Amplify Desmos Math

Grade 7

Additional Practice
Student Resources

About Amplify

Amplify is dedicated to collaborating with educators to create learning experiences that are rigorous and riveting for all students. Amplify creates K–12 core and supplemental curriculum, assessment, and intervention programs for today's students.

A pioneer in K–12 education since 2000, Amplify is leading the way in next-generation curriculum and assessment. All of our programs provide teachers with powerful tools that help them understand and respond to the needs of every student.

Amplify gratefully acknowledges the work of distinguished program advisors from the English Learners Success Forum (ELSF), who have been integral in the development of Amplify Desmos Math. ELSF is a 501(c)(3) nonprofit organization whose mission is to expand educational equity for multilingual learners by increasing the supply of high-quality instructional materials that center their cultural and linguistic assets.

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Practice Problems

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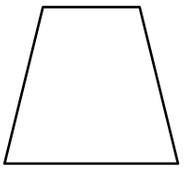
Additional Practice 1.01

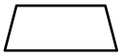
1. Which of the following appears to be a scaled copy of the original figure?

Original Figure

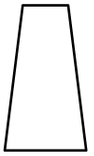


A.

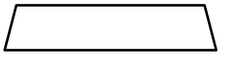
B.



C.

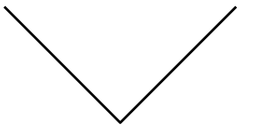


D.

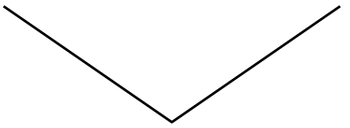


2. Refer to the drawing of the letter V shown. Which of the following appear to be scaled copies of the original letter V? Select *all* that apply.

Original Figure

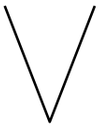


☐ A.



☐ B.

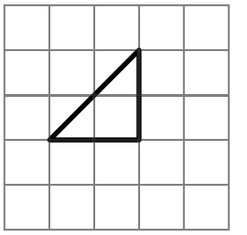
☐ C.



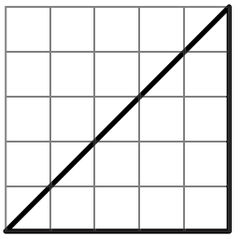
☐ D.

3. Which of the following figures is *not* a scaled copy of the original figure?

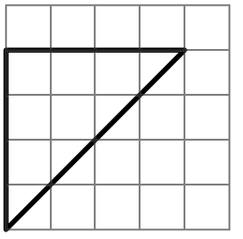
Original Figure



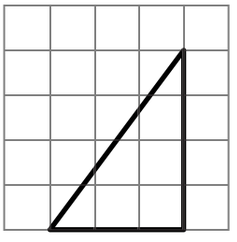
A.



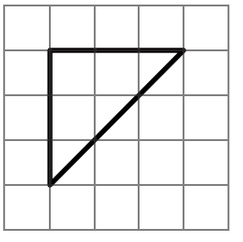
B.



C.

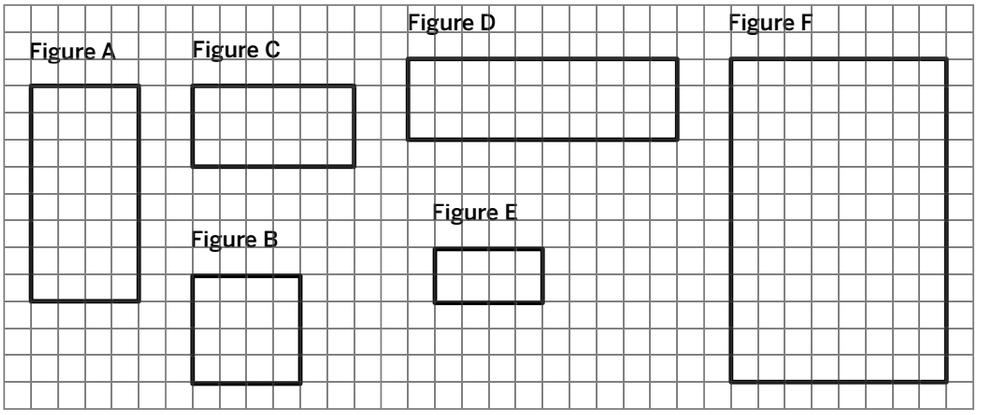


D.



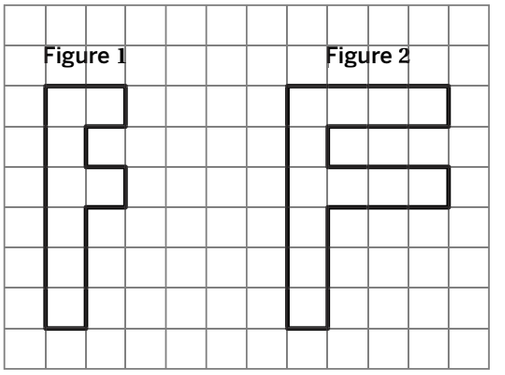
Name: ..... Date: ..... Period: .....

4. Study the figures. Select *all* the figures that are scaled copies of each other.



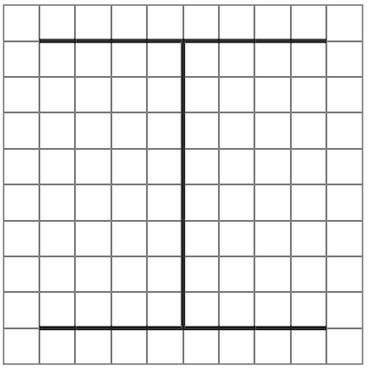
- ☐ Figure A
- ☐ Figure B
- ☐ Figure C
- ☐ Figure D
- ☐ Figure E
- ☐ Figure F

5. Kiran says that Figure 2 is a scaled copy of Figure 1 because it is twice as wide. Is Kiran correct? Explain your thinking.

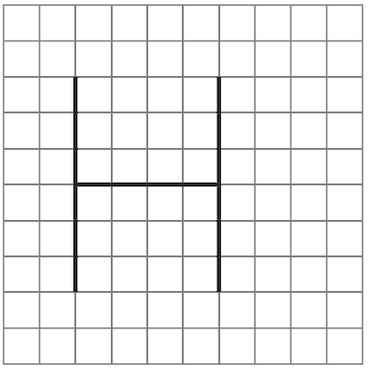


6. Jada drew the letter I and Diego drew the letter H as shown. Diego says his drawing is a scaled copy of Jada's drawing. Is Diego correct? Explain your thinking.

Jada's drawing



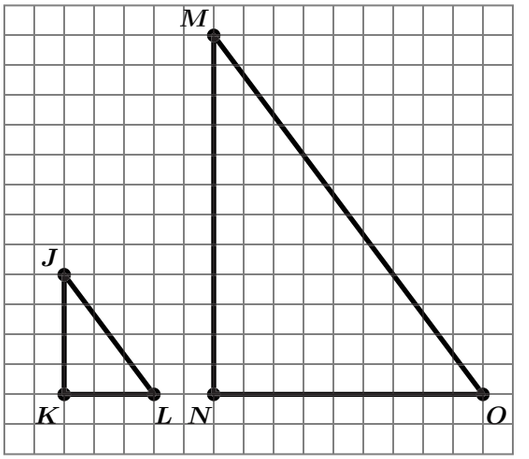
Diego's drawing



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

Additional Practice 1.02

1. Triangle MNO is a scaled copy of Triangle JKL. What is the scale factor?



A. 2

B. 3

C. 4

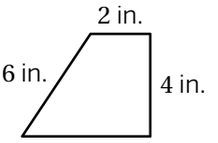
D. 5

2. Polygon B is a scaled copy of Polygon A.

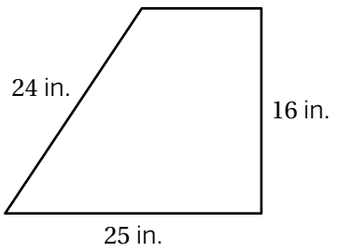
a What is the length of the shortest side of Polygon B?

b What is the length of the longest side of Polygon A?

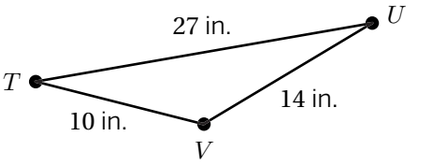
Polygon A



Polygon B



3. Which values could represent the corresponding side lengths, in inches, of the scaled copy of Triangle TUV if the scale factor is $\frac{1}{2}$? Select *all* three side lengths.



☐ **A.** 7

☐ **B.** 28

☐ **C.** 13.5

☐ **D.** 20

☐ **E.** 5

☐ **F.** 54

4. Polygon A has side lengths of 10, 18, 20, and 22 units. Polygon B is a scaled copy of Polygon A. Which of the following sets of values could *not* be the side lengths of Polygon B?

