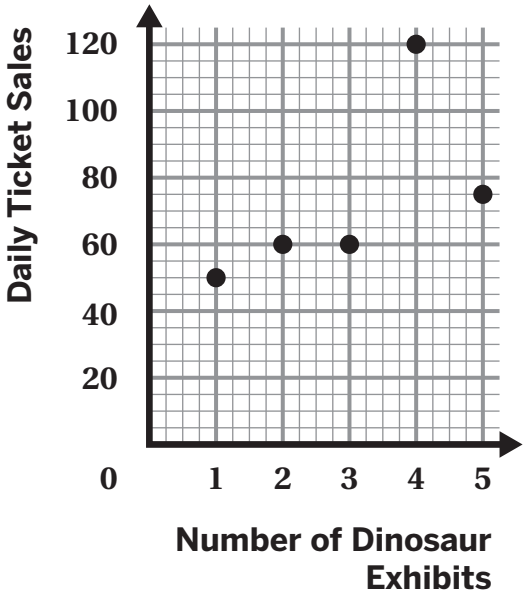
Problems 5–6: A study gathered data about different natural history museums. The table and scatter plot shows the number of exhibits and the number of daily ticket sales for each museum.

Museum	Dinosaur Exhibits	Daily Ticket Sales
National Dinosaur Museum	4	120
Time Capsule Institute	2	60
The Hall of History	1	50
The Museum of National Treasures	5	75
The Hall of Historical Tales	3	60



5. Circle the point on the scatter plot that represents the data for the National Dinosaur Museum.

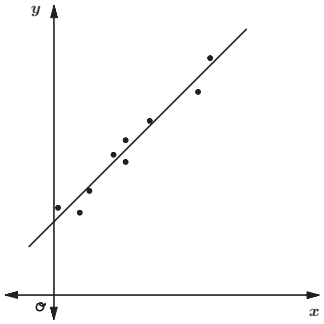
6. What does the point $(1, 50)$ represent?

Name: ..... Date: ..... Period: .....

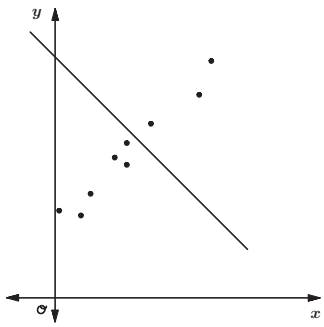
Additional Practice 6.04

1. Select the graph whose line best fits the data.

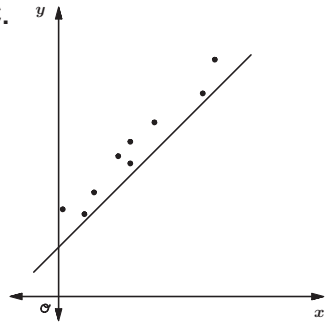
☐ A.



☐ B.

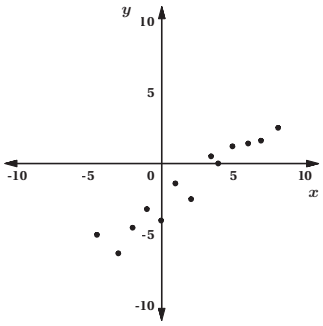


☐ C.

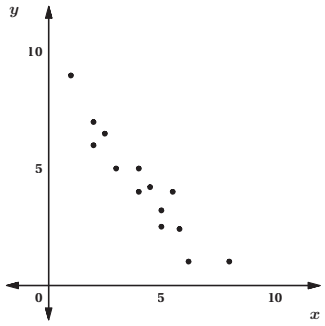


2. For each graph, draw a line that models the data.

a

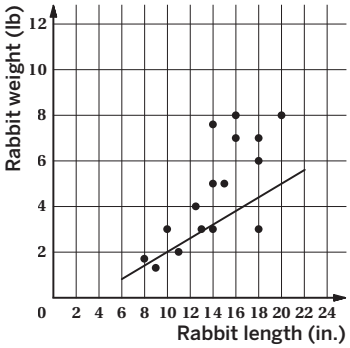


b

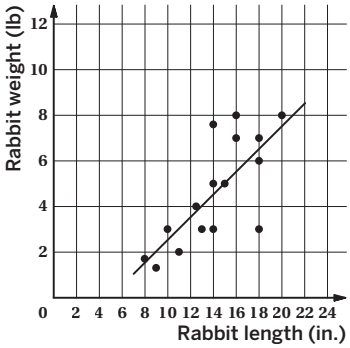


3. The two scatter plots have the same data, but different lines. Which line is a better fit? Explain your thinking.

A.



B.



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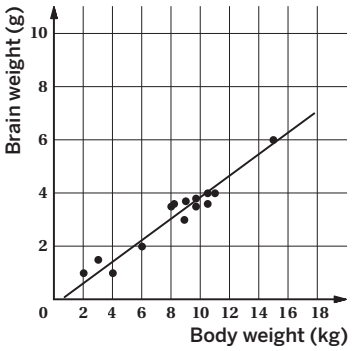
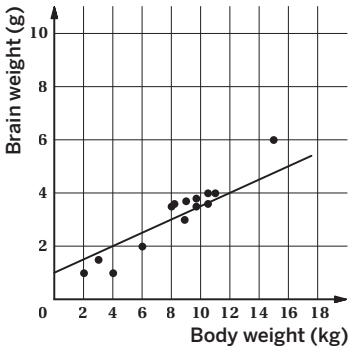
Name: ..... Date: ..... Period: .....

4. The two scatter plots have the same data, but different lines. Which line is a better fit? Explain your thinking.

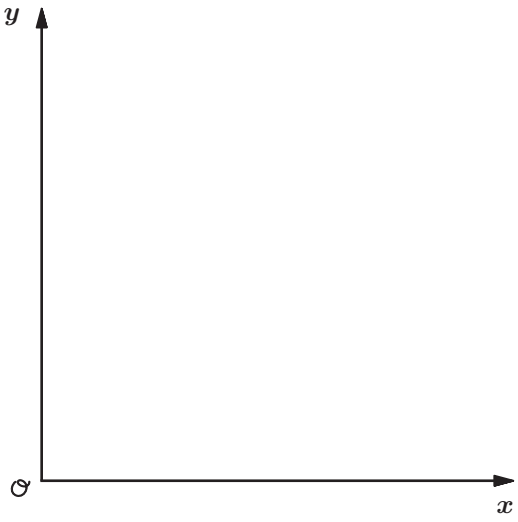
A.



B.



5. Create a scatter plot that has a positive association without clustering. Then draw a line of fit for your scatter plot.



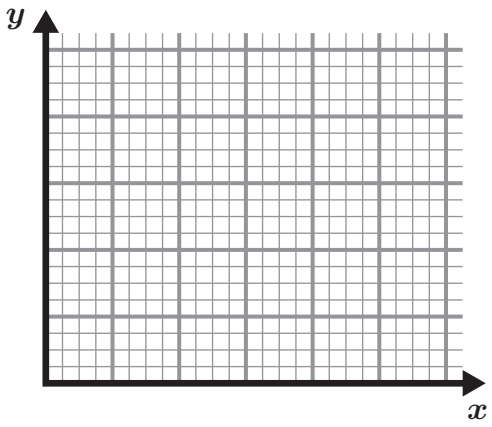
Name: ..... Date: ..... Period: .....

Additional Practice 6.05

Problems 1–2: Use the table.

x	*y*
1	2
2	5
3.5	6
4	8
5	8.5
5.5	9

1. Create a scale for the graph so it fits all the data. Then create a scatter plot of the data.



2. What pattern do you notice in the scatter plot?

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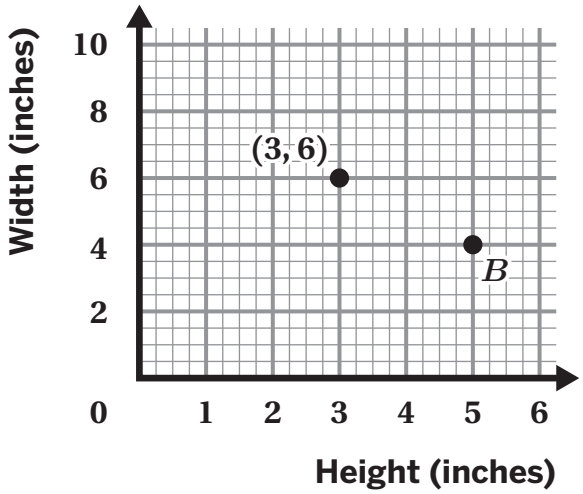
Name: ..... Date: ..... Period: .....

Problems 3–5: The graph shows the height and width of sketchbooks available at an art store.



3. What does the point $(3, 6)$ tell you about the sketchbook?

4. Plot a point to represent a different sketchbook that has a height of 4 inches and a width of 9 inches.

5. What values represent point *B*?

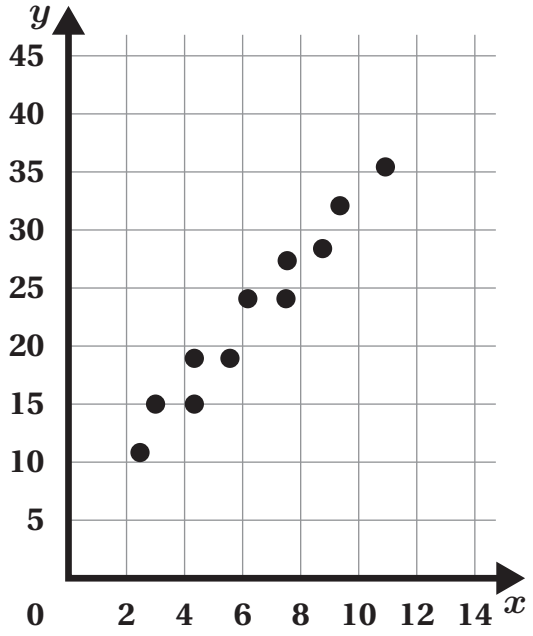
- ☐ **a.** $(5, 4)$
- ☐ **b.** $(4, 5)$
- ☐ **c.** $(4, 4)$
- ☐ **d.** $(4, 6)$

Name: ..... Date: ..... Period: .....

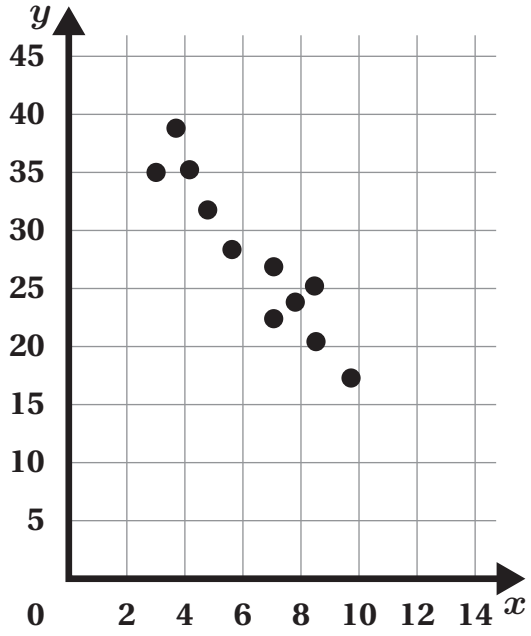
Additional Practice 6.06

Problems 1–2: Sketch a line that fits the data.

1.

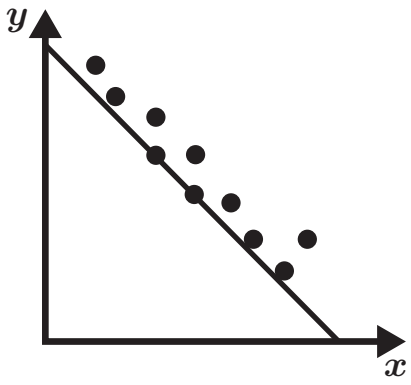


2.

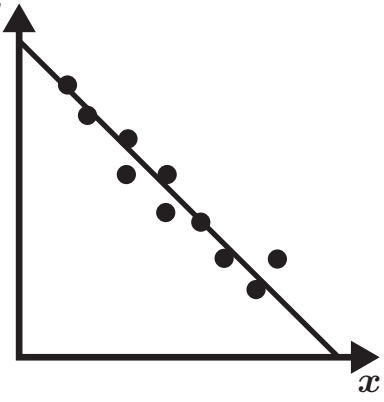


3. Which line best fits the data? Explain your thinking.

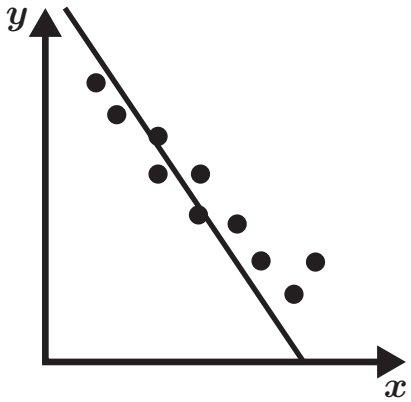
A.



B.



C.



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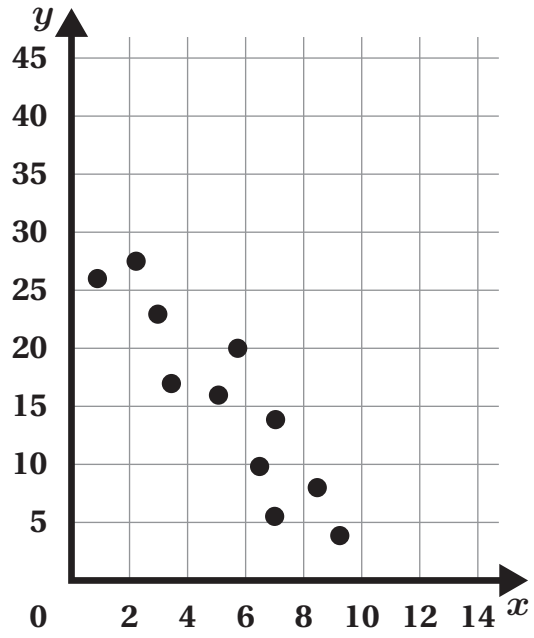
Problems 4–5: Use this scatter plot.



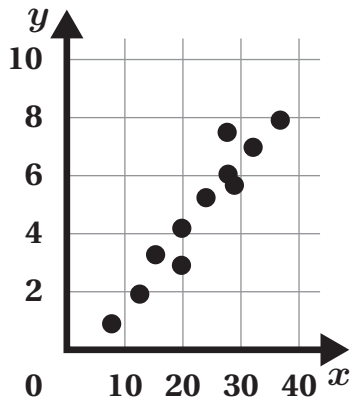
4. Sketch a line of fit for the data.

5. If a new data point has an x-value of 4, what does your line of fit predict for the value of y? Explain your thinking.

Name: ..... Date: ..... Period: .....

Additional Practice 6.07

1. Which type of association does the scatter plot show?



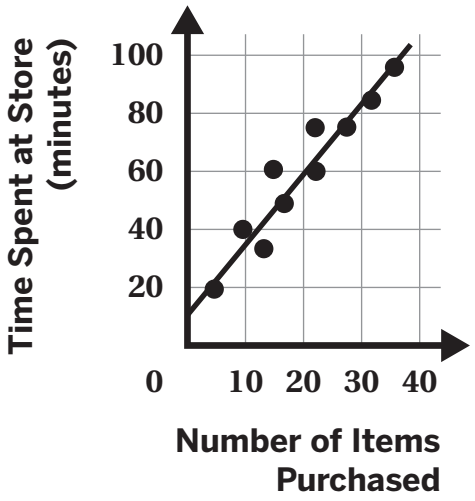
A. Positive association

B. Negative association

C. No association

Explain your thinking.

Problems 2–4: The scatter plot shows the data from 10 customers shopping at a supermarket. The equation for this linear model is $y = 4.1x + 15.6$.



2. What is the slope of the linear model?

3. What does the slope represent in this situation?

4. What type of association is there between the number of items purchased and time spent at the store? Circle your choice.

Positive association **Negative association** **No association**

Explain your thinking.

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Problems 5–6: Librarians looked at the relationship between the minutes spent reading a book (daily) and the number of spelling errors made when writing an email. They found the variables had a negative association.

5. What does this negative association mean about the relationship between time spent reading and the number of spelling errors when writing an email?

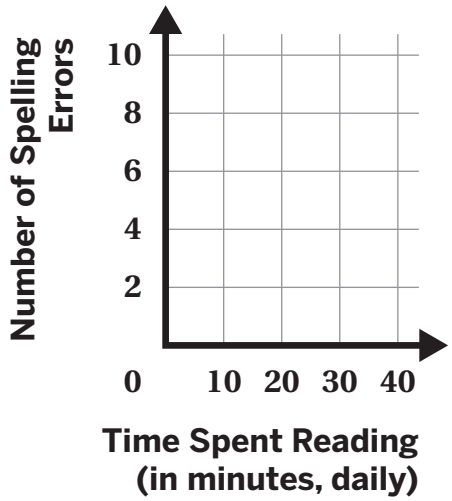
A. As the time spent reading increases, the number of spelling errors decreases.

B. As the time spent reading increases, the number of spelling errors increases.

C. As the time spent reading decreases, the number of spelling errors decreases.

D. There is no relationship between the time spent reading and the number of spelling errors.

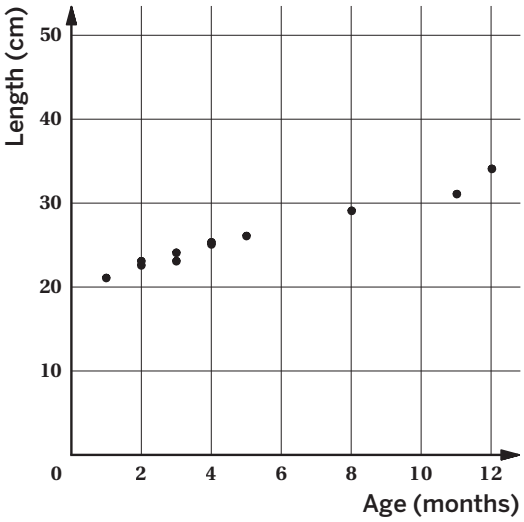
6. Create a scatter plot that represents this situation.



Name: ..... Date: ..... Period: .....

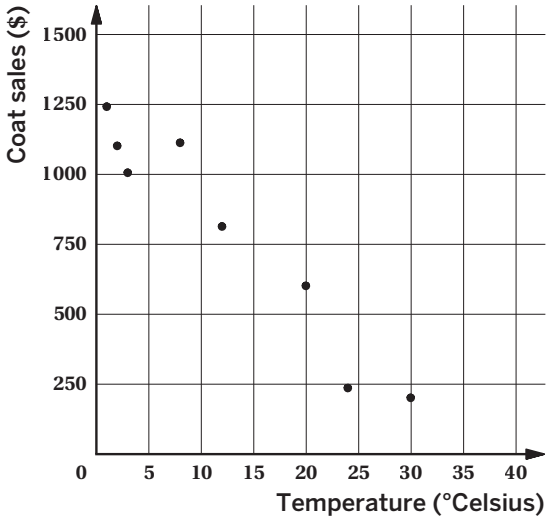
Additional Practice 6.08

1. Select *all* the following terms that describe the association represented in the scatter plot.



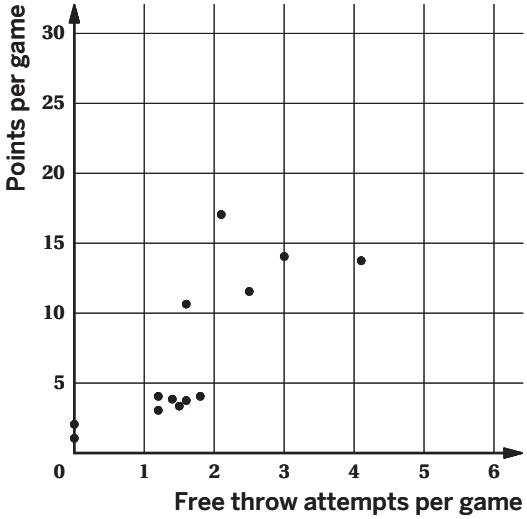
- ☐ **A.** Linear association
- ☐ **B.** Nonlinear association
- ☐ **C.** Positive association
- ☐ **D.** Negative association
- ☐ **E.** No association

2. Select *all* the following terms that describe the association represented in the scatter plot.



- ☐ **A.** Linear association
- ☐ **B.** Nonlinear association
- ☐ **C.** Positive association
- ☐ **D.** Negative association
- ☐ **E.** No association

3. Circle any clusters in the data. Use the labels on the axes to explain what the clusters mean in context.



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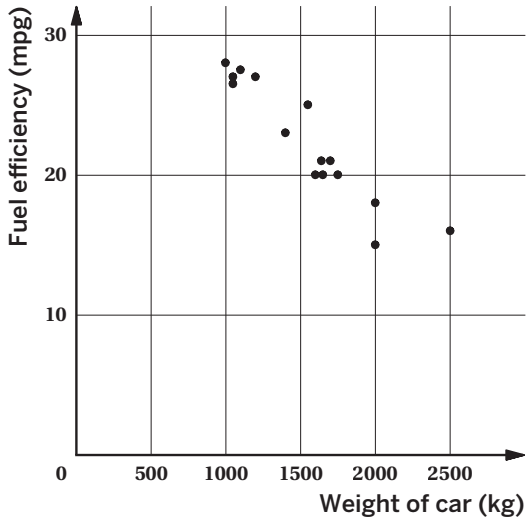
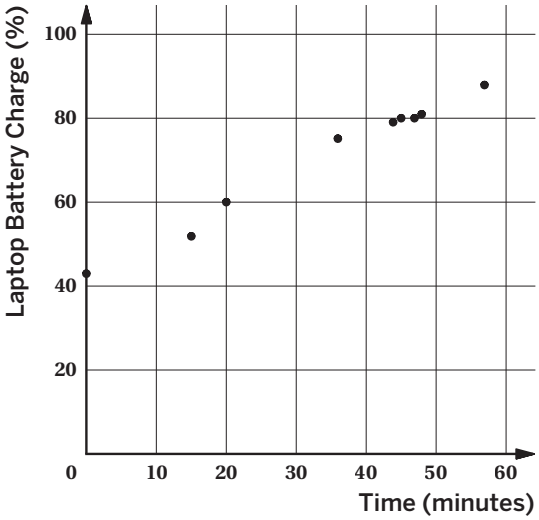
4. Circle any clusters in the data. Use the labels on the axes to explain what the clusters mean in context.



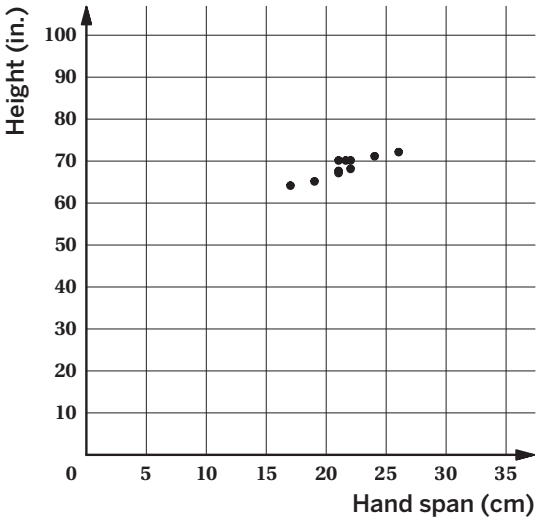
5. Consider the scatter plot shown.

a Determine the type(s) of association and indicate whether there is any clustering.

b Describe the association and clustering, if any, in context.



6. Noah creates the scatter plot shown and says that it has a positive, linear association and clustering. He explains that the association means that as a hand span increases the height of a person decreases. Do you agree with Noah? Explain your thinking.

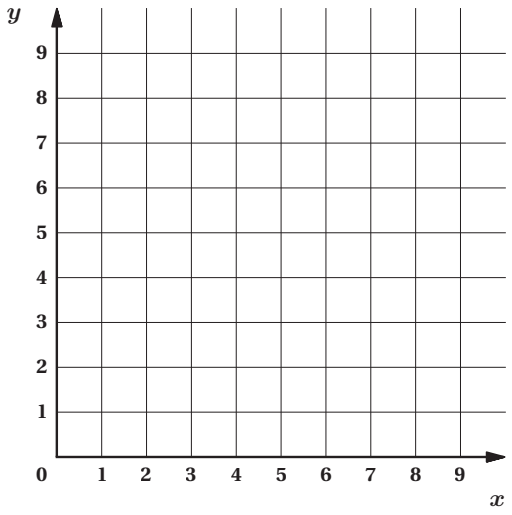


Name: ..... Date: ..... Period: .....

Additional Practice 6.09

1. Plot the points to create a scatter plot of the data, and then draw a line to model the data.

x	y
2.4	7.6
3.7	8.9
3.1	8
2	4.9
1.5	4

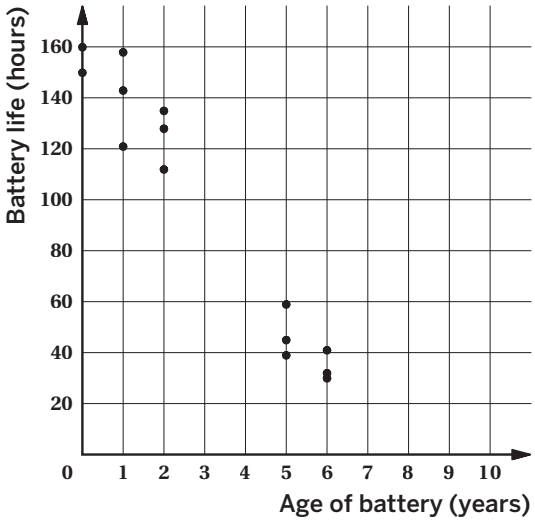


2. Kiran wants to draw a line to model the data shown on the graph. Which type of slope would best fit his line?

A. Positive

B. Negative

C. Zero



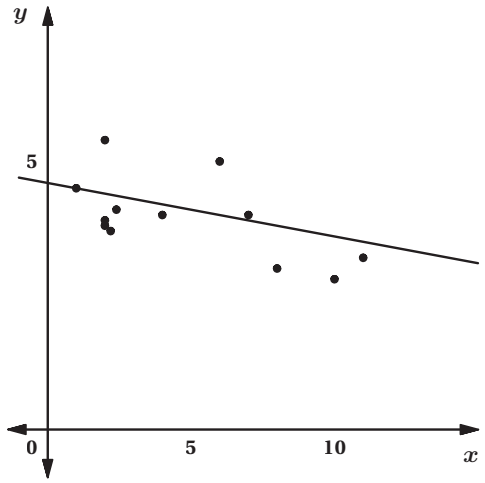
3. Which of the following equations might be the linear model that describes the data?

A. $y = -0.1x$

B. $y = 0.1x - 4.5$

C. $y = -0.1x + 4.5$

D. $y = 4.5x + 4.5$



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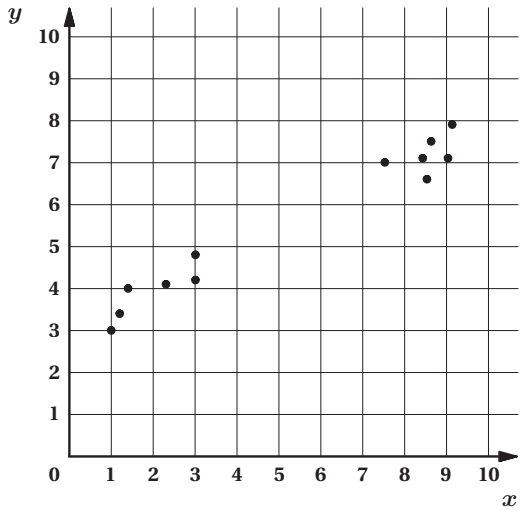
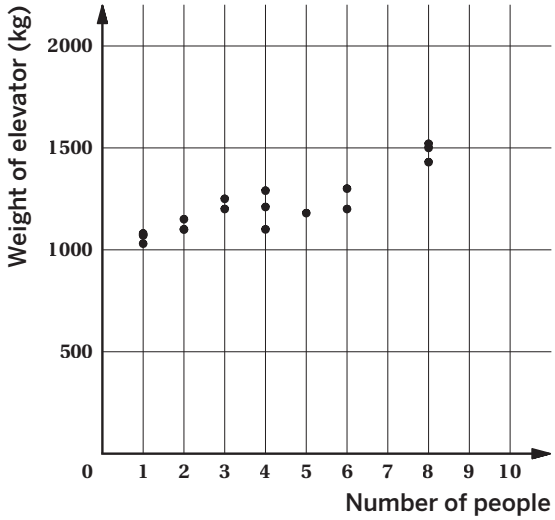
4. For the scatter plot shown, complete the following.



a Draw a line of fit to model the data.

b If a new point is added to the scatter plot where $x = 6$, what do you predict for the value of y of this point? Add this point to the scatter plot.

5. The scatter plot shows the relationship between the number of people in an elevator and weight in kilograms.



a Draw a line of fit to model the data.

b Write an equation for your line.

c What does your linear model's slope represent in this context?

d What does your linear model's y-intercept represent in this context?

6. Clare determined the equation for the line of fit of a data set. She noticed that, for a given value of x, her equation predicts a different value of y than is observed in the data. Is her equation incorrect? Explain your thinking.

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Additional Practice 6.10

1. The two-way table shows the relationship between news-reading habits among different age groups. What does the number 132 represent in the table?

	Internet media	Print media	Total
18–25 year olds	151	28	179
26–45 year olds	132	72	204
Total	283	100	383

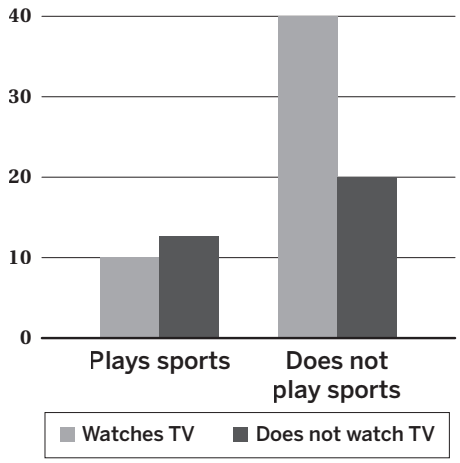
A. 132 people, who are 18–25 years old and read print media.

B. 132 people, who are 26–45 years old and read print media.

C. 132 people, who are 18–25 years old and read internet media.

D. 132 people, who are 26–45 years old and read internet media.

2. The double bar graph shows the relationship between watching TV and playing sports for several students in a middle school. How many students do not play sports and do not watch TV?



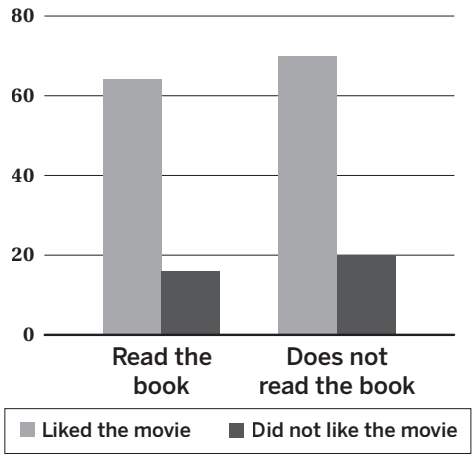
A. 10

B. 12

C. 20

D. 40

3. A teacher wants to know whether reading a certain book affects liking the movie adaptation of the book for middle school students. Several students' responses were recorded and then graphed using the bar graph shown. Is there evidence to suggest an association between reading the book and liking the movie? Explain your thinking.



	Liked the movie	Did not like the movie	Total
Read the book	64	16	80
Did not read the book	70	20	90
Total	134	36	170

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4. A restaurant manager records whether people were satisfied with their food and service. Complete the two-way table. Then create a double bar graph to represent the data.