A. 5, 9, 10, 11

B. 25, 45, 50, 55

C. 20, 28, 30, 32

D. 2, 3.6, 4, 4.4

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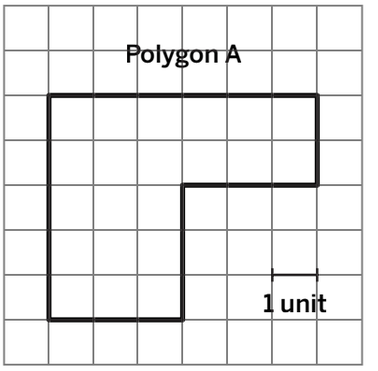
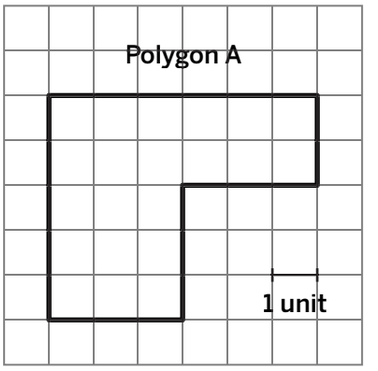
5. Quadrilateral $ZOID$ is a scaled copy of Quadrilateral $TRAP$. Select *all* the true statements.



- ☐ **A.** Angle DIO is smaller than angle PAR.
- ☐ **B.** The scale factor is greater than 1.
- ☐ **C.** Point T corresponds to point Z.
- ☐ **D.** Side PT is 2.25 times longer than side DZ.
- ☐ **E.** The measure of angle DZO is 105.
- ☐ **F.** Side RA corresponds to side ZD.

6. Polygon B is a scaled copy of Polygon A, shown here. Suppose the shortest side of Polygon B is 13.5 units.



a What is the scale factor that takes Polygon A to Polygon B?

b What is the length of the longest side of Polygon B?

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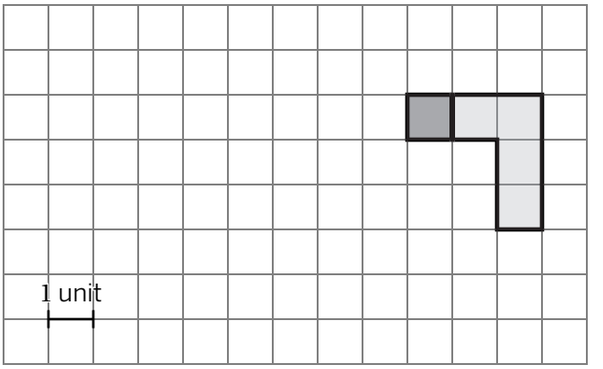
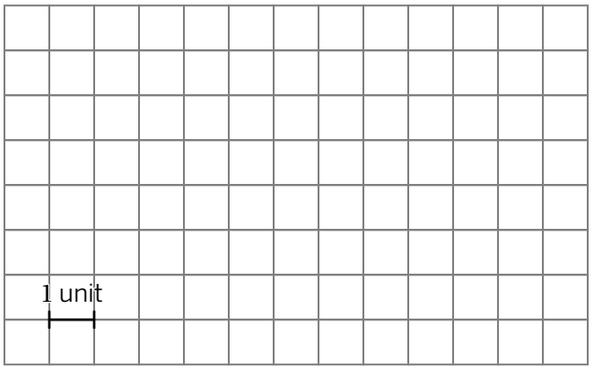
Additional Practice 1.03

Problems 1–2: Here is a polygon.



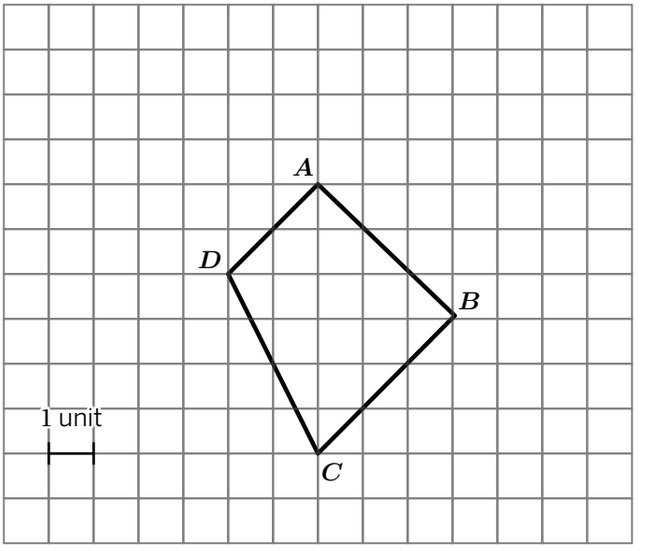
1. Draw a scaled copy of the polygon using a scale factor of 2.



2. What is the area and perimeter of your scaled copy?

Here is figure $ABCD$.

Use this figure for Problem 3.



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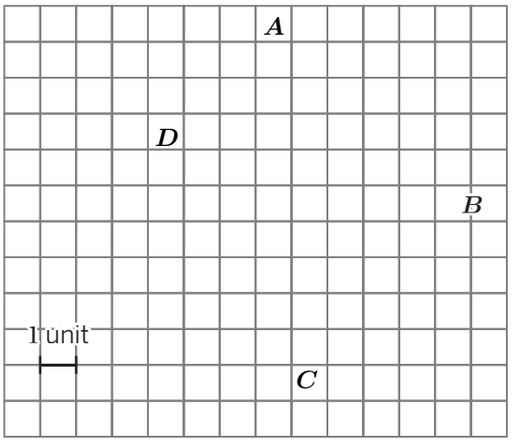
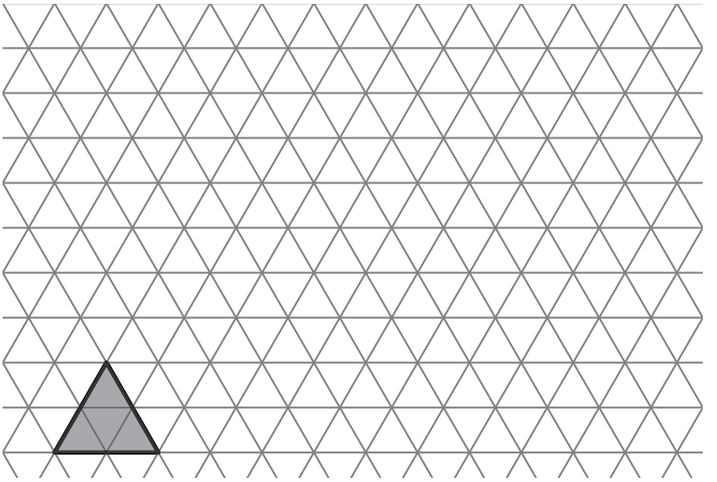
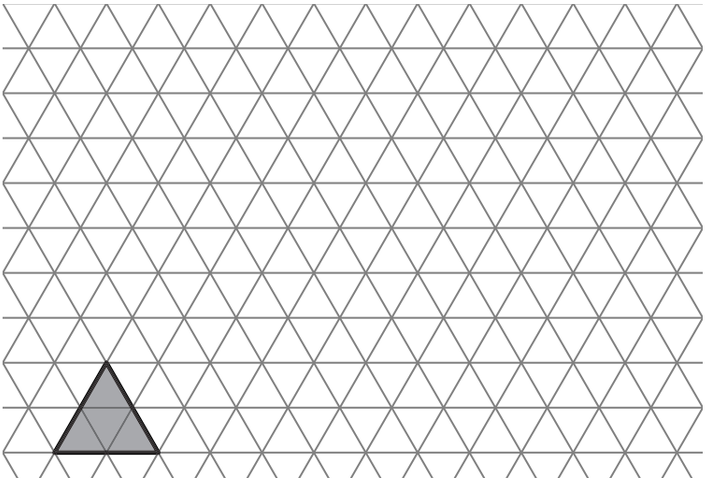
3. Draw a scaled copy of figure $ABCD$ using a scale factor of 1.5.



Problems 4–5: Here is an equilateral triangle.



4. Draw a scaled copy of this equilateral triangle using a scale factor of 4.



5. Equilateral triangles are always scaled copies. Are squares also scaled copies?

Yes No Maybe

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Additional Practice 1.04

1. If a scaled copy is created by applying a scale factor of 10 to a polygon, what scale factor would take the scaled copy back to its original size? Explain your thinking.

2. Figure B is a scaled copy of Figure A. Which of the following values could be the scale factor that maps Figure A onto Figure B?

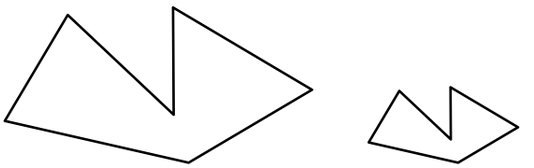


Figure A Figure B

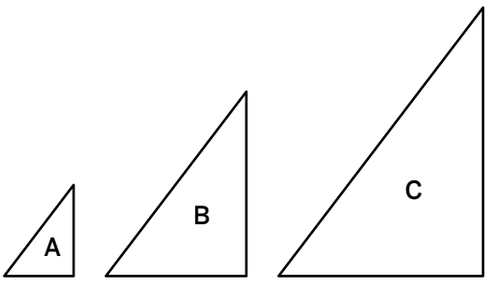
A. 1

B. $\frac{1}{2}$

C. 2

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

3. Triangles A, B, and C are scaled copies of one another. For each pair, decide if the scale factor that takes one figure to another is *greater than* 1 or *less than* 1. Explain your thinking.



a From Triangle A to B

b From Triangle B to C

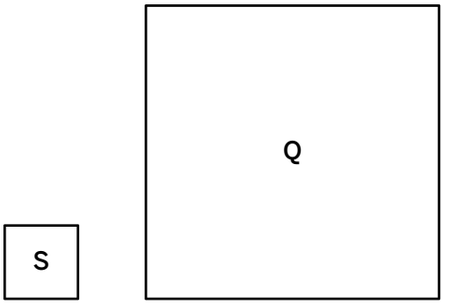
c From Triangle B to A

d From Triangle C to A

4. Squares S and Q are scaled copies of one another.

a What scale factor maps Square S onto Square Q?

b What scale factor maps Square Q onto Square S?