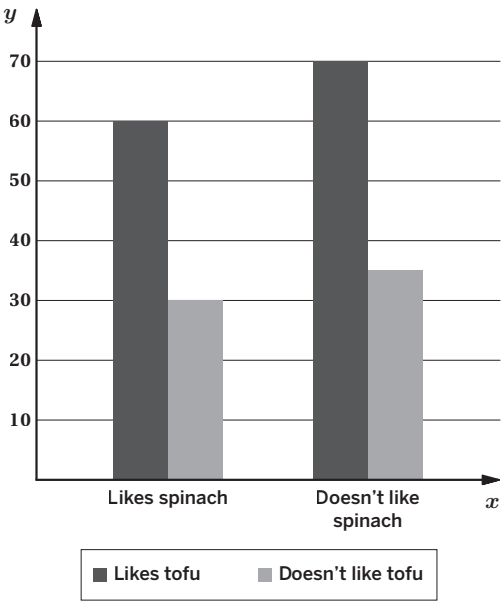
	Satisfied with the service	Dissatisfied with the service	Total
Satisfied with the food		8	
Dissatisfied with the food	9		30
Total		29	110

5. A journalist surveys several people about whether they will vote for or against two issues. Complete the two-way table. Then create a double bar graph to represent the data.

	For	Against	Total
Issue A	832		997
Issue B		160	
Total	912		1,237

6. Create a real-world example that is supported by this double bar graph. Create a two-way table with data that would support your example. Be sure to describe what association, if any, is in your data, and add labels to the graph and table.

	Likes spinach	Doesn't like spinach	Total
Likes tofu			
Doesn't like tofu			
Total			

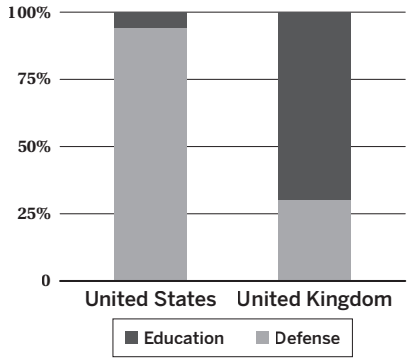


Name: ..... Date: ..... Period: .....

Additional Practice 6.11

1. The two-way table and segmented bar graph displays the government budgets for 2009, in billions of U.S. dollars. Which of the following describes the data?

	Defense	Education	Total
United States	718.4	44.9	763.3
United Kingdom	49.2	113.9	163.1
Total	767.6	158.8	926.4



A. There is no association; the relative frequency for each country is roughly the same.

B. There is a greater percentage of budget spent on education in the United States.

C. There is a greater percentage of budget spent on defense in the United States.

D. There is a greater percentage of budget spent on defense in the United Kingdom.

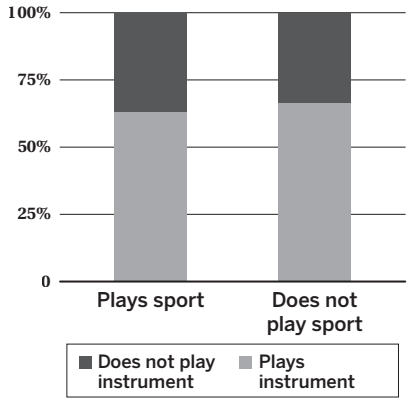
2. Complete the frequency table to represent the data from the two-way table, showing relative frequencies by column. Round to the nearest percent.

	Class A	Class B
Prefers math	6	8
Prefers science	2	10
Total	8	18

	Class A	Class B
Prefers math	75%	
Prefers science		
Total		

3. Students were asked if they play a sport or play a musical instrument. The results are shown in the table and in the segmented bar graph. Is there evidence of an association between playing a sport and playing an instrument? Explain your thinking.

	Plays instrument	Does not play instrument	Total
Plays sport	12	7	19
Does not play sport	10	5	15
Total	22	12	34



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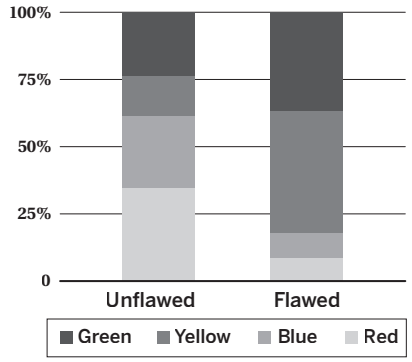
4. The manager of an eraser factory notices some flaws in certain erasers. Each color eraser is made through a different machine. The manager collects data on the number of flawed and unflawed erasers of each color. The results are recorded in the table and are shown in the segmented bar graph. Is there evidence that the flawed erasers are associated with certain colors? Explain your thinking.

	Unflawed	Flawed
Red	285	15
Blue	223	17
Yellow	120	80
Green	195	65



5. A scientist is interested in whether certain plants attract more bees or butterflies. Do these data show an association between bees and butterflies and flower types? Explain your thinking.

	Daisies	Lavender
Bees	17	23
Butterflies	22	28

6. Several students at a middle school were asked whether they preferred drama or band classes. The results are shown in the two-way table.

Write a question that could be answered by the data in the table.

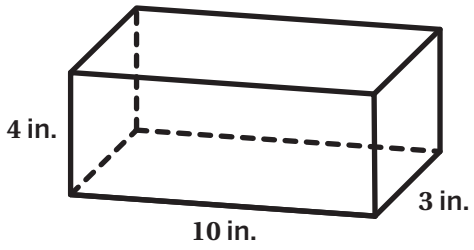
	Drama	Band	Total
7th grade	72	51	123
8th grade	85	32	117
Total	157	83	240

Name: ..... Date: ..... Period: .....

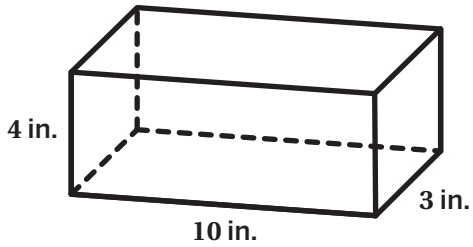
Additional Practice 7.09

Problems 1–3: Show how to cut a rectangular prism to make each cross section.

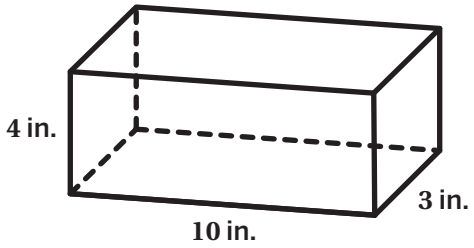
1. 3-in. by 4-in. Rectangle



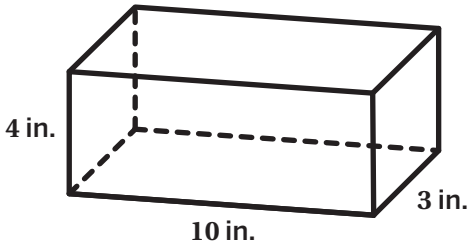
2. 4-in. by 10-in. Rectangle



3. A different rectangle than Problem 1 or 2

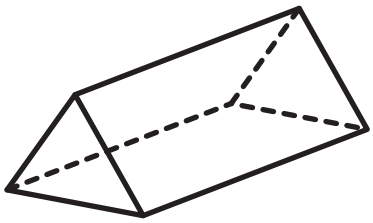


4. A triangle



5. Select *all* of the cross sections you can make from the prism shown with a base that is an equiangular triangle.

- ☐ **A.** Equiangular Triangle
- ☐ **B.** Square
- ☐ **C.** Rectangle
- ☐ **D.** Trapezoid
- ☐ **E.** Isosceles Triangle



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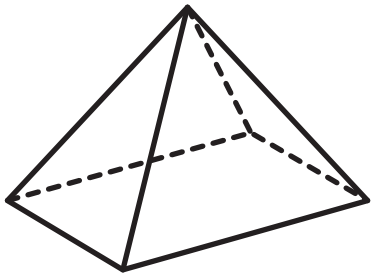
6. Which of the following descriptions could result in a triangular cross section for the three-dimensional figure shown?



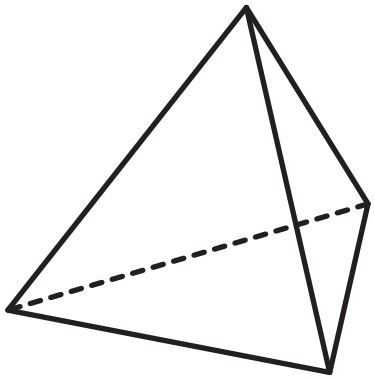
A. Slice the figure parallel to its base halfway up.

B. Slice the figure parallel to its base near the top.

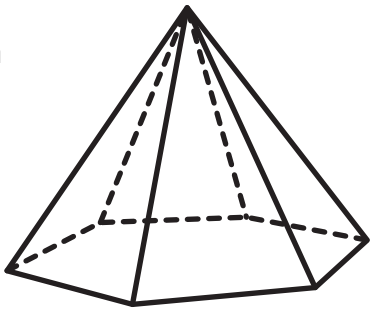
C. Slice the figure parallel to its base near the bottom.

D. Slice the figure vertical to its base through the top of the pyramid.

7. Ben says, "No matter which way you slice this three-dimensional figure, the cross section will be a triangle." Harper says, "I'm not so sure." Show and describe a slice Harper might be thinking of.



Problems 8–10: The pyramid shown has a hexagonal base. The side lengths of the hexagon are equal. Describe the cross section that will result if the pyramid is sliced:



8. Parallel to the base

9. Vertical to the base through the top point of the pyramid.

10. Describe another way you could slice the pyramid that would result in a different cross section.

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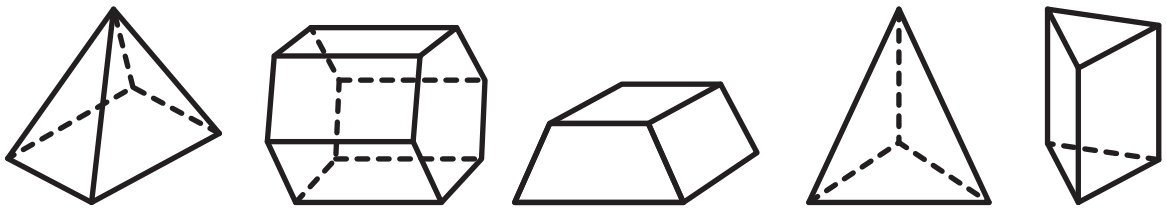
Additional Practice 7.10

Problems 1–2: Here is a set of 3-D objects.



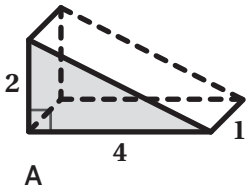
Object A Object B Object C Object D Object E

1. Circle all of the prisms.

2. For each prism, shade one of the bases.

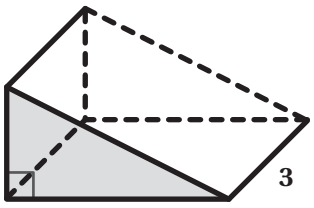
Problems 3–5: Here are three prisms with the same base.

3. Determine the volume of prism A.



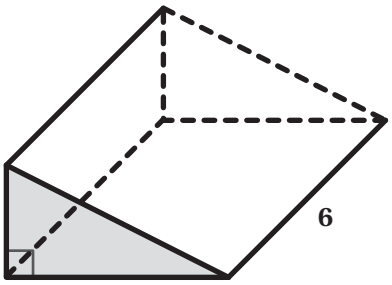
A

4. Determine the volume of prism B.



B

5. Determine the volume of prism C.



C

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Name: Date: Period:

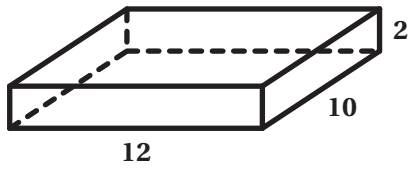
Problems 6–7: The base of a rectangular prism is a square with edges of 4 inches. The height of the prism is 6.6 inches.

6. Draw the prism and label the measurements.

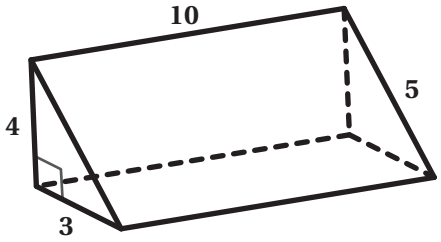
7. Calculate the volume of the prism. Show or explain your thinking.

Problems 8–9: Determine the volume of each prism. Show or explain your thinking.

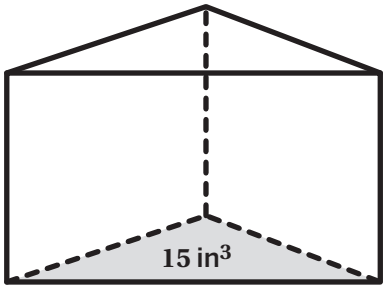
8.



9.



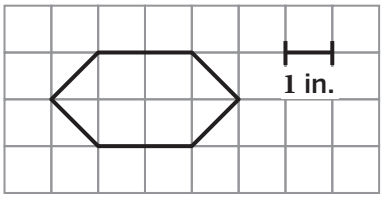
10. The volume of this prism is between 60 in^3 and 80 in^3. What are three possible heights of the prism? Show or explain your thinking.



Name: ..... Date: ..... Period: .....

Additional Practice 7.11

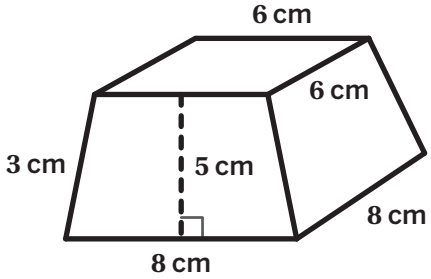
Problems 1–2: The base of a prism is shown.



1. If the height of the prism is 5 inches, what is the volume of the prism? Show or explain your thinking.

2. If the volume of the prism is 99 in^3, what is the height of the prism? Show or explain your thinking.

Problems 3–4: Finnias calculated the volume of the prism but made an error.



3. Identify and explain why Finnias' method is incorrect.

4. Calculate the volume of the prism.

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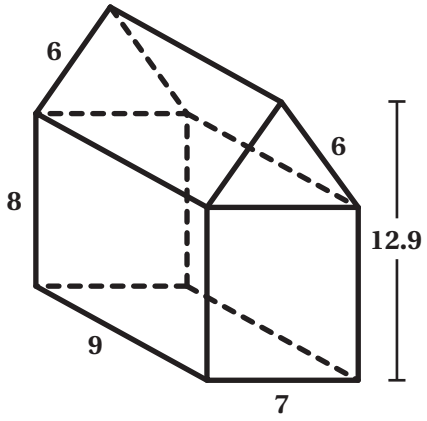
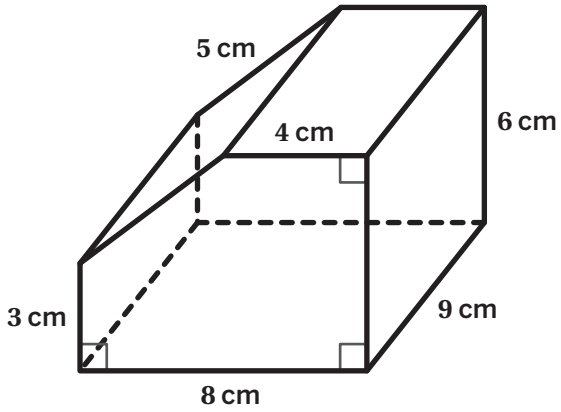
Problems 5–8: Determine the area of the base of each prism and the volume of each prism. Show or explain your thinking.

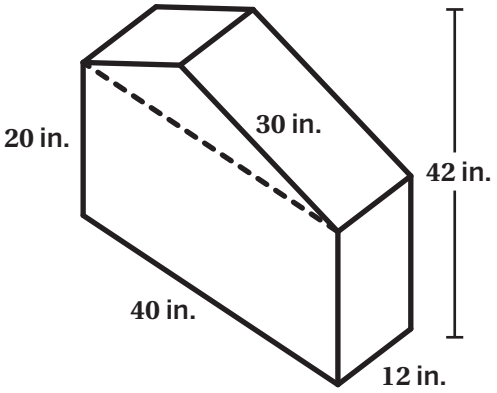
5.



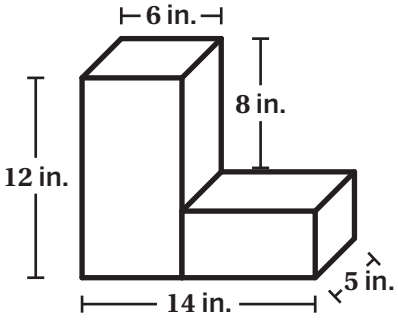
6.



7.



8.



Name: ..... Date: ..... Period: .....

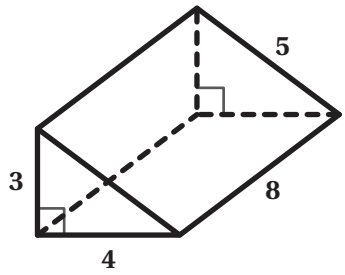
Additional Practice 7.12

1. Select *all* the situations where knowing the surface area of an object would be useful.

- ☐ **A.** Deciding on the amount of cardboard needed to make a box of cereal.
- ☐ **B.** Determining how much wood is needed to build cubed-shaped stacking blocks.
- ☐ **C.** Determining the amount of paint needed to paint a playhouse.
- ☐ **D.** Measuring the amount of milk remaining in a jug of milk.
- ☐ **E.** Calculating how much brown paper is needed to cover a package.
- ☐ **F.** Charging a company for advertising space on a highway sign.

Problems 2–3: Determine the volume and surface area of each prism. Show your thinking.

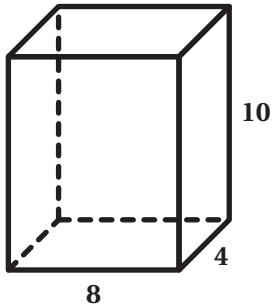
2.



Volume:

Surface Area:

3.



Volume:

Surface Area:

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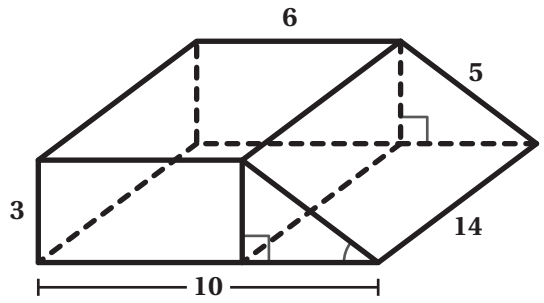
Problems 4–5: Here is a 3-D object.



4. Determine the surface area using two different methods. Show your thinking.

Method #1:

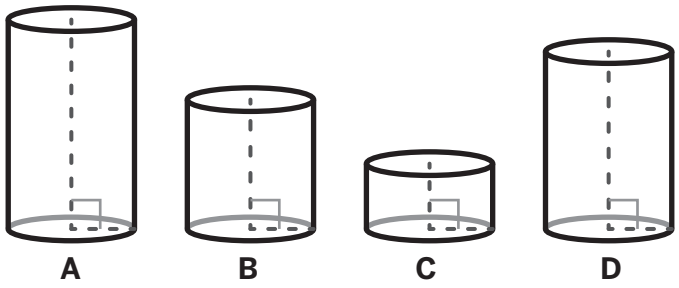
Method #2:

5. Determine the volume. Show your thinking.

Name: ..... Date: ..... Period: .....

Additional Practice 5.10

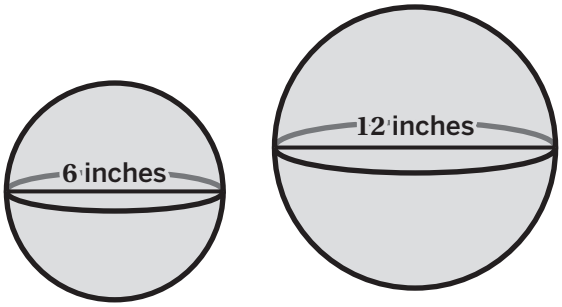
1. Cylinders A, B, and C have the same radius but different heights.



Order the cylinders from *least* volume to *greatest* volume.

Least			**Greatest**

2. Kai bought a balloon for a birthday party. The diameter of the balloon measures 6 inches and has a volume of approximately 113 cubic inches. Kai would like a balloon that has double the diameter. He finds a sphere balloon that measures 12 inches in diameter. What is the approximate volume of this balloon? Explain your thinking.



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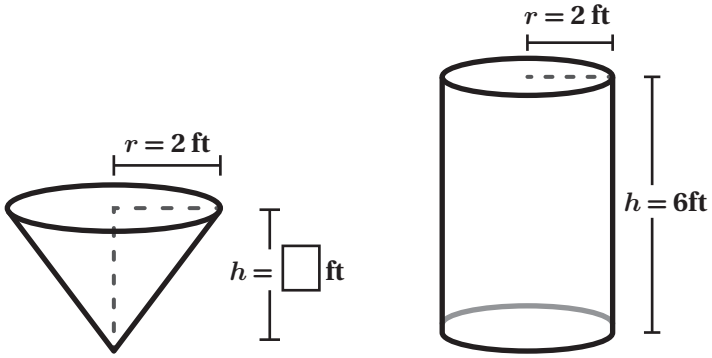
Name: Date: Period:

3. Here is a cylinder and a cone. What does the height of the cone need to be so that the cylinder will have a volume that is three times greater than the cone?



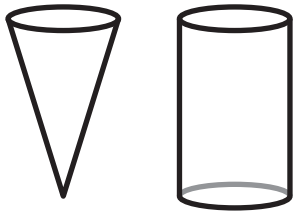
A. 2 feet

B. 3 feet

C. 6 feet

D. 18 feet

4. Maia bought two items at a flower shop, a bouquet of flowers and a vase. The bouquet of flowers is in the shape of a cone. The base of the bouquet has a height of 12 inches and a diameter of 6 inches. The vase is in the shape of a cylinder. The base of the vase also has a height of 12 inches and a diameter of 6 inches. How many bouquets would it take to fill the vase? Explain your thinking.

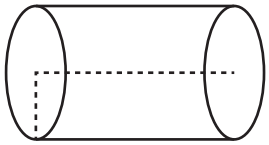


Name: ..... Date: ..... Period: .....

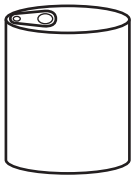
Additional Practice 5.11

1. For Cylinders A–D, draw the radius and the height. Label each radius with r and each height with h.

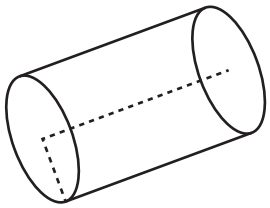
Cylinder A



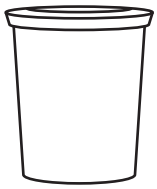
Cylinder B



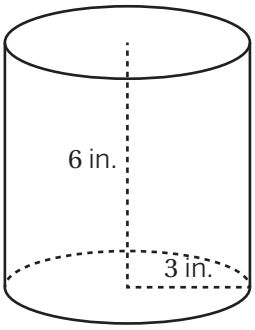
Cylinder C



Cylinder D



2. What is the volume of the cylinder shown?



A. 9π in^3

B. 18π in^3

C. 54π in^3

D. 108π in^3

3. Respond to the following questions.

a Draw a cylinder. Label the radius 4 units and the height 10 units.

b Determine the area of the base. Write your response in terms of π.

c Determine the volume of the cylinder. Write your response in terms of π.

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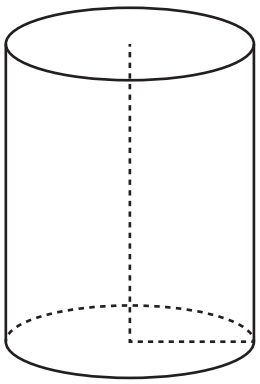
4. The cylinder shown has a height of 12 cm and a radius of 5 cm.



a How many cubic centimeters of fluid can fill this cylinder? Write your response in terms of π.

b Give a decimal approximation of your answer to the nearest hundredths place.

5. A preschool teacher stores modeling clay in two types of containers. One type of container is in the shape of a rectangular prism. The base has side lengths 14 cm and 21 cm, and the height is 8 cm. The second container is in the shape of a cylinder with a diameter of 20 cm. The height of the cylinder container is 8 cm, the same height as the rectangular container.

a Which is greater in area, the rectangular base of the rectangular container or the circular base of the cylinder container? Show your thinking.

b Which is greater in volume, the rectangular container or the cylinder container? Show your thinking.

6. Cylinder A has a radius of 9 in. Cylinder B has the same height as Cylinder A and a radius of one third as long as Cylinder A. What fraction of the volume of Cylinder A is the volume of Cylinder B? Show or explain your thinking.

7. Andre says that if you double the height of a cylinder, it will have the same effect on the volume as doubling the radius of the cylinder. Do you agree with Andre? Show or explain your thinking.

Name: ..... Date: ..... Period: .....

Additional Practice 5.12

1. Each row of this table lists information about a specific cylinder. Complete the table.

Diameter (units)	Area of Base (square units)	Height (units)	Volume (cubic units)
	9π	3	
4		5	
2			2π
	25π	6	

Problems 2–5: George buys soup at the store. The soup cans are in the shape of cylinders. All the soup cans have a height of 5 inches. Let r represent the radii of the soup cans, in inches, and V represent the volume of the soup cans, in cubic inches.

2. Write an equation that represents the relationship between the volume, V, and the radius, r, for all the soup cans with a height of 5 inches.

3. Complete this table:

r (inches)	4	5	6
V (cubic inches)			

4. George notices a jumbo soup can that is now available at the store. The jumbo soup can is also in the shape of a cylinder and has a height of 5 inches, but the radius is 8 inches. What is the volume of this jumbo soup can in cubic inches?

A. 80π

B. 160π

C. 240π

D. 320π

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5. If the radius of the soup can is doubled, does the volume double?

Yes No Maybe

6. A cylinder has a volume of 216π cubic inches and a height represented by h. Complete this table with the volumes of other cylinders that have the same radius but different heights.

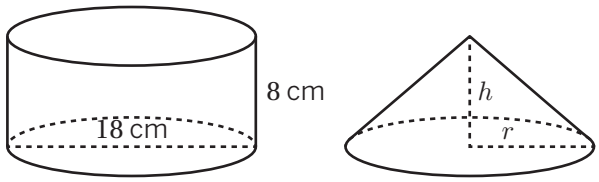
Height (inches)	Volume (cubic inches)
$\frac{h}{2}$	
$\frac{h}{3}$	
$2h$	
$3h$	
$4h$	

7. Using the volumes from the table, what do you think the volume of a cylinder with a height of $8h$ will be? Explain your thinking.

Name: ..... Date: ..... Period: .....

Additional Practice 5.13

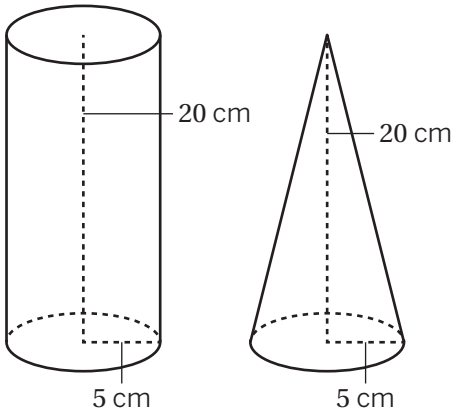
1. The cylinder and cone shown have the same height and the same base area.



a What is the radius r of the cone?

b What is the height h of the cone?

2. Which is a true statement about the volumes of the cylinder and cone?



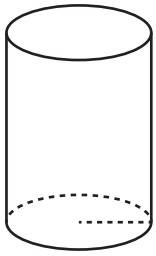
A. The volumes are equal.

B. The volume of the cone is $\frac{1}{3}$ times the volume of the cylinder.

C. The volume of the cylinder is $\frac{1}{3}$ times the volume of the cone.

D. The volume of the cone is 3 times the volume of the cylinder.

3. The volume of this cylinder is 72π mm^3. What is the volume of a cone that has the same base area and the same height?



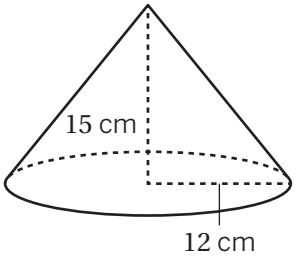
A. 24π mm^3

B. 36π mm^3

C. 72π mm^3

D. 216π mm^3

4. What is the volume of the cone shown?



A. 60π cm^3

B. 180π cm^3

C. 720π cm^3

D. 900π cm^3

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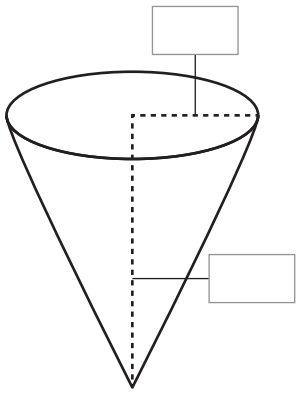
Name: ..... Date: ..... Period: .....

5. A cone-shaped hanging basket is used to grow flowers. The basket has a diameter of 14 in. and a height of 15 in.

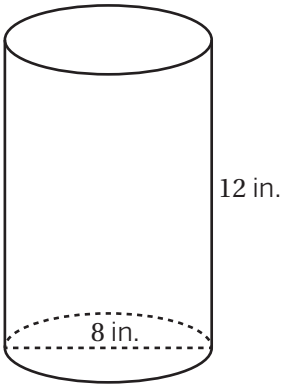


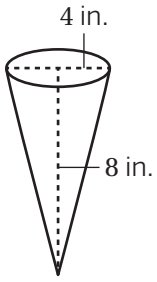
a Label the height and radius of the hanging basket.

b If the container is filled completely with potting soil, about how many cubic inches can the container hold? Round to the nearest tenth. Show your thinking.

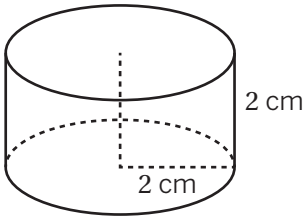
6. The volume of a cylinder is 96π cubic units. What is the volume of a cone that has the same base area and the same height as the cylinder? Explain your thinking.

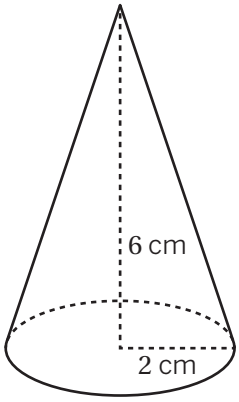
7. At a frozen yogurt shop, a cylinder-shaped container of frozen yogurt has the base diameter and height shown. The shop serves the frozen yogurt in waffle cones that have a base diameter of 4 in. and a height of 8 in. If each waffle cone is filled completely with frozen yogurt, how many cones can be filled from one container of frozen yogurt? Explain your thinking.





8. Study the cylinder and cone shown. Bard claims that the cone has a greater volume than the cylinder. Han argues that the cylinder has the greater volume. Who is correct? Explain your thinking.





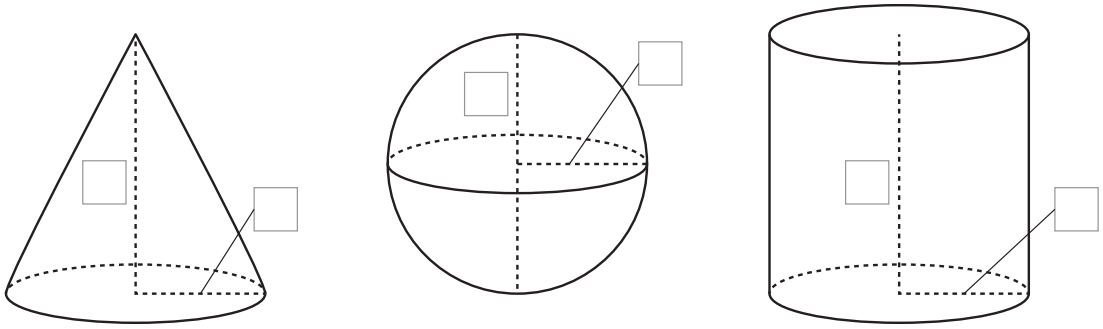
Name: ..... Date: ..... Period: .....