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5. Suppose Figure B is a scaled copy of Figure A. If each of the listed values represents a scale factor that map Figure A onto Figure B, determine the scale factor that will map Figure B back onto Figure A.

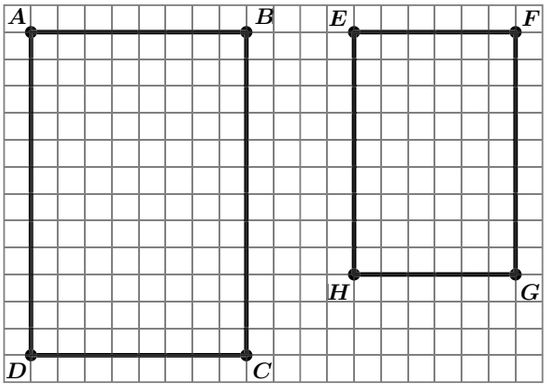
a 4

b $\frac{1}{2}$

c $\frac{3}{5}$

d 3.5

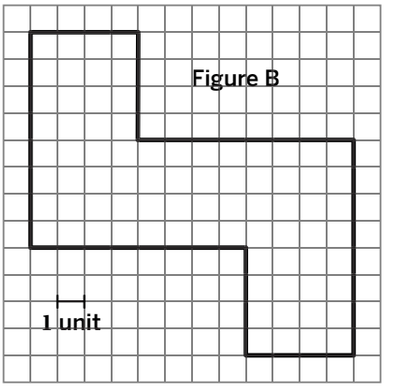
6. Polygon $EFGH$ is a scaled copy of Polygon $ABCD$.



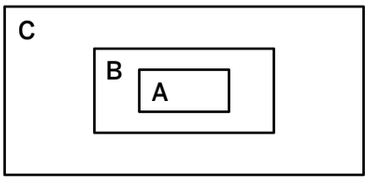
a What scale factor will take Polygon $EFGH$ back to its original size?

b What scale factor will result in Polygon $EFGH$ remaining the same size?

7. Figure B is a scaled copy of Figure A (not drawn). The scale factor that takes Figure A to Figure B is $\frac{2}{3}$. Determine the side lengths of Figure A. Explain your thinking.



8. Andre and Tyler are creating the design shown. They use a scale factor of 2 from Rectangle A to Rectangle B and from Rectangle B to Rectangle C. They create Rectangle A with dimensions 1 in. by $\frac{1}{2}$ in.



a What dimensions should Tyler use to create Rectangle B? Explain your thinking.

b Andre plans to create Rectangle C with dimensions 3 in. by $1\frac{1}{2}$ in. Are Andre's dimensions correct? Explain your thinking.

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Additional Practice 1.05

1. A square has a side length of 3. The square is scaled by a scale factor of $\frac{2}{3}$.

a What is the side length of the scaled copy?

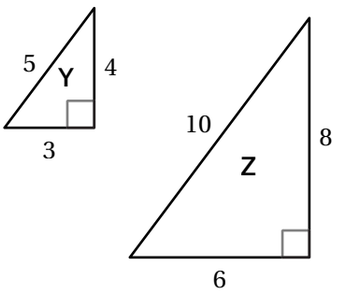
b What is the perimeter of the scaled copy?

c What is the area of the scaled copy?

2. Triangle Z is a scaled copy of Triangle Y.

a Determine the perimeter of both triangles.

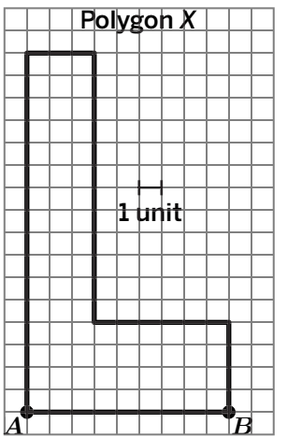
b Determine the area of both triangles.



3. Suppose Polygon X is scaled by a scale factor of $\frac{1}{3}$.

a What is the length of the corresponding side of side AB in the scaled copy?

b What is the perimeter of the scaled copy?



4. Suppose a polygon has a perimeter of 16 units and an area of 12 square units. If you draw the scaled copies of this polygon using the scale factors in the table, what will be the perimeter and area of these scaled copies? Complete the table and explain your thinking.

Scale factor	Perimeter (units)	Area (square units)
1	16	12
2		
$\frac{1}{2}$		

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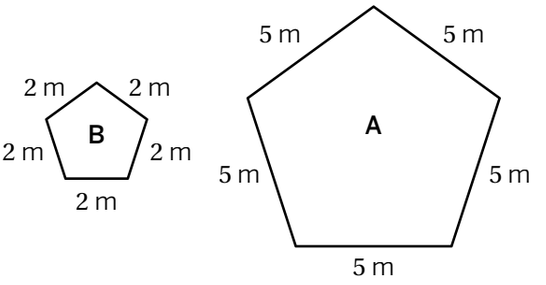
5. Rectangle B has a length of 9 in., a width of 2 in., and is the result of scaling Rectangle A by a scale factor of 2. What is the perimeter of Rectangle A?

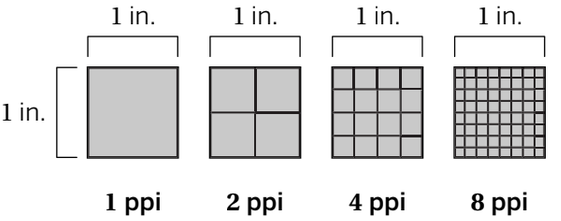
6. Pentagon B is a scaled copy of Pentagon A.



a What scale factor takes Pentagon A to Pentagon B?

b How does the perimeter of Pentagon B compare to the perimeter of Pentagon A?

7. A pixel is one of many tiny dots of colored light that computers use to create images on a smartphone or computer screen. The diagram shows the number of pixels that can fit in a 1-in.-by-1-in. display, for different pixel densities, which are measured in pixels per inch (ppi).



a How many pixels are in a 1-in.-by-1-in. display with 3 ppi? Explain your thinking.

b What happens to the number of pixels in the display as the pixel density increases by 1 ppi?

c How does pixel density relate to determining the area of the scaled copies of a square?

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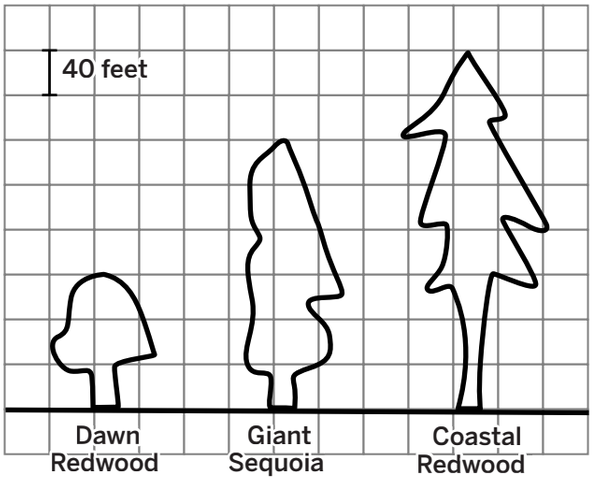
Additional Practice 1.06

Problems 1–2. Here is a scale drawing of three different types of redwood species.

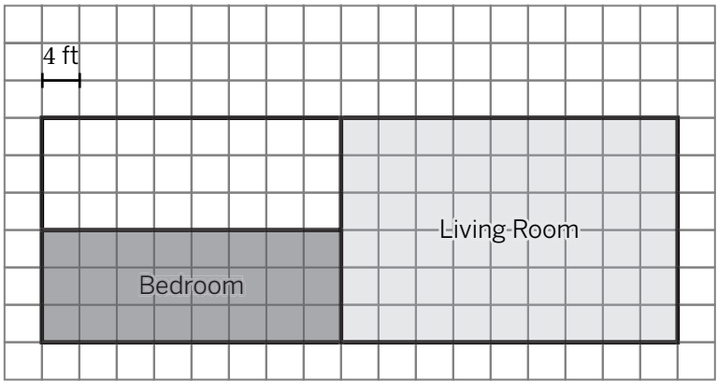


1. Which tree is the tallest?

2. Use the scale to estimate how tall each tree is.

Tree	Estimate Height (in feet)
Dawn Redwood	
Giant Sequoia	
Coastal Redwood	

Lilly lives in the city. Here is a scale drawing of their apartment that shows their rooms.