Additional Practice 5.15

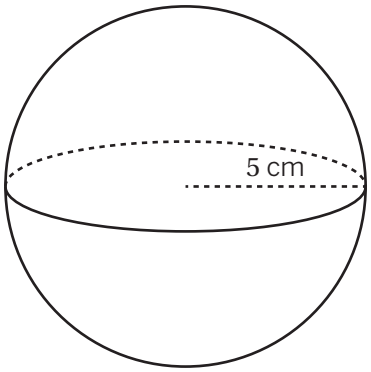
1. Complete the following table for different spheres.

Radius	14 in.		$\frac{500}{3}$ ft		4.09 m	
Diameter		16 cm		$\frac{700}{3}$ yd		4.09 m

2. The cylinder, cone, and sphere all have the same radius and height. The radius of the cone is 7 units. Label the radius and height on each figure, in units.



3. Use the formula $V = \frac{4}{3}\pi r^3$ to determine the volume of the sphere with a radius of 5 cm.



A. $\frac{125}{3}\pi$ cm^3

B. $\frac{500}{3}\pi$ cm^3

C. 125π cm^3

D. 500π cm^3

4. A sphere has a diameter of 12 in. What is the volume of the sphere? Write your response in terms of π.

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5. Which of the following are true statements about the volumes of a sphere, a cone, and a cylinder with the same dimensions? Select *all* that apply.

- ☐ **A.** The sphere has the greatest volume.
- ☐ **B.** The cone's volume is half the sphere's volume.
- ☐ **C.** The cone's volume is half the cylinder's volume.
- ☐ **D.** The sphere's volume is double the cone's volume.
- ☐ **E.** The cylinder's volume is $\frac{3}{2}$ the sphere's volume.
- ☐ **F.** The sphere's volume is $\frac{2}{3}$ the cylinder's volume.

6. Match the description of each sphere to its volume.

a. Sphere A: radius of 7 cm ..... $\frac{32}{3}\pi$ cm^3

b. Sphere B: radius of 2 cm ..... $\frac{256}{3}\pi$ cm^3

c. Sphere C: diameter of 8 cm ..... $\frac{1372}{3}\pi$ cm^3

d. Sphere D: radius of 9 cm ..... 972π cm^3

7. A cube's volume is 216 in^3.

a What is the length of its edge?

b If a sphere fits snugly inside this cube, what is the volume of the sphere? Show or explain your thinking.

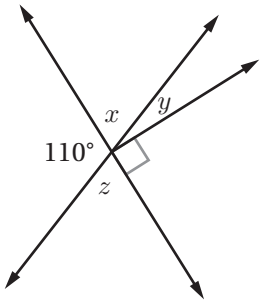
c What percent of the cube is taken up by the sphere? Round to the nearest whole percent. Show or explain your thinking.

Name: ..... Date: ..... Period: .....

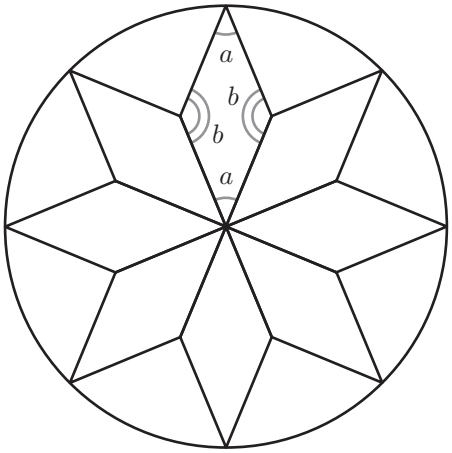
Additional Practice 7.13

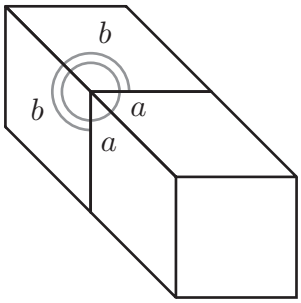
In Problems 1–4, you will apply your understanding of the skills and concepts you learned throughout this unit.

1. Refer to the diagram shown. Determine the values of x, y, and z.



2. The two patterns shown were created using identical rhombuses. Without using a protractor, determine the values of a and b. Show or explain your thinking.





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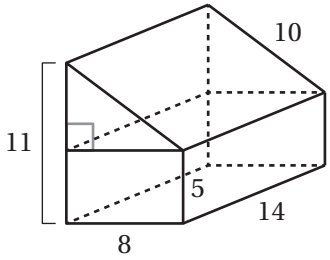
3. Can you draw a triangle with side lengths of 4 cm, 2 cm, and 8 cm? If so, draw one. If not, explain why.

4. Refer to the prism shown.

a Shade a base of the prism.



b Determine the area of the base you shaded. Show your thinking.

c Determine the volume of the prism. Show your thinking.

d Determine the surface area of the prism. Show your thinking.

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Additional Practice 7.01

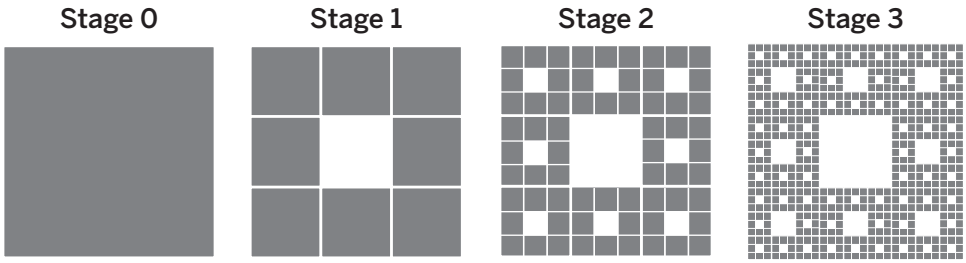
1. Match each single power with its expanded form.

Single power	Expanded form
a. 2^6	..... $3 \cdot 3 \cdot 3 \cdot 3$
b. 6^2	..... $4 \cdot 4 \cdot 4$
c. 4^3	..... $6 \cdot 6$
d. 3^4	..... $2 \cdot 2 \cdot 2 \cdot 2 \cdot 2 \cdot 2$

2. Complete the table by writing the missing single power or expanded form.

Single power	Expanded form
10^2	
	$4 \cdot 4 \cdot 4 \cdot 4 \cdot 4$
	$\frac{1}{2} \cdot \frac{1}{2} \cdot \frac{1}{2} \cdot \frac{1}{2} \cdot \frac{1}{2} \cdot \frac{1}{2}$
	$\frac{7}{9}$
$\left(1\frac{2}{3}\right)^4$	

3. The pattern shown is called Sierpiński's carpet. Study the pattern. The shaded area of each square in Stages 0–2 is written as a fraction of the total area, in square units. Write the fraction that represents the shaded area for Stage 3.



1 $\frac{8}{9}$ $\frac{64}{81}$ $\frac{\square}{\square}$

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4. Han made $\$240$ mowing lawns last summer. He put the money in a savings account that pays 2% interest per year. If Han does not touch the money in his account, he can determine the amount he will have the next year by multiplying his current amount by 1.02.

a How much money will Han have in his account after 1 year? Explain your thinking.

b How much money will Han have in his account after 3 years? Explain your thinking.

c Write an expression for the amount of money Han would have after 20 years if he never withdraws money from the account.

5. Bard received $\$150$ as a gift and put the money in a savings account that pays 2.5% interest per year. If Bard does not touch the money in the account, Bard can determine the amount that will be in the account the next year by multiplying the current amount by 1.025.

a How much money will Bard have in the account after 1 year? Explain your thinking.

b How much money will Bard have in the account after 5 years? Explain your thinking.

c Write an expression for the amount of money Bard would have after 40 years if money was never withdrawn from the account.

6. Use exponents to write another expression equivalent to $(6)^3$. Explain your thinking.

7. The first three terms of a pattern are shown.

$\frac{3}{5}, \frac{9}{25}, \frac{27}{125}, \ldots$

a What is the 10th term of this pattern? Explain your thinking.

b Write an expression for the $n\text{th}$ term of this pattern. Explain your thinking.

Name: ..... Date: ..... Period: .....

Additional Practice 7.02

1. Write each expression as a single power. Show your thinking.

a $7^4 \cdot 7^7$

b $25^8 \cdot 25^3$

c $\left(\frac{2}{3}\right)^9 \cdot \left(\frac{2}{3}\right)^5$

d $(5.4)^{13} \cdot (5.4)^6$

e $(-3) \cdot (-3)^6$

f $6^{15} \cdot 16^7 \cdot 16^3$

2. Which expressions are equivalent to 10^{16}? Select *all* that apply.

☐ **A.** $10^4 \cdot 10^4$

☐ **B.** $10^2 \cdot 10^8$

☐ **C.** $10^8 \cdot 10^8$

☐ **D.** $10^{16} \cdot 10$

☐ **E.** $10^{15} \cdot 10$

3. Two of the following expressions are equivalent. Identify the expression that is *not* equivalent. Explain your thinking.

10^6 $10 + 10 + 10 + 10 + 10 + 10$ $10^3 \cdot 10 \cdot 10 \cdot 10$

4. A new large rectangular aquarium is 81 in. long, 81 in. wide, and 9 in. deep. The aquarium is filled to the top with water.

a Write each measurement of the aquarium as a single power of 9.

Length: ..... **Width:** ..... **Depth:** .....

b Use your responses from part a to write an expression that represents the volume, in cubic inches, of the aquarium.

c How much water does the aquarium hold? Write your response as a single power of 9.

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5. Replace the empty box with a single power of 4 to make each equation true.

a $4^7 \cdot \square = 4^{16}$

b $\square \cdot 4^6 = 4^7$

c $4^{10} \cdot \square \cdot 4 = 4^{18}$

6. Replace the empty box with a single power of a to make each equation true.

a $a^9 \cdot \square = a^{10}$

b $\square \cdot a^{10} = a^{20}$

c $a^3 \cdot \square \cdot a = a^6$

7. Lin wants to write a multiplication expression that is equivalent to 2^8. She writes the expression $2^4 \cdot 2^2$. Is her expression correct? Explain your thinking and correct Lin's expression, if necessary.

8. If $a^b \cdot a^b = a^c$ is true, is $\frac{c}{2}$ greater than, less than, or equal to b? Show or explain your thinking.

Name: ..... Date: ..... Period: .....

Additional Practice 7.04

1. Select *all* expressions that are equivalent to 12^4.

- ☐ **A.** $\frac{12^7}{12^3}$
- ☐ **B.** $2 \cdot 6^4$
- ☐ **C.** $12^{10} - 12^6$
- ☐ **D.** $12 \cdot 12^3$
- ☐ **E.** $(12^2)^2$

Problems 2–9: Rewrite each expression as a single power.

2. $3^2 \cdot 4^2$

3. $\frac{7^{12}}{7^8}$

4. $(16^2)^3$

5. $\frac{5^8 \cdot 5^4}{5^9}$

6. $31^2 \cdot 31^{10}$

7. $\frac{9^5}{9}$

8. $(11^4)^5 \cdot 11$

9. $\frac{8^{11}}{4^{11}}$

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10. Michael and Amelia were asked to rewrite the expression $\frac{4^{10}}{4^4} \cdot 4$ as a single power.

Michael says the answer is 4^7. Amelia says the answer is 2^{14}.

Who is correct? Circle your choice.

Michael Amelia Neither Both

Show or explain your thinking.

Name: ..... Date: ..... Period: .....

Additional Practice 7.05

1. Rewrite each expression using a single *negative* exponent.

a $\frac{1}{10} \cdot \frac{1}{10} \cdot \frac{1}{10} \cdot \frac{1}{10} \cdot \frac{1}{10}$

b $\frac{1}{6 \cdot 6 \cdot 6 \cdot 6}$

c $\frac{1}{2} \cdot \frac{1}{2} \cdot \frac{1}{2} \cdot \frac{1}{2} \cdot \frac{1}{2} \cdot \frac{1}{2}$

d $\frac{1}{y \cdot y \cdot y}$

2. Rewrite each expression using a single *positive* exponent.

a 10^{-2}

b 5^{-5}

c 8^{-7}

d 2^{-8}

3. Rewrite each expression using a single *positive* exponent.

a $10^{7} \cdot 10^{-2}$

b $9^{-3} \cdot 9^{-5}$

c $\frac{10^{6}}{10^{8}}$

d $\frac{4^{2}}{4^{7}}$

4. Which expressions are equivalent to $\frac{1}{1{,}000}$? Select *all* that apply.

- ☐ **A.** $(-10)^{4}$
- ☐ **B.** 10^{-3}
- ☐ **C.** $1{,}000^{-1}$
- ☐ **D.** 100^{-2}
- ☐ **E.** $-1{,}000$

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Name: Date: Period:

5. Which expressions are equivalent to 10^{-5}? Select *all* that apply.

- ☐ **A.** $\frac{10^5}{10^{10}}$
- ☐ **B.** -50
- ☐ **C.** $10^{-2} + 10^{-3}$
- ☐ **D.** $10^{-5} \cdot 10$
- ☐ **E.** $\frac{1}{10} \cdot \frac{1}{10} \cdot \frac{1}{10} \cdot \frac{1}{10} \cdot \frac{1}{10}$

6. Replace the empty box with a single power of 10 to make each equation true.

a $\frac{10^3}{\square} = \frac{1}{10^4}$

b $\frac{\square}{10^4} = \frac{1}{10}$

c $10^{-4} \cdot \square \cdot 10 = \frac{1}{10}$

7. Without evaluating, order the expressions 12^{-3}, 12^2, and 12^0 from least to greatest. Explain your thinking.

8. Mai states the missing single power of b in the expression $\frac{b^{-12}}{\square} = \frac{1}{b^{10}}$ is b^2. Do you agree? Show or explain your thinking.

Name: Date: Period:

Additional Practice 7.07

1. Show three different ways to write each number as a multiple of a power of 10. For example, one way is writing $576{,}000$ as $5{,}760 \cdot 10^2$.

a $576{,}000$

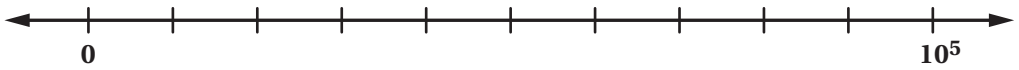
b $9{,}510{,}000$

2. Rewrite the quantity in each statement as a multiple of a power of 10.

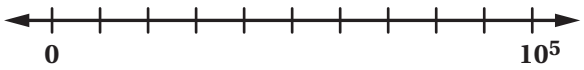
a One light-year is about 6 trillion miles.

b On average, the human brain has 86 billion neurons.

3. Refer to the number line.



a Label the tick marks on the number line.



b Plot and label the values $35{,}000$ and $5 \cdot 10^4$ on the number line.

c Which value is less, $35{,}000$ or $5 \cdot 10^4$? Estimate how many times less.

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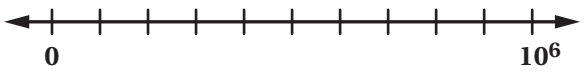
4. Refer to the number line.



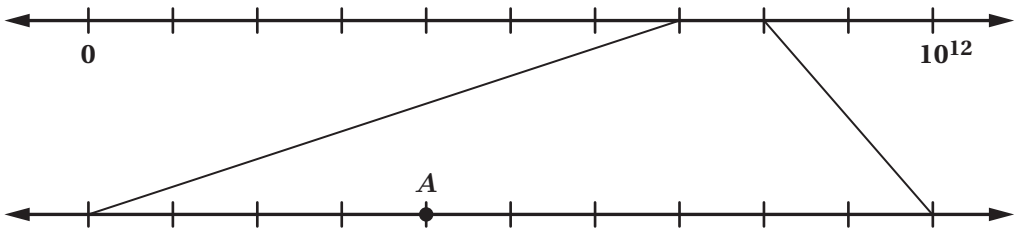
a Plot and label the values $250{,}000$ and $6 \cdot 10^5$ on the number line.

b Which is greater: $250{,}000$ or $6 \cdot 10^5$? Estimate how many times greater.

5. Which value is less: $2 \cdot 10^4$ or $2 \cdot 10^5$? Explain your thinking.

6. Which value is greater: $500{,}000$ or $50 \cdot 10^4$? Explain your thinking.

7. What number is represented by point A? Show or explain your thinking.



8. The distance from Pluto to the Sun is about 4 billion miles. Andre claims that this is less than $4 \cdot 10^8$ miles. Do you agree? Explain your thinking.

Name: ..... Date: ..... Period: .....

Additional Practice 7.08

1. Select *all* expressions that are equivalent to $\frac{1}{100}$.

- ☐ **A.** $-1 \cdot 10^2$
- ☐ **B.** $1 \cdot 10^{-2}$
- ☐ **C.** $-1 \cdot 10^2$
- ☐ **D.** $10 \cdot 10^{-3}$
- ☐ **E.** $-1 \cdot 10^{-3}$

2. Order the expressions from least to greatest.

$-4 \cdot 10^0$	$-5 \cdot 10^{-2}$	$4 \cdot 10^2$	$5 \cdot 10^{-2}$	$-4 \cdot 10^2$
Least				**Greatest**

Problems 3–4: Write the sum as a decimal.

3. $7 \cdot 10^{-3} + 3 \cdot 10^{-4} + 2 \cdot 10^{-5}$

4. $5 \cdot 10^{-6} + 1 \cdot 10^{-3} + 4 \cdot 10^{-1}$

Problems 5–6: Write each value as a number times a single power of 10.

5. $\frac{1}{100{,}000}$

6. 0.012

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7. Write $-625{,}000$ in three different ways, using a single power of 10.

8. Write 0.000986 in three different ways, using a single power of 10.

9. Which value is greater: 0.91 thousands or $9 \cdot 10^{-3}$. Explain your thinking.

10. Consider the statement $5 \cdot 10^{-x} > 5 \cdot 10^{-y}$. For what values of x and y will the statement be true? Show or explain your thinking.

Name: ..... Date: ..... Period: .....

Additional Practice 7.09

1. Determine whether the following statements are *true* or *false*. Explain your thinking.

a 18.2 billion written in scientific notation is 18.2×10^9.

b 95 million written in scientific notation is 9.5×10^7.

c 0.00083 written in scientific notation is 83×10^{-4}.

d 0.0005 written in scientific notation is 5×10^{-4}.

2. Complete the table to show equivalent forms of each number written in scientific notation.

Number	Scientific notation
23,400	
0.0035	
	6.4×10^7
	9.7×10^{-4}
3,500	
	6×10^{-2}
0.35	
3.5	
350,000,000,000	
	6×10^{-9}

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3. Han and Clare were determining the correct way to write the approximate radius of Jupiter, 71-million m, in scientific notation. Han wrote the value as 71×10^6 m. Clare wrote the value as 7.1×10^7 m. Who is correct? Explain your thinking.

4. Bard and Elena were determining the correct way to write the approximate diameter of a red blood cell, 0.000007 m, in scientific notation. Bard wrote the value as 7×10^{-6} m. Elena wrote the value as 0.7×10^{-5} m. Who is correct? Explain your thinking.

5. The radius of a certain fish egg is 0.0028 m. Andre claims that the number written in scientific notation is 2.8×10^3 m. Andre is incorrect. Without evaluating, how do you know he is incorrect? Explain your thinking.

6. Shawn analyzed a microorganism in science class. Using a microscope, Shawn measured the diameter to be 0.0000035 cm. Shawn was asked to write this value in meters and rewrote the value as 3.5×10^{-6} m. Did Shawn correctly rewrite the value in scientific notation? Explain your thinking.

7. The volume of a drop of a liquid is 0.05 ml. Priya was asked to write this value in liters, so she rewrote the value as 5×10^{-6} liters. Did she correctly rewrite the value in scientific notation? Explain your thinking.

Name: ..... Date: ..... Period: .....

Additional Practice 7.11

1. Evaluate each expression. Write the result in scientific notation. Show your thinking.

a $(2.5 \times 10^3) \times (3 \times 10^7)$

b $\frac{9 \times 10^{-10}}{3 \times 10^{-4}}$

c $(7 \times 10^5) \times (4 \times 10^6)$

d $(8.4 \times 10^2) \div (2.1 \times 10^7)$

2. Replace the empty box with the correct value to make each equation true.

a $(\square \times 10^8) \times (3 \times 10^2) = 9 \times 10^{10}$

b $\frac{8 \times 10^9}{\square \times 10^2} = 4 \times 10^7$

c $(5 \times 10^{\square}) \times (8 \times 10^3) = 4 \times 10^8$

d $(15 \times 10^5) \div (3 \times 10^{\square}) = 5 \times 10^{-2}$

3. On planet Zerg, there are two different types of alien species, zings and zangs. One zing has a mass of 5.6×10^6 kg and one zang has a mass of 2.1×10^2 kg. About how many times less in mass is one zang than one zing? Show your thinking.

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4. The mass of one Brachiosaurus is estimated to have been 8.7×10^4 kg. The mass of one antarctic krill is 4.86×10^{-4} kg. About how many times more massive is one Brachiosaurus than one antarctic krill? Show your thinking.

5. The radius of an atom of silver is 0.000000000125 m. The radius of the Moon is $1{,}740{,}000$ m. To determine how many times greater the radius of the Moon is than the radius of an atom of silver, Elena says it will be more efficient to estimate using scientific notation. Shawn says it will be more efficient to estimate using the values given in standard form. Do you agree with Elena or Shawn? Explain your thinking.

6. The mass of one white-toothed pygmy shrew is 4.86×10^{-3} kg. One of the largest blue whales to ever have lived had a mass of about 1.7×10^5 kg. Clare and Diego were determining how many times more massive the largest blue whale is than the mass of one white-toothed pygmy shrew. Their strategies are shown.

Clare's strategy:	Diego's strategy:
$\frac{1.7 \times 10^5}{4.86 \times 10^{-3}} \approx \frac{20 \times 10^4}{5 \times 10^{-3}} \approx 4 \times 10^7$	$\frac{1.7 \times 10^5}{4.86 \times 10^{-3}} \approx 0.4 \times 10^8 \approx 4 \times 10^7$

What do you notice about each strategy used and their solutions?

7. How many Olympic-sized swimming pools would it take to hold all the water in the world's oceans? Write your response in scientific notation.

Some useful information:

- The world's oceans hold about 1.4×10^9 km^3 of water.
- An Olympic-sized swimming pool holds about $2{,}500{,}000{,}000$ cm^3 of water.
- There are 10^{15} cm^3 in a cubic kilometer.

Name: ..... Date: ..... Period: .....

Additional Practice 7.13

1. State whether each statement is *true* or *false*. Show or explain your thinking.

a $(6 \times 10^3) + (2 \times 10^4) = 8 \times 10^7$

b $(8 \times 10^{-3}) + (4 \times 10^{-2}) = 4.8 \times 10^{-2}$

c $(5 \times 10^3) - (3.3 \times 10^4) = 1.7 \times 10^2$

2. Evaluate each expression. Write the result in scientific notation. Show your thinking.

a $(1.9 \times 10^{-5}) + (8.9 \times 10^{-5})$

b $(4.9 \times 10^6) - (4.1 \times 10^5)$

c $(3.8 \times 10^3) + (6.2 \times 10^3)$

d $(5.3 \times 10^{-4}) - (5.2 \times 10^{-4})$

3. Select *all* the expressions that are equal to the expression 1×10^5.

- ☐ **A.** $(7.9 \times 10^4) + (2.1 \times 10^4)$
- ☐ **B.** $(6.3 \times 10^5) - (5.3 \times 10^4)$
- ☐ **C.** $(8 \times 10^4) + (2 \times 10^4)$
- ☐ **D.** $(3 \times 10^5) + (7 \times 10^5)$
- ☐ **E.** $(2.1 \times 10^5) - (1.1 \times 10^5)$

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4. Select *all* the expressions that are equal to the expression 6×10^{-3}.

- ☐ **A.** $(8.8 \times 10^{-3}) - (8.2 \times 10^{-3})$
- ☐ **B.** $(7.7 \times 10^{-2}) - (7.1 \times 10^{-2})$
- ☐ **C.** $(3 \times 10^{-3}) + (3 \times 10^{-3})$
- ☐ **D.** $(4 \times 10^{-4}) + (2 \times 10^{-3})$
- ☐ **E.** $(4.7 \times 10^{-2}) - (4.1 \times 10^{-2})$

5. Tardigrades, also known as water bears, are eight-legged micro-animals. One tardigrade has a length of 5×10^{-3} cm. One adult male Kodiak bear has a length of 2.44×10^{2} cm. Compare the length of one Tardigrade with the length of an adult Kodiak bear. Explain your thinking.

6. The average mass of one Brachiosaurus is estimated to have been 8.7×10^{4} kg. The mass of one human is 6.2×10^{1} kg. How much greater is the average mass of one Brachiosaurus than the average mass of five humans? Explain your thinking.

7. Priya wants to find $(4.3 \times 10^{4}) + (3.5 \times 10^{5})$ and writes $(4.3 \times 10^{4}) + (3.5 \times 10^{5}) = 7.8 \times 10^{5}$. Explain Priya's mistake and determine the correct sum.

8. Bard wants to find $(2.8 \times 10^{3}) - (2.7 \times 10^{3})$ in scientific notation and writes $(2.8 \times 10^{3}) - (2.7 \times 10^{3}) = 1 \times 10^{3}$. Is Bard correct? Show or explain your thinking.

Name: Date: Period:

Additional Practice 7.14

Problems 1–4: In 2023, the European countries had an approximate population of 742.3 million people. Russia, Turkey, Germany, and the United Kingdom had the greatest populations out of all the countries.

1. What was the total population of all four countries? Write your answer in scientific notation.

County	Population (people)
Russia	$1.5 \cdot 10^8$
Turkey	$8.5 \cdot 10^7$
Germany	$8.4 \cdot 10^7$
United Kingdom	$6.8 \cdot 10^7$

2. What was the total population of other European countries not listed? Write your answer in scientific notation. Show or explain your thinking.

3. What percentage of the European population is made up of these top 4 populated countries? Show your thinking.

4. One of the smaller European countries is Liechtenstein which has a population of about 40,000 people. How many times greater is the population of Germany than the population of Liechtenstein?

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Problems 5–8: Here are some interesting facts about the weight and length of very large and very small sea creatures.

- The blue whale can weigh up to $400{,}000$ pounds and can be up to 100 feet long.
- The great white shark can weigh up to 5000 pounds and can be up to 20 feet long.
- An orca, or killer whale, can weigh up to $12{,}000$ pounds and can be up to 32 feet long.
- A manta ray can weigh up to 6000 pounds and can be up to 29 feet long.
- An angler fish can weigh up to 5 pounds and can be up to 3.3 feet long.
- A clownfish can weigh up to 0.1 pound and can be up to 0.3 feet long.
- A sea horse can weigh up to 0.5 pound and can be up to 1.2 feet long.
- A krill can weigh up to 0.004 pounds and can be up to 0.12 feet long

5. What is the sum of the weights of the blue whale, great white shark, and orca (killer) whale? Write your answer in standard form and in scientific notation.

6. How much longer is a manta ray than a clownfish? Write your answer in standard form and in scientific notation.

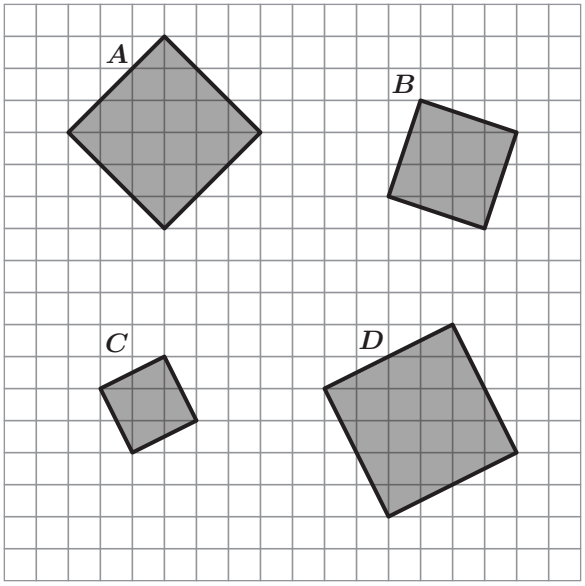
7. A blue whale can consume an astonishing amount of krill each day. On average, a blue whale eats around 8000 pounds of krill daily during feeding seasons. Approximately how many krill does a blue whale consume in one day? Show your thinking.

8. Write and solve your own question using the facts shared about sea creatures. Show your thinking.

Name: ..... Date: ..... Period: .....

Additional Practice 8.01

Problems 1–4: Determine the area of each tilted square. Each square grid represents 1 square unit.



1. Square *A*

2. Square *B*

3. Square *C*

4. Square *D*

Problems 5–6: Determine the area of each square given its side length.

5. Side length: 4 centimeters

6. Side length: x units

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Name: Date: Period:

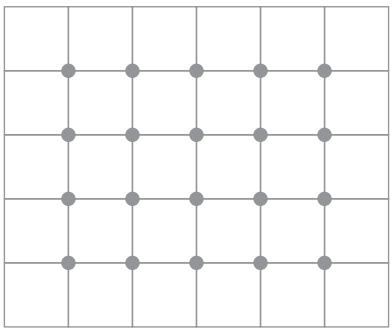
Problems 7–9: Here are the areas of three squares. Determine the side length of each square.

7. Area: 36 square meters

8. Area: $\frac{9}{49}$ square inches

9. Area: w^2 square units

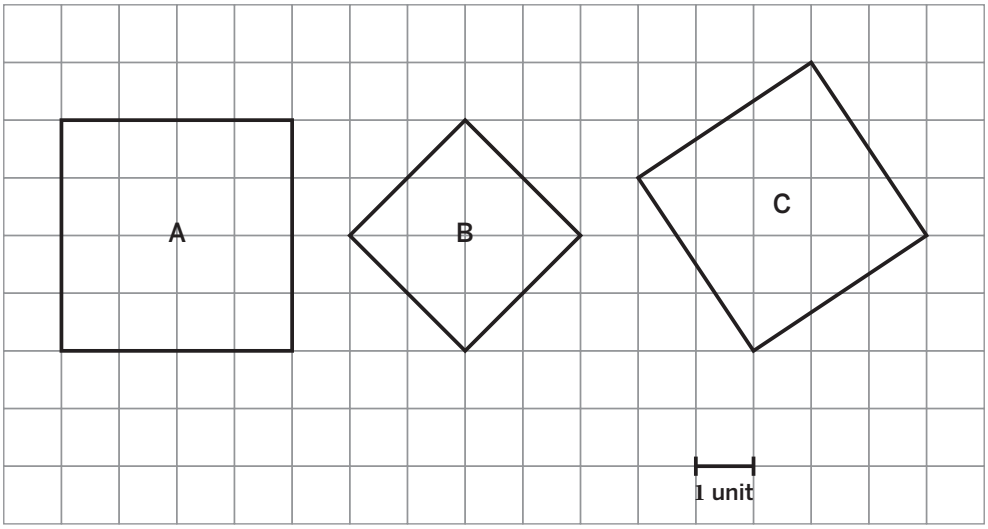
10. Determine the area of the largest tilted square that can be created on the dot grid. Show your thinking.



Name: ..... Date: ..... Period: .....