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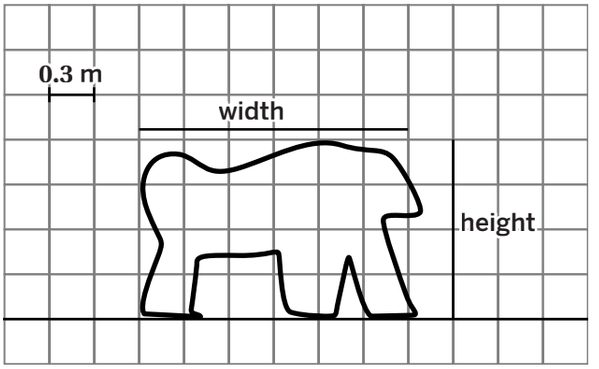
3. Complete the table with the dimensions of Lilly's rooms.

	Length (ft)	Width (ft)
Bedroom		
Living Room		

Problems 4–5. The North American brown bear, also known as the grizzly bear, is one of the largest bears in the world. Here is a scale drawing that shows a grizzly bear.

Approximate the actual lengths.



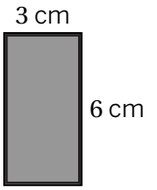
4. The width of the grizzly bear:

5. The height of the grizzly bear:

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

Additional Practice 1.07

Problems 1–4. Here is part of a scale drawing of Nova's kitchen. The scale is 9 centimeters to 21 feet.



1. What are the dimensions of Nova's actual kitchen?

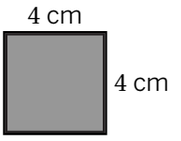
2. What is the actual area of Nova's kitchen?

3. Nova wants to put a table in their kitchen that is 3.5 feet wide. How wide would the table be if it were drawn on the scale drawing?

4. Nova's living room is near their kitchen and measures 6 centimeters by 10 centimeters. Is Nova's living room twice as large as their kitchen? Explain your thinking.

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

Problems 5–7. Paulina is looking at a map of a square fountain in a park that has a scale of 2 centimeters to 800 feet. On the map, each side of the park is 4 centimeters long.



5. Paulina lives 2,000 feet from the fountain. How long would this distance be on the map?

6. If Paulina ran around the perimeter of the fountain once, what distance would she run?

7. Paulina wants to run a mile (5,280 feet). About how many times would she need to run around the fountain in order to reach her goal?

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

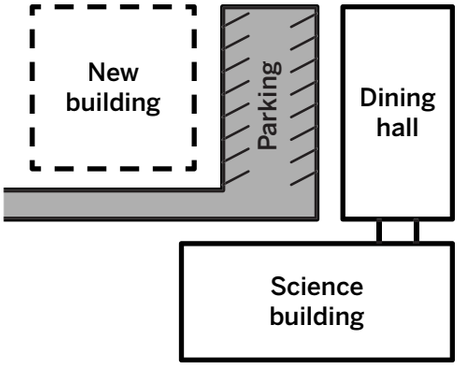
Additional Practice 1.08

Problems 1–2: A book measures 6 inches wide and 9 inches tall. The publisher wants to display an image of the book on a billboard. The width of the book on the billboard is 36 inches.

1. How tall is the book on the billboard?

2. What scale is used for the image on the billboard? Show or explain your thinking.

3. The local university is planning to construct a new building on their campus. The scale drawing shows the proposed location of the new building from a bird's eye view and has a scale of 1 in. = 3 ft.



a In the drawing, the length of the parking lot is 9 in. What is its actual length? Show your thinking.

b The entrance for the new building is 20.5 in. from the entrance to the science building in the drawing. What will be the actual distance between the two entrances once the new building is constructed? Show your thinking.

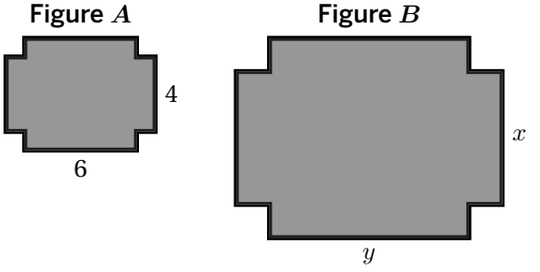
Name: ..... Date: ..... Period: .....

4. The blueprint for an apartment complex that is being constructed has a scale that says that 1 cm is equivalent to 2.5 ft.

a If an apartment building is 120 cm tall in the blueprint, what is its actual height? Show your thinking.

b The blueprint includes plans for building a community center for the apartment complex. If the community center is 54 cm tall in the blueprint, what is its actual height? Show your thinking.

5. Figures A and B are scaled copies. The scale that takes Figure A to figure B is 1 unit to $6\frac{1}{2}$ units.



What are the values of x and y?

6. A Manhattan tourist buys a miniature statue that is an exact replica of the Statue of Liberty. The height of the actual Statue of Liberty is 305 ft.

a The height of the miniature statue is 10 in. What actual height is equivalent to 1 in. on the replica?

b The tourist measures the length of the right arm of the miniature Statue of Liberty, which is a little less than 1.5 in. Based on his measurement, what is the approximate length of the right arm of the actual Statue of Liberty?

c How is the replica that the tourist bought similar to a scale drawing?

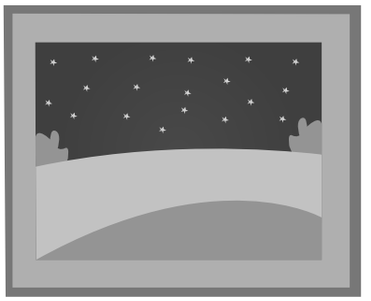
Name: ..... Date: ..... Period: .....

Additional Practice 1.09

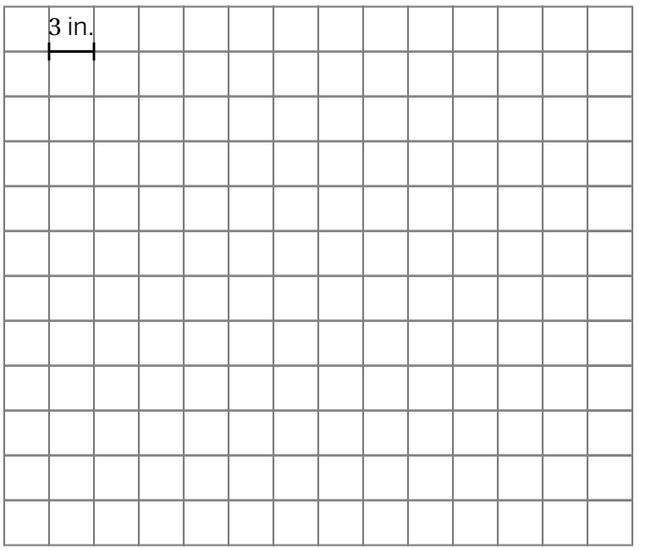
Phoebe made a scale model of Mars in science class. The scale that maps the scale model to the actual Mars is 1 inch to 375 miles.

1. If the height in the scale model is 11.2 inches, what is the actual height of Mars?

Problems 2–4. A painting measures approximately 36 inches by 27 inches.

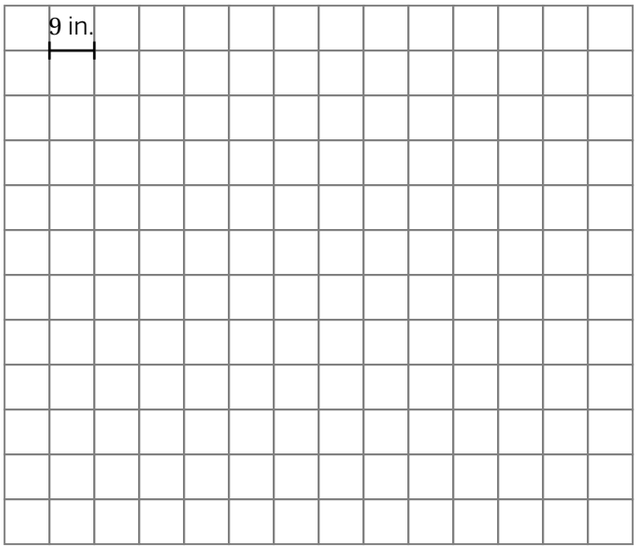


2. Create a scale drawing of the outline of the painting where 1 unit represents 3 inches.



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

3. Create a scale drawing of the outline of the painting where 2 units represent 9 inches.



4. Imagine a new scale drawing of the painting where 3 units represent 1 inch.
Is this drawing smaller, larger, or equal in size compared to your previous drawings?
Explain your thinking.

5. The floorplan of a factory shows a scale of 1 inch to 15 feet. The floorplan shows the area of the factory as 30 square inches. Kai says the actual area of the factory is 450 square feet. Is Kai correct? Explain your thinking.

Name: Date: Period:

Additional Practice 1.10

Problems 1–4: James and Piper buried a treasure together on their school's field. The field is 400 feet wide. James made a map that is 8 inches wide to record its location.

1. Write two possible scales James could have used to make his drawing.

2. Piper made her own map using a scale of 1 inch to 20 feet. Whose map is larger: James's or Piper's? Explain your thinking.

3. On Piper's map, the treasure is 2 inches from the south edge of the field. How far is the treasure from the south edge on Piper's map?

4. On Piper's map, the area of the field is 16 square inches. Piper says that the actual area of the field is 320 square feet. Is Piper correct? Explain your thinking.

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

5. Select *all* the scales that are equivalent to 4 centimeters to 20 meters.

- ☐ **A.** 4 inches to 20 inches
- ☐ **B.** 1 centimeter to 5 meters
- ☐ **C.** 10 meters to 2 centimeters
- ☐ **D.** 5 millimeters to 3 meters
- ☐ **E.** 1 inch to 4 feet

Explain your thinking for the scale(s) you selected.

6. On a blueprint, the living room is 4.2 inches wide. The blueprint has a scale of 1 inch to 5 feet. How wide would the living room be on a blueprint that has a scale of 1 inch to 20 feet?

A. 1.2 inches

B. 2.1 inches

C. 3.2 inches

D. 31 inches

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

Additional Practice 1.11

1. The Space Needle in Seattle, Washington is about 605 feet tall and 140 feet wide. Luigi wants to make a scale drawing of the building on a sheet of paper that is $8\frac{1}{2}$ by 11 inches.

Which scale do you think is the most appropriate for the scale drawing?

A. 1 inch to 50 feet

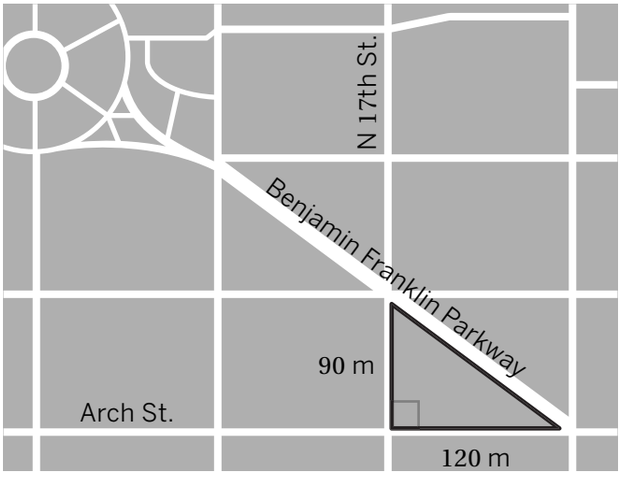
B. 1 inch to 100 feet

C. 1 inch to 400 feet

D. 1 inch to 500 feet

Explain your thinking.

Problems 2–5. This map shows a part of Philadelphia, Pennsylvania, near Logan Square. The Benjamin Franklin Parkway divides a plot of land into a right triangle.



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

2. Imagine making a scale drawing of this triangular plot of land that fits nicely on a sheet of paper. Write a scale that would make a scale drawing of appropriate size.

..... inch(es) to ..... meter(s)

3. Using this scale, what are the dimensions of the triangle in the scale drawing?

4. What is the area of the triangular plot of land on your scale drawing?

5. How many square meters are represented by 1 square inch in your scale drawing?

Explain your thinking.

Grade 7 | Unit 2

Additional Practice

Practice Problems

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

Additional Practice 2.01

Problems 1–5: The table shows an original mixture for orange paint, as well as four other mixtures.

1. Select *all* the mixtures that will create the same shade of orange as the original mixture.

- ☐ **A.** Mixture A
- ☐ **B.** Mixture B
- ☐ **C.** Mixture C
- ☐ **D.** Mixture D

Mixture	Yellow Paint (cups)	Red Paint (cups)
Original	9	6
Mixture A	6	8
Mixture B	6	4
Mixture C	3	2
Mixture D	12	18

2. Choose one mixture that creates the same shade of orange as the original. Explain your thinking.

3. Choose a mixture that does *not* have the same shade of orange as the original. Will it be a shade of orange that is more yellow or more red? Explain your thinking.

4. How much red paint would you need to mix with 1 cup of yellow paint to make a mixture that has the same shade of orange as the original mixture? Explain your thinking.

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

5. Complete the table to create a different mixture that will also have the same shade of orange as the original mixture.

Yellow Paint (cups)	Red Paint (cups)

6. Brenden mixed 4 cups of blue paint with 3 cups of yellow paint to make a perfect color green to paint his bedroom.

Complete the table to show several other ways to make this color.

Yellow Paint (cups)	Red Paint (cups)
3	4
9	
12	
	20

7. Which ratios are equivalent to $3:4$? Select *all* that apply.

- ☐ **A.** $50:100$
- ☐ **B.** $18:24$
- ☐ **C.** $\frac{1}{4}:\frac{1}{5}$
- ☐ **D.** $75:100$
- ☐ **E.** $4:5$
- ☐ **F.** $\frac{1}{3}:\frac{1}{4}$

Name: Date: Period:

Additional Practice 2.02

Problems 1–4: Complete the tables so that the relationship is proportional.

1.

x	y
16	4
20	
	9

2.

x	y
1	2.4
4	
	18

3.

x	y
12	36
1	
	0

4.

x	y
0.4	1
1	
	15

5. DesKayaks rents one-person and two-person kayaks for a fee of $\$10$ an hour plus $\$2.50$ per person for gear. The table shows the cost for several groups of people. Is the relationship between the number of people renting kayaks and the fees charged a proportional relationship? Explain your thinking.

Number of People in Group	Total Fees ($)
1	12.50
2	15.00
3	27.50
4	30.00

Name: Date: Period:

6. Sabaan's favorite smoothie shop charges $\$6.20$ for 12 ounces of the drink. Complete the table so that it shows a proportional relationship between ounces of a smoothie drink and the cost. Show or explain your thinking.

Smoothie (oz)	Cost ($)
12	6.60
18	
	13.20

7. At an airport in Mexico City, Sara exchanged 300 U.S. dollars to $6{,}156$ Mexican pesos. Complete the table so that it shows a proportional relationship between the U.S. dollar and Mexican pesos. Show or explain your thinking.

U.S. dollars	Mexican pesos
300	6,156
1	
	100,260
$\approx$	1

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

Additional Practice 2.03

1. The tables show the weights of different bags of fruit based on the number of fruits in the bag. Which table shows a proportional relationship? Show or explain your thinking.

A.

Number of Apricots	Weight of Bag
1	1.2
2	2.7
3	4.0

B.

Number of Apricots	Weight of Bag
1	1.5
2	3.5
3	6.0

C.

Number of Apricots	Weight of Bag
1	8.7
2	17.0
3	25.9

D.

Number of Apricots	Weight of Bag
1	5.3
2	10.6
3	15.9

Problems 2–3: When you mix two colors of paint in equivalent ratios, the color you get is always the same. Amanda's favorite shade of purple is created by mixing the right ratio of red paint with blue paint

2. Complete the table so that each row makes the same color purple.

Red Paint (cups)	Blue Paint (cups)
1	
8	5

3. What is the constant of proportionality for this relationship?

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

4. The table shows the cooking measurement chart given on a bag of rice. Select *all* the statements that are true.

Dry Rice	1 cup	2 cups	3 cups
Water	2 cups	4 cups	6 cups
Yield	3 cups	6 cups	9 cups
Servings	4	8	12

- ☐ **A.** The amount of dry rice used will yield twice as much cooked rice.
- ☐ **B.** $\frac{1}{4}$ cup of dry rice is needed to make a single serving of cooked rice.
- ☐ **C.** The ratio of dry rice to water needed is 1 to 2.
- ☐ **D.** The constant of proportionality that gives the number of servings, if you know the number of cups of dry rice, is $\frac{3}{4}$.
- ☐ **E.** There is a proportional relationship between the amount of water used and the number of servings.
- ☐ **F.** The unit rate of servings to water is $\frac{1}{2}$.

5. Diego is making a 16 oz glass of lemonade. When his mother makes lemonade, she uses 1 gallon (or 128 ounces) of water and squeezes the juice from 4 lemons.

a If Diego wants his lemonade to taste like his mother's recipe, how many lemons does he need? Explain or show your thinking.

b If Diego's mom uses 1 cup of honey to 1 gallon of water, how much honey should Diego use for his glass of lemonade?

c If Diego's cousin wants his lemonade to have a stronger lemon flavor than Diego's mom's recipe, how many lemons should he juice for a 12 oz glass?

Name: Date: Period:

Additional Practice 2.04

1. The given table shows the relationship between the cost and weight of seedless grapes.

a What is the constant of proportionality?

b Write an equation that represents the cost of seedless grapes c given their weight w.

Weight of seedless grapes (lb)	Cost of seedless grapes ($)
2	5.00
0.5	1.25
0.25	0.63

2. Diego is running at a speed of 3.5 m per second. Consider using the table to help with your thinking.

a If he continues at this speed for 15 seconds, how far does he run?

b If he continues at this speed for 60 seconds, how far does he run?

c If he continues at this speed for x seconds, how far does he run?

Time (seconds)	Distance (meters)
15	
60	
x	

3. The table shows the amount of money a tourist would receive in Egyptian pounds in exchange for different amounts of money in British pounds.

a Complete the table with the missing values if the exchange rate is 1 British pound to 21.48 Egyptian pounds.

b Write an equation to represent the amount of money in Egyptian pounds y the tourist receives in exchange for x British pounds.

British pounds, x	Egyptian pounds, y
100	
250	
	100

Name: Date: Period:

4. Han makes fruit punch following a recipe that uses one 48-oz can of pineapple juice to one 6-oz can of frozen lemonade.

a Complete the table to determine how many ounces of frozen lemonade are needed for the given measures of pineapple juice.

b Write an equation to model how many ounces of pineapple juice p are needed for f ounces of frozen lemonade.