Additional Practice 8.02

1. Determine the area and exact side length of each square.



2. Determine the side length of a square if the area of the square is . . .

a $9\ \text{cm}^2$

b $\frac{1}{4}\ \text{in}^2$

c $25\ \text{m}^2$

d $\frac{4}{49}\ \text{ft}^2$

3. Compare each pair of expressions using the symbol $<$, $>$, or $=$.

a $\sqrt{15} \square \sqrt{51}$

b $\sqrt{100} \square 8$

c $\sqrt{7} \square \sqrt{0.7}$

d $\sqrt{25} \square 5$

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4. Write each square root under the corresponding column in the table according to its value.

$\sqrt{37}$	$\sqrt{52}$	$\sqrt{60}$	$\sqrt{43}$	$\sqrt{58}$

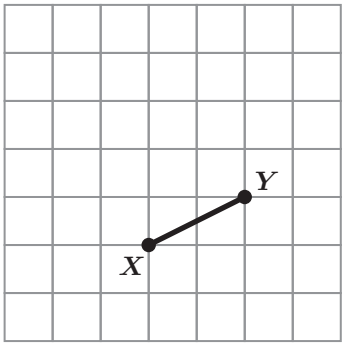
Between 6 and 7	Between 7 and 8

5. Order the squares by side length, from least to greatest.

Area: 81 square units	Side length: 8 units	Side length: 8.5 units	Side length: $\sqrt{61}$ units

Least **Greatest**

6. Determine the exact length of line segment XY. Explain your thinking.



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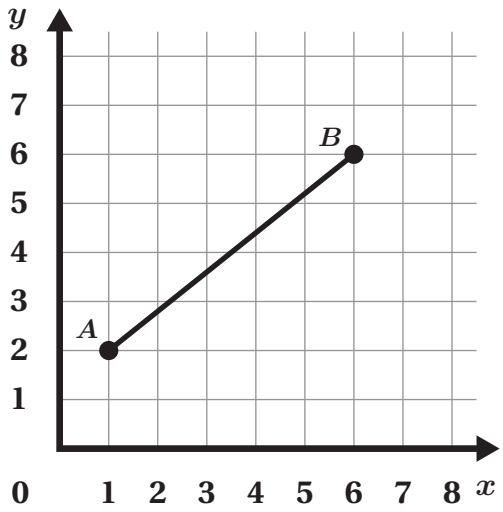
Additional Practice 8.03

Problems 1–4: Here is a line segment AB. Each grid square represents 1 square unit. Use the ruler, circle, or square if they help with your thinking.



1. Determine the approximate length of AB.

2. Determine the exact length of AB.

3. Which method did you choose to help with your thinking?

Ruler **Circle** **Square**

4. Why did you choose that particular method?

Problems 5–6: Determine the value of each square root.

5. $\sqrt{81}$

6. $\sqrt{36}$

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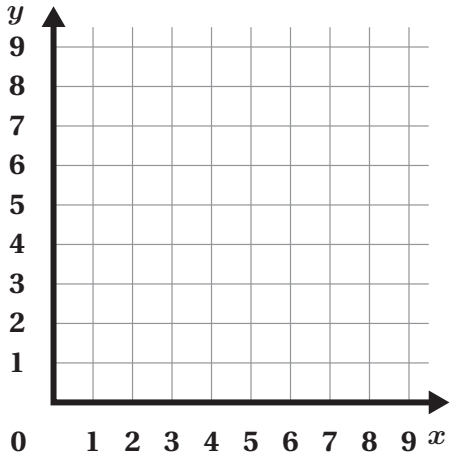
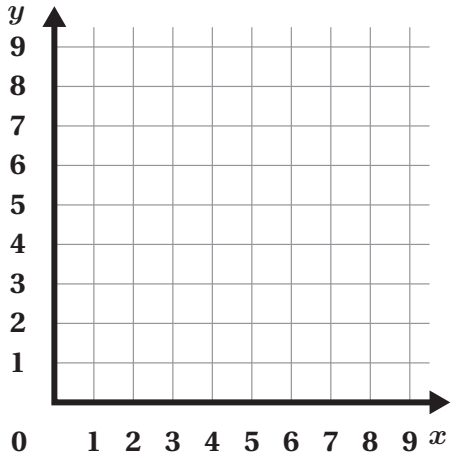
Problems 7–8: Estimate each square root. Draw a square if it helps with your thinking.

7. $\sqrt{27}$



8. $\sqrt{50}$



Problems 9–10: Determine which two whole numbers each square root is between.

9. $\sqrt{38}$

10. $\sqrt{72}$

11. Here is a list of values ordered from least to greatest. One value is unknown. Which could be the unknown value?

$\frac{9}{2}, 4.8, \quad ? \quad , \sqrt{26}$

A. 5.5

B. $(2.5)^2$

C. 5.1

D. $\frac{5}{2}$

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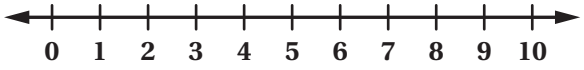
Additional Practice 8.04

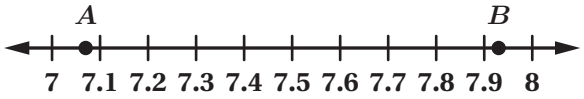
1. Plot and label the approximate value for each number on the number line.
$\sqrt{77}$, 1.5, 6.7, $\sqrt{94}$, $\sqrt{18}$



2. Estimate each square root to the nearest tenth.

a $\sqrt{13}$ **b** $\sqrt{28}$ **c** $\sqrt{78}$ **d** $\sqrt{85}$

3. Refer to the number line.



a Write a number using square root notation that could represent Point A.

b Write a number using square root notation that could represent Point B.

4. Between which two decimals is the solution for the equation $x^2 = 7$?

A. 2.3 and 2.4

B. 2.4 and 2.5

C. 2.5 and 2.6

D. 2.6 and 2.7

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5. Determine whether each statement is *true* or *false*. Circle your response.

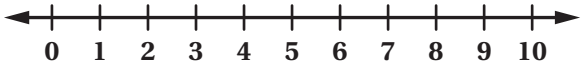
a $\sqrt{14}$ is greater than 3.5. True False

b $\sqrt{125}$ is greater than 11.5. True False

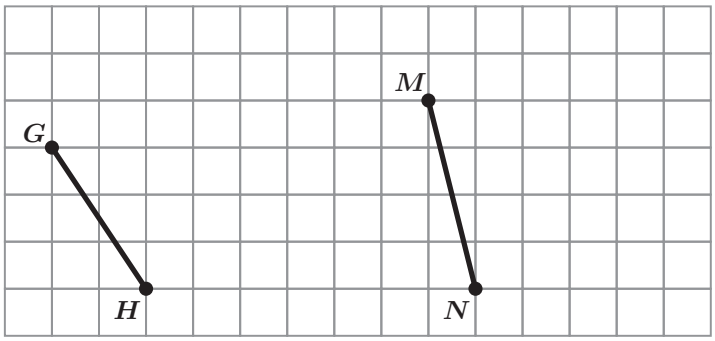
c $\sqrt{22}$ is between 4.5 and 4.6. True False

d $\sqrt{77}$ is between 8.7 and 8.8. True False

6. Consider the equations $a^2 = 3$ and $b^2 = 35$, where a is a positive solution for the first equation and b is a positive solution for the second equation. Plot and label the approximate values of a and b on the number line.



7. Which line segment, GH or MN, has an approximate length of 4.1 units? Show or explain your thinking.
Note: Each grid square has a side length of 1 square unit.



Name: ..... Date: ..... Period: .....

Additional Practice 8.05

1. Write an equivalent value *without* using a cube root symbol.

a $\sqrt[3]{27}$ **b** $\sqrt[3]{8}$ **b** $\sqrt[3]{125}$

2. Complete the table. If possible, write your response without using cube root notation.

x	x^3
1	
$\sqrt[3]{10}$	
	64
	24

3. Order the numbers from least to greatest.

$\sqrt[3]{27}$	$\sqrt[3]{120}$	$\sqrt{48}$	$\sqrt{121}$	$\sqrt[3]{\frac{1}{64}}$

Least **Greatest**

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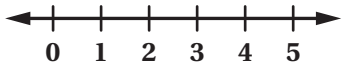
4. Cube A is smaller than Cube B. Cube B is smaller than Cube C. The edge lengths of the cubes are $\sqrt[3]{62}$ units, $\sqrt[3]{7}$ units, and 8.5 units. Determine the edge length of Cube A, Cube B, and Cube C.

5. Consider the equation $x^3 = 33$. Plot the approximate value of x on the number line.



6. Determine whether each statement is *true* or *false*. Circle your response.

a $\sqrt[3]{41}$ is less than 3. True False

b $\sqrt{4}$ is equal to $\sqrt[3]{8}$. True False

c $\sqrt[3]{29}$ is between 3 and 4. True False

d $\sqrt[3]{\frac{64}{125}}$ is between 1 and 2. True False

7. If you double the edge length of a cube, what happens to the volume?

8. If you double the volume of a cube, what happens to the edge length?

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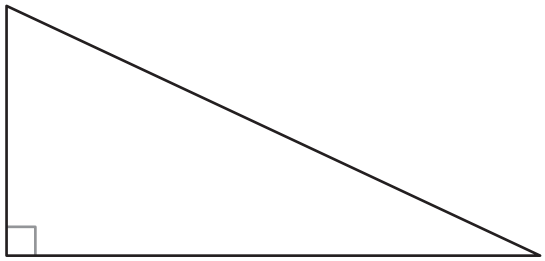
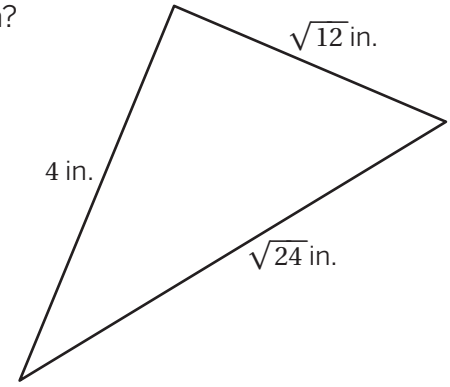
Additional Practice 8.06

1. Show that the Pythagorean Theorem is true for a right triangle with legs 3 units and 4 units and a hypotenuse of 5 units.

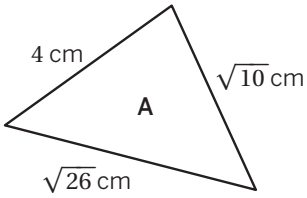
2. Label the legs and hypotenuse of the right triangle.

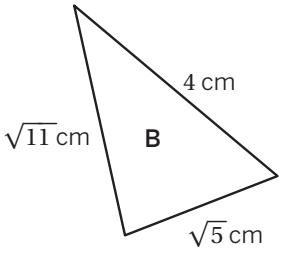


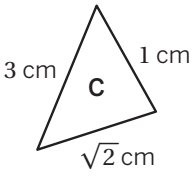
3. Is the Pythagorean Theorem true for the triangle shown? Show or explain your thinking.



4. Consider the three triangles. For which triangles is the Pythagorean Theorem true? Show or explain your thinking.







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5. If a right triangle has legs a and b and hypotenuse c, which of the following statements are true? Select *all* that apply.

- ☐ **A.** $c^2 - b^2 = a^2$
- ☐ **B.** $c^2 + b^2 = a^2$
- ☐ **C.** $c^2 = a^2 + b^2$
- ☐ **D.** $c^2 - a^2 = b^2$
- ☐ **E.** $c^2 - a^2 - b^2 = 0$

6. Han is asked to determine lengths for a triangle with legs a and b and hypotenuse c that would make the Pythagorean Theorem true for the triangle. Han claims that if $a = \sqrt{5}$, $b = \sqrt{31}$, and $c = 6$, the Pythagorean Theorem will be true for the triangle. Do you agree? Explain your thinking.

7. Can the Pythagorean Theorem ever be true for an isosceles triangle? What about an equilateral triangle? **Hint:** An isosceles triangle has two congruent sides and an equilateral triangle has three congruent sides.

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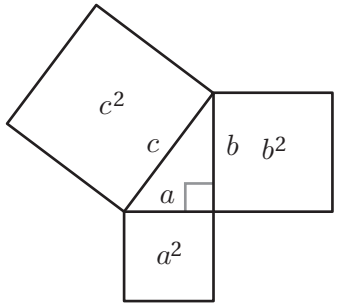
Additional Practice 8.07

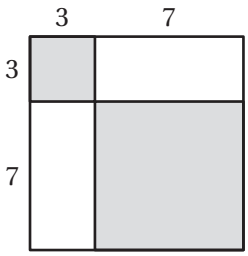
1. Consider the diagram shown. If $a = 6$ and $b = 8$, what is the value of c^2? Show or explain your thinking.



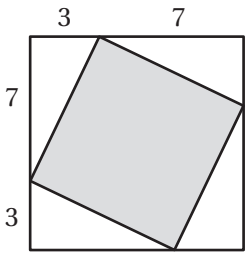
2. Consider Squares E and F.

a Determine the total area of the shaded region for each square in square units.

Square E



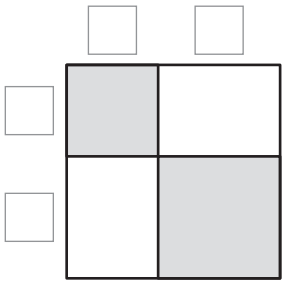
Square F



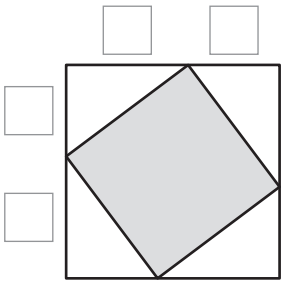
b For Square F, determine the exact side length of the shaded square.

3. Complete the diagram to show that $3^2 + 4^2 = 5^2$.

Square X



Square Y



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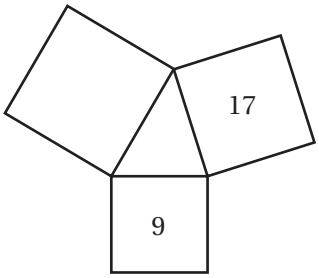
4. The diagram shows an acute triangle and three squares.

Tyler says the area of the large unmarked square is 26 square units because $9 + 17 = 26$. Do you agree with Tyler? Explain your thinking.



5. The lengths of the three sides are given for several right triangles in inches. For each, write an equation that expresses the relationship between the lengths of the three sides.

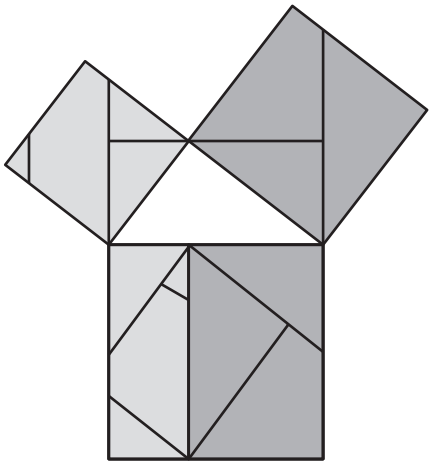
a $\sqrt{5}, \sqrt{3}, \sqrt{8}$

b $1, \sqrt{37}, 6$

c $5, \sqrt{5}, \sqrt{30}$

d $3, \sqrt{2}, \sqrt{7}$

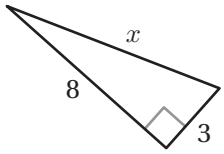
6. How does the figure show that the Pythagorean Theorem is true for the right triangle shown?



Name: ..... Date: ..... Period: .....

Additional Practice 8.08

1. Clare was solving for the unknown side measure, x, for the right triangle shown. Which equation should she use to help her solve for x?



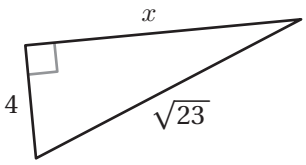
A. $3^2 - 8^2 = x^2$

B. $8^2 + x^2 = 3^2$

C. $8^2 + 3^2 = x^2$

D. $3^2 + x^2 = 8^2$

2. Mai was solving for the unknown side measure, x, for the right triangle shown. Which equation should she use to help her solve for x?