Pineapple juice (oz)	Frozen lemonade (oz)
48	6
16	
12	
4	

5. Bard buys a half pound of turkey breast for $\$4.99$ at the local deli.

a What is the price per pound of the turkey breast?

b Write an equation to represent the price in dollars of the turkey breast y given its weight x in pounds.

c Use your equation to complete the table.

Weight (lb)	0.33		1.82	
Price ($)		6.75		26.94

6. Noah and Andre examine the table shown representing a proportional relationship. Noah writes the equation $y = 1.5x$ to represent the relationship between the two quantities, x and y. Andre writes the equation $y = \left(\frac{2}{3}\right)x$ to represent the relationship between the quantities. Who is correct? Explain your thinking.

x	y
12	8
39	26
57	38

Name: Date: Period:

Additional Practice 2.05

1. A mother buys lunch boxes for each of her 4 children. She pays a total of $\$52$. If n represents the number of lunchboxes and c represents the total cost, in dollars, which equation gives the relationship between n and c?

A. $n = 13c$

B. $c = n + 13$

C. $c = 13n$

D. $n = c + 13$

Problems 2—4: A line cook at a restaurant uses 8 tomatoes to make 12 bowls of salad. Assume all tomatoes and salads are about the same size.

2. How many bowls of salads can be made with 1 tomato? Show or explain your thinking.

3. Write an equation that represents the relationship between the number of tomatoes used, x, and the number of bowls of salads that can be made, y.

4. If the line cook has 24 tomatoes, how many salad bowls can she make?

Problems 5—6: A hardware store sells copper wire by the foot. The equation $c = 1.27f$ represents the cost c, in dollars, of a copper wire that is f ft long.

5. What does the 1.27 represent in this situation?

6. What is the cost of 50 feet of copper wire? Show or explain your thinking.

Name: Date: Period:

Problems 7–8: On its way from Orlando, Florida to Los Angeles, California, a plane flew at a constant speed over Baton Rouge, Houston, San Antonio, and Phoenix.

7. This table shows the flight time and distance traveled for each segment on the flight. Complete the table.

Segment	Time (hr)	Distance (mi)	Speed (mph)
Baton Rouge to Houston	0.6	268	
Houston to San Antonio	2.3		
San Antonio to Phoenix		980	

8. Let t represent the time in hours and d represent the distance in miles. Write an equation that represents the distance traveled for t hours.

9. Rodney runs at a constant speed at a recent cross country event. He ran $3\frac{1}{10}$ miles in $\frac{3}{5}$ of an hour. How far does Rodney run in one hour at this same speed?

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

Additional Practice 2.06

1. Quadrilateral B is a scaled copy of Quadrilateral A. The table shows their side lengths.

a What is the constant of proportionality that gives the side length of Quadrilateral B given the corresponding side length of Quadrilateral A?

b What is the constant of proportionality that gives the side length of Quadrilateral A given the corresponding side length of Quadrilateral B?

Side length of Quadrilateral A (m)	Corresponding side length of Quadrilateral B (m)
2.5	10
6	24
19.5	78
104	26

2. Consider this statement. One yd is equal to 3 ft.

a Complete the table with the equivalent distances.

b Complete each sentence.

Multiplying the distance given in feet by _____ gives the equivalent distance in yards.

Multiplying the distance given in yards by _____ gives the equivalent distance in feet.

Distance (ft)	Equivalent distance (yd)
30	
	7
3	1
1	

3. At an airport in Mexico City, Diego exchanged 300 U.S. dollars to 6,000 Mexican pesos. Consider using the table to help you solve these problems.

a How many Mexican pesos are equivalent to 1 U.S. dollar?

b How many Mexican pesos are equivalent to 500 U.S. dollar?

c What U.S. coin is equivalent to 1 Mexican peso? Explain your thinking.

U.S. dollars	Mexican pesos
300	6,000
1	
500	
	1

Name: Date: Period:

4. A cellphone company offers a data plan that allows 3, 4, or 5 gigabytes (GB) of cloud storage a month. One gigabyte (GB) is equivalent to $1{,}000$ megabytes (MB).

a Complete the table to show the equivalent amount of data in MB to the given amount of data in GB. What is the constant of proportionality?

Data (GB)	3	4	5
Data (MB)			

Constant of proportionality:

b Complete the table to show what value in GB is equivalent to the given amounts of data in MB. What is the constant of proportionality?

Data (MB)	2,000	1,000	500
Data (GB)			

Constant of proportionality:

c What is the relationship between the two constants of proportionality?

5. Han and Elena are comparing a painting to a scale drawing of the painting. Han realizes that the side lengths of the scale drawing are $\frac{1}{4}$ the lengths of the corresponding sides in the actual painting and concludes that the scale factor is $\frac{1}{4}$. Elena says $\frac{1}{4}$ is also one of the constants of proportionality. Is she correct? Explain your thinking.

6. Lin determined the area of three squares with the dimensions of 3 in. by 3 in., 5 in. by 5 in., and 7 in. by 7 in. She says there is a proportional relationship between the side lengths of the squares and their corresponding areas. Do you agree with Lin? Explain your thinking.

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

Additional Practice 2.07

1. Is the relationship between the weight of cherries and the cost the cherries *proportional* or *nonproportional*? Explain your thinking.

Cherries (lb)	2	3	4	5
Cost ($)	9.98	14.97	19.96	24.95

2. Kiran, Lin, and Mai are reading a novel in their English class. Their teacher checks how many pages they have read every day for the first week. The tables show the number of pages read by each student. Determine whether each table shows a *proportional* or *nonproportional* relationship. If the relationship is proportional, determine the constant of proportionality.

Kiran

Days	Pages Read
1	25
2	49
3	72
4	94
5	115

Lin

Days	Pages Read
1	23
2	46
3	69
4	92
5	115

Mai

Days	Pages Read
1	20
2	50
3	75
4	102
5	115

3. The table shows the cost of renting a catering hall based on the number of guests attending.

Number of Guests	Cost ($)
75	8,250
100	11,000
150	16,500

a Is there a *proportional* or *nonproportional* relationship between the cost and the number of guests? Explain your thinking.

b Predict the cost of renting the catering hall if 200 guests are attending.

Name: Date: Period:

4. The table represents different ways you can purchase tickets at a carnival. Select *all* statements that are true based on the relationship between the price and the number of carnival tickets.

Number of tickets	Price ($)
5	2
20	8
100	40

- ☐ **A.** The table represents a nonproportional relationship.
- ☐ **B.** The table has equivalent ratios.
- ☐ **C.** The price per ticket is the same regardless of the number of tickets purchased.
- ☐ **D.** The constant of proportionality to determine the price is $\$2.50$.
- ☐ **E.** The constant of proportionality to determine the price is $\$0.40$.
- ☐ **F.** There is no constant of proportionality.

5. Shawn determines the pattern in the table shown and concludes there is a proportional relationship between the quantities. Do you agree with Shawn? Explain your thinking.

Quantity 1	1	2	3	4
Quantity 2	2	4	8	16

6. Clare buys 3 pieces of Fruit A and 3 pieces of Fruit B at her local farmer's market. The tables show the total weight and price as each fruit is added to the scale at checkout.

Number of Fruit A	Total Weight (oz)	Price ($)
1	4.2	0.42
2	8.7	0.87
3	13.4	1.34

Number of Fruit B	Total Weight (oz)	Price ($)
1	2.6	0.50
2	3.0	1.00
3	2.9	1.50

a Is the relationship between the price of fruit A and the number of fruits purchased *proportional* or *nonproportional*? What about the relationship between the price of fruit A and total weight?

b Which fruit's price is determined by the number of fruits purchased? Which is determined by total weight? Explain your thinking.

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

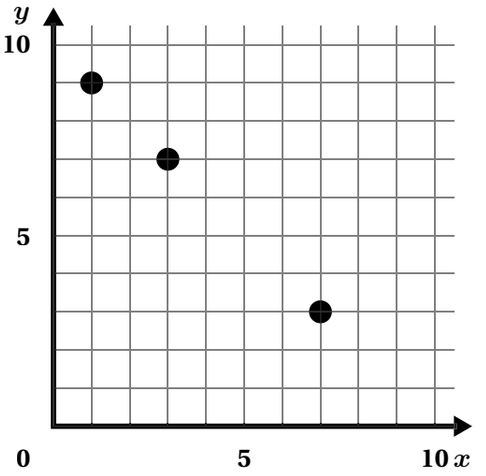
Additional Practice 2.08

1. Which of the following statements about the graph of a proportional relationship are true? Select *all* that apply.

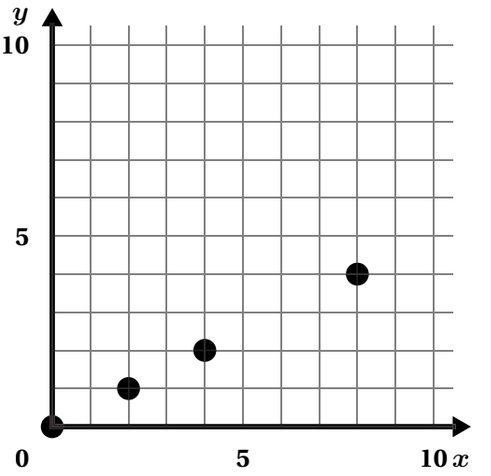
- ☐ **A.** The points on the graph form a curve.
- ☐ **B.** The points on the graph form a straight line.
- ☐ **C.** The graph goes through the origin.
- ☐ **D.** The graph must be a solid line.
- ☐ **E.** The graph could be a series of points.

Problems 2–5: Determine if each graph or table represents a proportional relationship. Explain your thinking.

2.

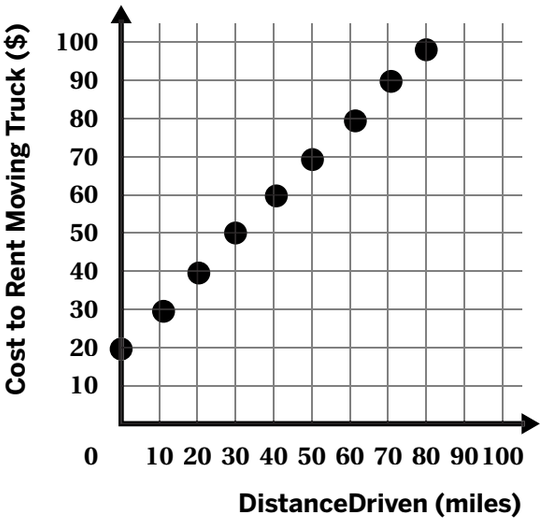


3.



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

4. The graph shows the relationship between the total cost of renting a moving truck and the number of miles the truck is driven. Explain why this relationship is not proportional based on the graph.



5. Complete the table below so that it shows a proportional relationship.

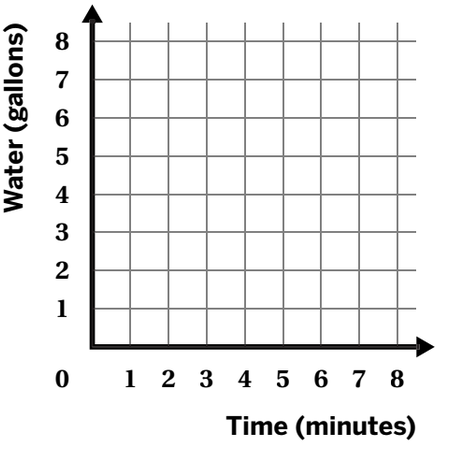
x	0	2	4	6
y			12	

6. Fiona earned $\$50.00$ for mowing 4 lawns. At this same rate, how much will she earn if she mowed 6 lawn? Explain your thinking.

7. A bathtub is being filled at a rate of $1\frac{1}{3}$ gallons of water per minute. The table shows how much water is in the bathtub after several minutes have passed.

Time (minutes)	1	2	3	5
Water (gallons)	$1\frac{1}{3}$	$2\frac{2}{3}$	4	$5\frac{1}{3}$

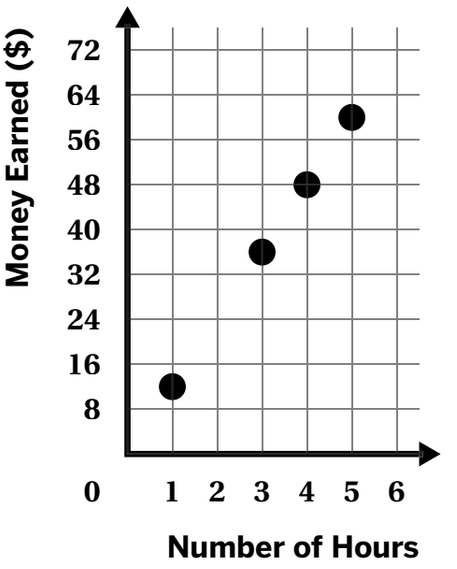
Graph the ordered pairs to determine whether the relationship between time and the amount of water in the bathtub is proportional.
Explain your thinking.



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

Additional Practice 2.09

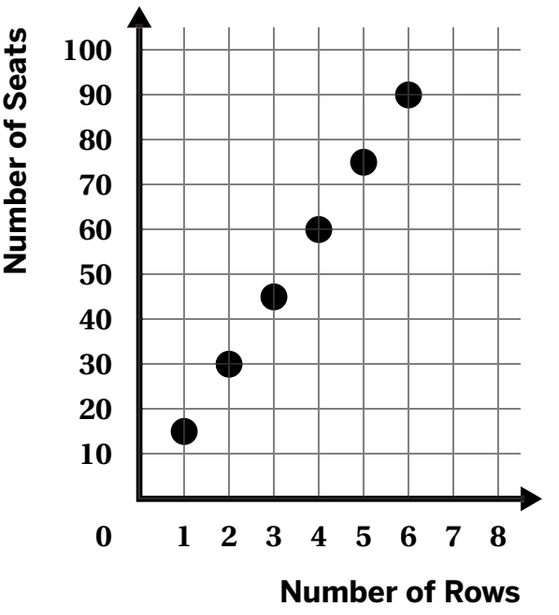
1. Here is a proportional relationship between the number of hours Andre babysits and the amount of money he earns.



a What is the constant of proportionality in this relationship?

b Write an equation that represents this relationship.

2. The graph represents the relationship between the number of rows and the number of seats in a school auditorium.

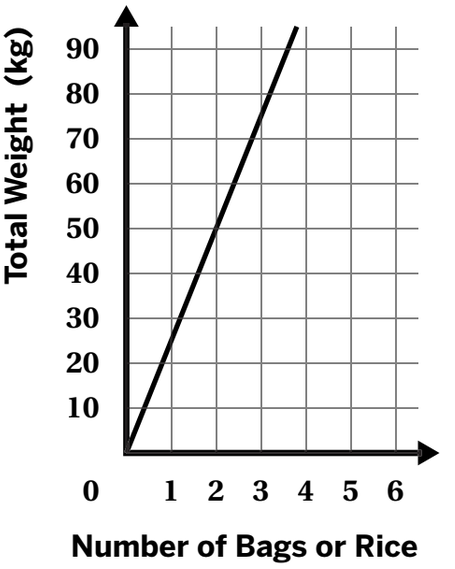


a What does the point $(5, 75)$ represent?

b What is the constant of proportionality in this relationship?

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

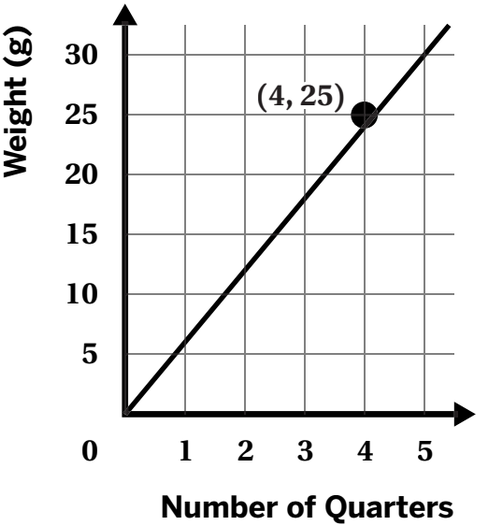
3. The graph shows the relationship between the number of bags of rice in stock at a grocery store and their total weight, in kilograms.



a Determine the constant of proportionality and explain its meaning.

b Label the point $(1, k)$ on the graph.

4. There is a proportional relationship between the number of quarters q and their total weight w in grams. 4 quarters weigh a total of 25 grams. The point $(4, 25)$ is shown on the graph.



a What is the constant of proportionality?

b What does the constant of proportionality represent in this context?

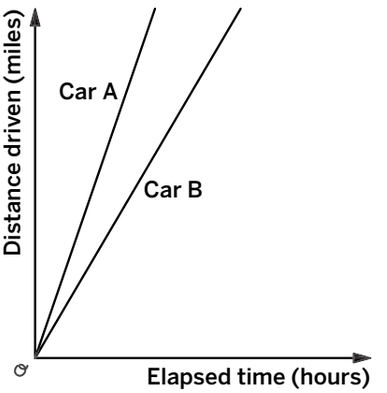
c Plot at least two more points that show the same relationship on the graph, and label the points with their coordinates.

d Using the constant of proportionality from part a, write an equation that represents the relationship between w and q.

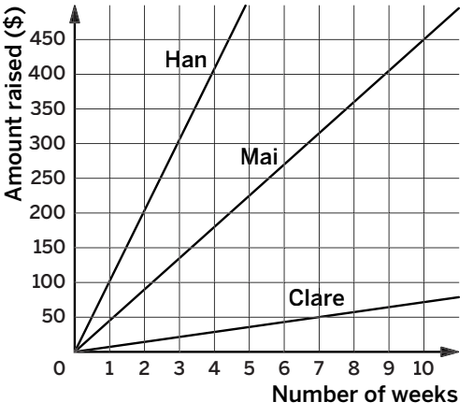
Name: ..... Date: ..... Period: .....