A. $4 + x = \sqrt{23}$

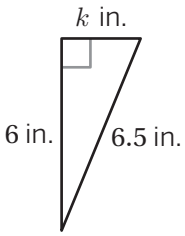
B. $4^2 + x^2 = (\sqrt{23})^2$

C. $4^2 + (\sqrt{23})^2 = x^2$

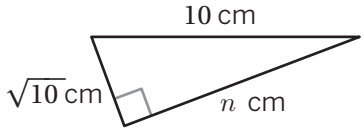
D. $(\sqrt{23})^2 + x^2 = 4^2$

3. Determine the exact value of each variable that represents a side length in a right triangle. Show your thinking.

a



b



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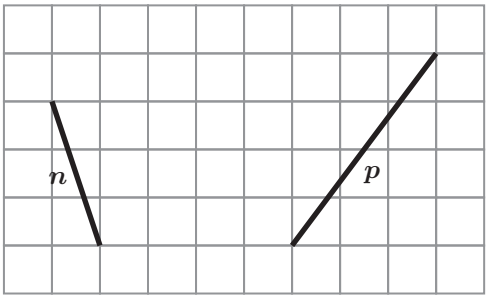
4. A right triangle has side lengths of a, b, and c units. The longest side has a length of c units. Complete each equation to show three relations among a, b, and c.

a $c^2 =$ .....

b $a^2 =$ .....

c $b^2 =$ .....

5. Consider the two line segments. One segment is n units long and the other is p units long. Determine the exact values of n and p. **Note:** Each small grid square is 1 square unit. Show or explain your thinking.



6. One leg of a right triangle has length of $\frac{1}{4}$ m. If the length of the hypotenuse is $\frac{1}{2}$ m, what is the length of the other leg? Show or explain your thinking.

7. A right triangle has side lengths of 2 cm and 5 cm.

Clare said that the other side must be $\sqrt{21}$ cm.
Diego said that the other side must be $\sqrt{29}$ cm.

Who is correct? Use drawings or equations to support your thinking.

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Additional Practice 8.09

1. A triangle has side lengths $\sqrt{11}$, 2, and $\sqrt{15}$ such that $(\sqrt{11})^2 + 2^2 = (\sqrt{15})^2$. Is it a right triangle?

2. A right triangle has side lengths 5, $\sqrt{7}$ and $\sqrt{32}$. A second triangle has side lengths 5, $\sqrt{7}$, and the longest side is greater than $\sqrt{32}$. What type of triangle is the second triangle, *acute* or *obtuse*?

3. For each right triangle, select the side that is the hypotenuse.

a Triangle A

A. 6 in.

B. 10 in.

C. 8 in.

b Triangle B

A. 3 cm

B. 7 cm

C. $\sqrt{40}$ cm

c Triangle C

A. 11 ft

B. 4 ft

C. $\sqrt{137}$ ft

d Triangle D

A. $\sqrt{14}$ m

B. $\sqrt{11}$ m

C. 5 m

4. A triangle has side lengths 4, 7 and $\sqrt{61}$. Is this triangle acute, right, or obtuse? Show or explain your thinking.

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5. Consider the set of triangles and their side lengths.

Triangle A: $6, 8, 10$

Triangle B: $6, 8, 9$

Triangle C: $5, 12, 13$

Triangle D: $5, 12, 14$

Triangle E: $1, \sqrt{10}, \sqrt{11}$

a Which are acute triangles?

b Which are obtuse triangles?

c Which are right triangles?

6. In each set of numbers, a and b represent the length of a leg of a right triangle, and c represents the length of its hypotenuse. Determine the missing length, given the other two lengths. Show or explain your thinking.

a $a = 12, b = 5$

b $b = 21, c = 29$

7. A triangle with legs of 5 and 12 and a hypotenuse of 13 is a right triangle because $5^2 + 12^2 = 169$ and $13^2 = 169$. Is a triangle with legs of 50, 120, and a hypotenuse of 130 also a right triangle? Show or explain your thinking *without* using the Pythagorean Theorem. Then, use the Pythagorean Theorem to check your thinking.

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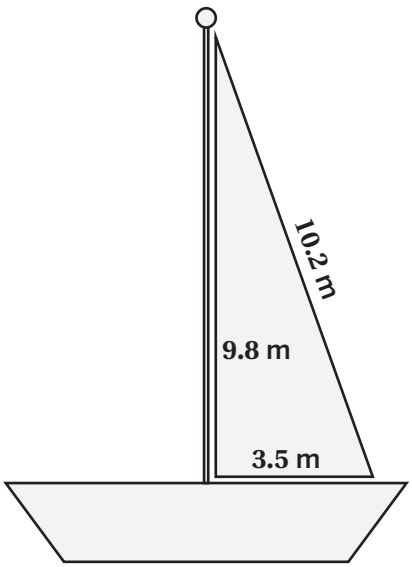
Additional Practice 8.10

1. Television screens are classified by the length of their diagonal. If a television screen is 22.5 in. tall and 40 in. wide, what is the length of its diagonal? Estimate your answer to the nearest inch. Show your thinking.

2. Lin leaves her house for a jog. She jogs 4 miles directly north, and then 3 miles directly west. If Lin wants to return home, what is the shortest distance she can travel directly back to her house? Show your thinking.

3. Sails come in many shapes and sizes. Is the sail shown a right triangle? Show or explain your thinking.



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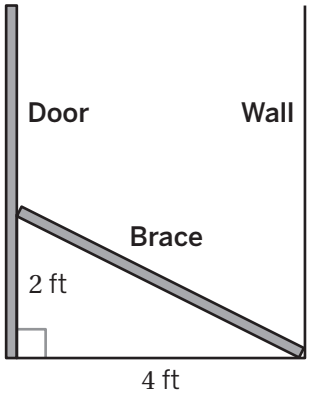
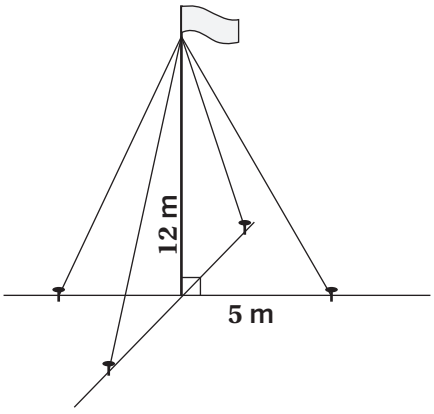
4. A carpenter cuts a length of wood that will brace a door against a wall. The wall is 4 ft away from the door, and she wants the brace to rest on the door, 2 ft above the floor. About how long should she cut the brace? Estimate your answer to the nearest tenth of a foot. Show or explain your thinking.



5. Jada is building a marble run track. She wants to create a straight path from the top of one section to the top of a second section. The height of the first section is 8 in., and the height of the second section is 4 in. If the distance between the bottom of the two sections is 10 in., how long should the connected path be? Estimate your answer to the nearest tenth. Show or explain your thinking.

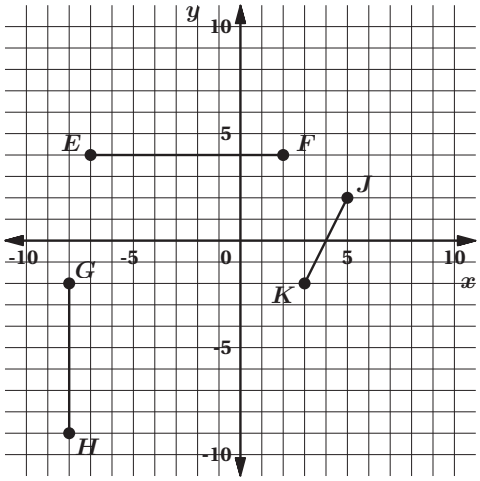
6. Four cables are used to mount a 12 m post. Each cable is mounted at the top of the post to the ground, where it is 5 m from the bottom of the post. What is the total amount of cable needed to mount the post? Show or explain your thinking.



Name: ..... Date: ..... Period: .....

Additional Practice 8.11

1. Determine the exact length of each line segment. Show or explain your thinking.

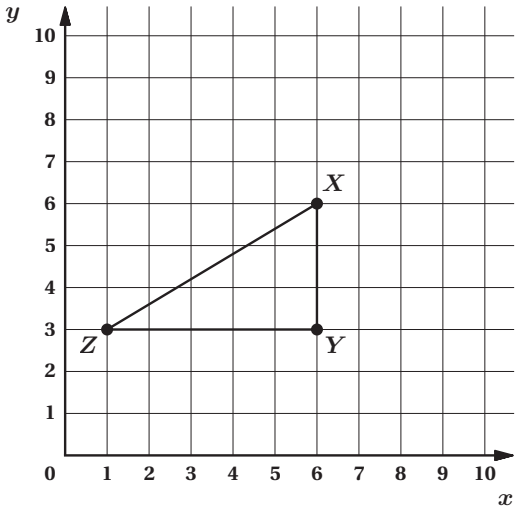


a Line segment EF

b Line segment GH

c Line segment JK

2. Determine the exact length of segment XZ. Show or explain your thinking.



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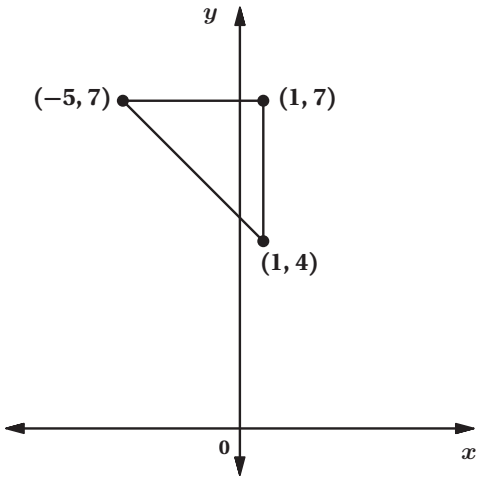
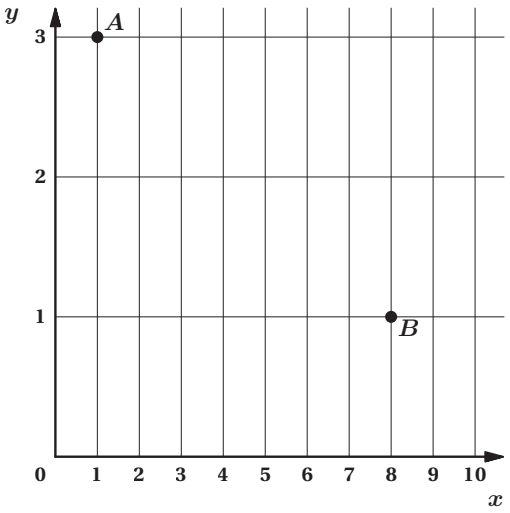
3. A right triangle is drawn on the coordinate plane, and the coordinates of its vertices are labeled. Label each side of the triangle with its exact length.



4. Determine the exact distance from Point A to Point B. Show or explain your thinking.



5. Estimate the perimeter of a triangle whose vertices are $(-1, 2)$, $(4, 2)$ and $(-1, 1)$ to the nearest tenth. To help with your thinking, plot the points on graph paper.

6. Estimate the perimeter of a triangle whose vertices are $(-3, 2)$, $(2, -3)$ and $(-7, -1)$ to the nearest tenth. To help with your thinking, plot the points on graph paper.

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Additional Practice 8.12

1. Rewrite each fraction as a decimal.

a $\frac{3}{5}$

b $-\frac{23}{100}$

c $\frac{7}{45}$

2. Determine whether the decimal representation of each fraction *terminates* or *repeats*. Circle your response.

a $\frac{1}{20}$ Terminates Repeats

b $\frac{1}{11}$ Terminates Repeats

c $\frac{1}{15}$ Terminates Repeats

3. Select *all* of the decimals that have the digit 4 in the thousandths place.

- ☐ **A.** $0.\overline{4}$
- ☐ **B.** $0.4\overline{1}$
- ☐ **C.** $0.\overline{41}$
- ☐ **D.** $4.\overline{04}$
- ☐ **E.** 0.44

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4. What is the value of $0.\overline{3} + 0.5$?

A. $\frac{8}{10}$

B. $\frac{6}{13}$

C. $\frac{8}{9}$

D. $\frac{5}{6}$

5. Determine whether each inequality is *true* or *false*. Circle your response.

a $\frac{1}{12} = 0.08$ True False

b $-0.\overline{46} = -\frac{7}{15}$ True False

c $\frac{2}{33} = 0.\overline{6}$ True False

d $5.\overline{3} = 5\frac{1}{3}$ True False

6. Let $x = \frac{25}{11} = 2.272727\ldots$ and $y = \frac{58}{33} = 1.757575\ldots$. For each problem, determine whether the fraction or decimal representation of each number is more helpful to respond to the problem, and then determine your response.

a Is x or y is closer to 2? Explain your thinking.

b What is the value of x^2? Show or explain your thinking.

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Additional Practice 8.13

1. Write each number as a fraction. Show your thinking.

a 0.4

b $0.\overline{4}$

2. Select the fraction that is equivalent to $0.\overline{23}$.

- ☐ **A.** $\frac{2}{3}$
- ☐ **B.** $\frac{23}{99}$
- ☐ **C.** $\frac{23}{100}$
- ☐ **D.** $\frac{2}{9}$
- ☐ **E.** $\frac{3}{2}$

3. Complete the table.

Fraction	Decimal expansion
$\frac{14}{5}$	
$\frac{2}{9}$	
	$-0.\overline{51}$
	-2.67
	$0.9\overline{1}$

4. Write each rational number as an equivalent fraction.

a $\sqrt{\frac{100}{121}}$ **b** $\sqrt{1.44}$ **c** $\sqrt[3]{0.064}$

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Name: ..... Date: ..... Period: .....

5. Match each decimal with its fraction.

Decimal	Fraction
a. 0.07	..... $\frac{7}{100}$
b. $0.0\overline{7}$	..... $\frac{5}{9}$
c. $0.\overline{5}$	..... $\frac{7}{90}$
d. $0.\overline{05}$	..... $\frac{5}{99}$

6. Complete the statement by writing the word *always*, *sometimes*, or *never*, so that the statement is true.

a A repeating decimal is ..... a rational number.

b If the digits in the decimal expansion do not repeat and do not terminate, the number is ..... rational.

c A non terminating decimal can ..... be written as a fraction.

7. Consider the fractions $\frac{3}{7}$ and $\frac{4}{7}$.

a Write each fraction as a decimal. Then determine the sum, written as decimal.

b Determine the sum of $\frac{3}{7}$ and $\frac{4}{7}$, written as a fraction.

c Compare the the decimal representation and fractional representation for the sum of $\frac{3}{7}$ and $\frac{4}{7}$. What do you notice?

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Additional Practice 8.14

1. Write three examples of *rational numbers*, including at least one number written as a square root or cube root.

2. Write three examples of *irrational numbers*, including at least one number written as a square root or cube root.

3. Write each number as a ratio of integers. If it is impossible, write "irrational number."

a 0.12

b $\sqrt[3]{27}$

c $\sqrt{73}$

d $-\sqrt{49}$

e $\sqrt[3]{11}$

4. Han says that the solution to $x^2 = 50$ is a rational number. Is Han correct or incorrect? Explain your thinking.

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5. Write each number under its corresponding column in the table.

$\sqrt{9}$	$\sqrt[3]{29}$	0.123	$-\frac{2}{13}$	$\sqrt{8}$	$\sqrt[3]{125}$

Rational number	Irrational number

6. Complete the statement by writing the word *always*, *sometimes*, or *never*, so that the statement is true.

a Perfect squares are ..... irrational numbers.

b The square root of a number is ..... an irrational number.

c Irrational numbers can ..... be written as fractions.

d The cube root of a perfect cube is ..... a rational number.

7. Does the exact length of the line segment MN represent a rational number or irrational number? Explain your thinking.