Additional Practice 2.10

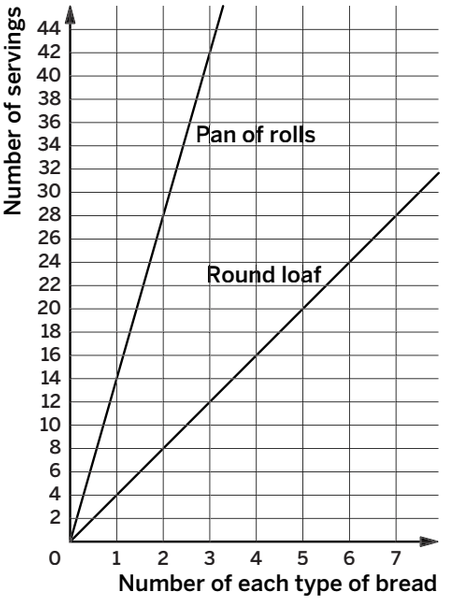
1. The graph shows two lines that represent the distance driven by two cars at a constant speed over time. Which car was driven at a faster speed?



2. The graph shows three lines that represent the amount of money raised by three different students during a school fundraiser over several weeks. Order their names from the student who raised money at the slowest rate to the one who raised money at the fastest rate.



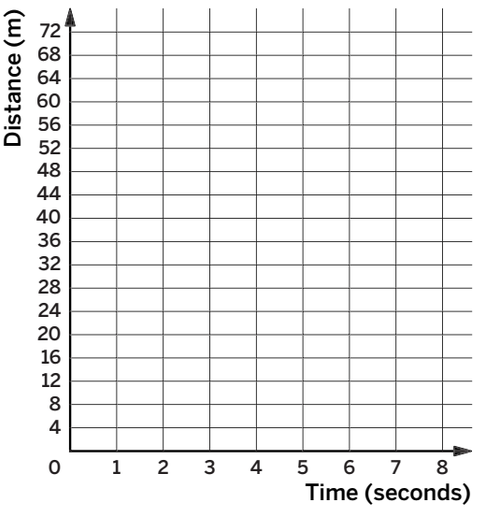
3. A bakery sells round loaves of bread and pans of rolls. The graph shows the relationship between the number of each type of bread and the number of servings. Select *all* the statements that are true, based on the graph.



- ☐ **A.** Both lines show a proportional relationship between the number of each type of bread and the number of servings.
- ☐ **B.** 2 pans of rolls can serve 28 people.
- ☐ **C.** There are 4 servings in 16 round loaves.
- ☐ **D.** There are more servings in a round loaf than in a pan of rolls.
- ☐ **E.** A round loaf serves less people than a pan of rolls.
- ☐ **F.** The line that represents the number of servings in a pan of rolls has a greater constant of proportionality.

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

4. Bard and Priya race each other on the school track. Priya takes 5 seconds to run 35 m and Bard takes 4 seconds to run 32 m. Both students run at a constant rate.

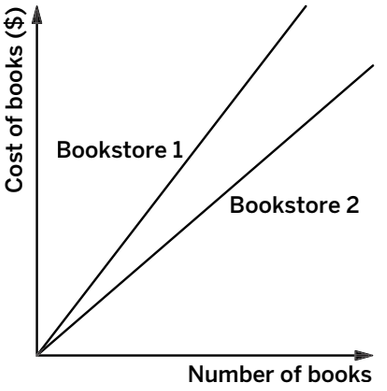


a Graph the two lines that represent the distance that Bard and Priya run on the track. Label each line with the appropriate name.

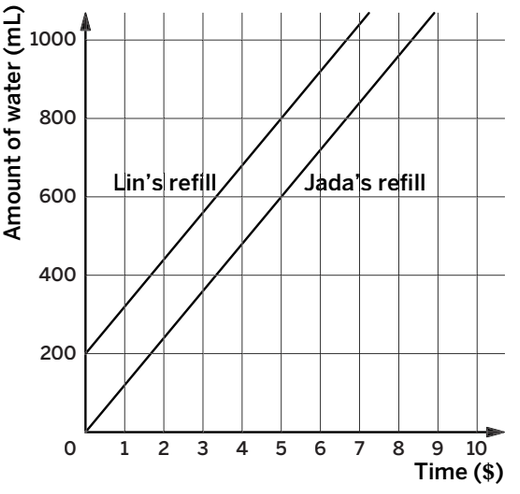
b For each line, label the point with coordinates $(1, k)$ and determine the value of k.

c Which student won the race? Explain your thinking.

5. A teacher needs to order a class set of books for his class. The graph shows two lines that represent the total cost of the books at two different bookstores. From which bookstore should the teacher purchase his class set of books? Explain your thinking.



6. Jada and Lin refill their water bottles at a drinking fountain after basketball practice. The graph represents the amount of water in their bottles as they fill it up at the drinking fountain.



a Which line represents a proportional relationship between time and the amount of water in the bottle? Explain your thinking.

b What does the point $(0, 0)$ mean on the line representing Jada's refill?

c What does the point $(0, 200)$ mean on the line representing Lin's refill?

d Which line represents the bottle that was filled at a faster rate? Explain your thinking.

Name: Date: Period:

Additional Practice 2.11

Problems 1–4: Determine a constant of proportionality in each representation. Show your thinking.

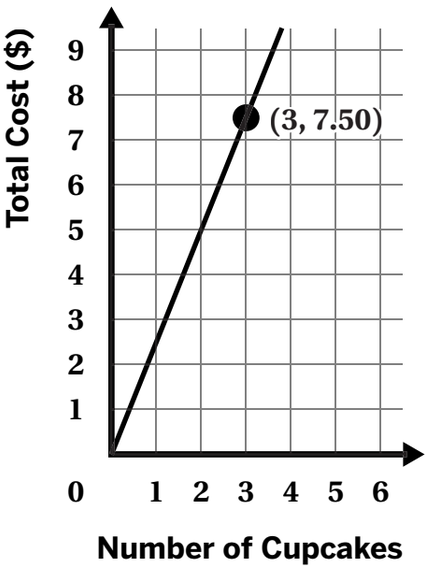
1. Sam drove the car 195 miles in 3 hours.

2. $T = 2.25h$

3.

x	y
0	0
$\frac{3}{5}$	$\frac{12}{35}$

4.



5. The point $\left(\frac{5}{4}, \frac{7}{10}\right)$ lies on a graph representing a proportional relationship. Which of the following points also lie on the same graph? Select *all* that apply.

- ☐ **A.** $(0, 0)$
- ☐ **B.** $(12.5, 10)$
- ☐ **C.** $\left(2\frac{1}{2}, 1\frac{2}{5}\right)$
- ☐ **D.** $\left(20, 17\frac{1}{2}\right)$
- ☐ **E.** $(0.625, 0.35)$

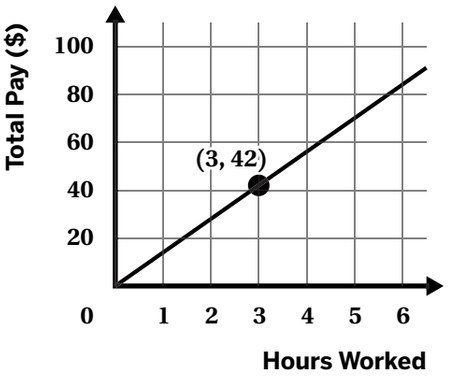
Name: Date: Period:

6. Here is a description, a graph, and a table.

Description

Marisa has to work 18 hours a week to earn $270.

Graph



Table

Hours Worked	Total Pay ($)
0	0
2	30
6	180
10	150
20	300

Which one represents a different relationship than the other two? Explain your reasoning.

Problems 7–9: The equation $y = 68.5x$ represents the number of calories, y, that is in x chocolate chip cookies.

7. Write four ordered pairs that fit this relationship, where the x-value is the number of cookies and the y-value is the number of calories.

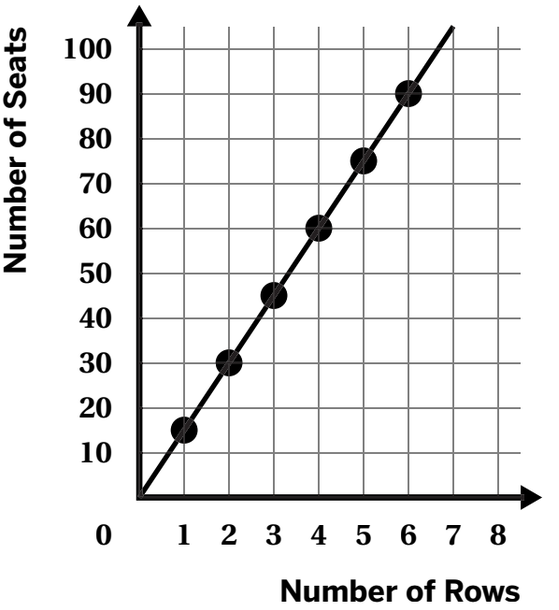
8. What does the value 68.5 represent in this situation?

9. Use the equation to determine how many calories are in 1 dozen cookies.

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

Additional Practice 2.12

Problems 1–4: Here is a graph that represents the relationship between the number of rows, x, and the number of seats, y in a school auditorium.



1. Explain how you know that these quantities are in a proportional relationship

2. What are two constants of proportionality for this relationship?

3. What do each of these constants of proportionality mean in this situation?

4. Write two equations representing this relationship.

5. Hamza plans to order a large veggie pizza to share with her friends. Each pie has 8 slices. If p represents the number of pies and s represents the number of slices, which equations relate p to s? Select *all* that apply.

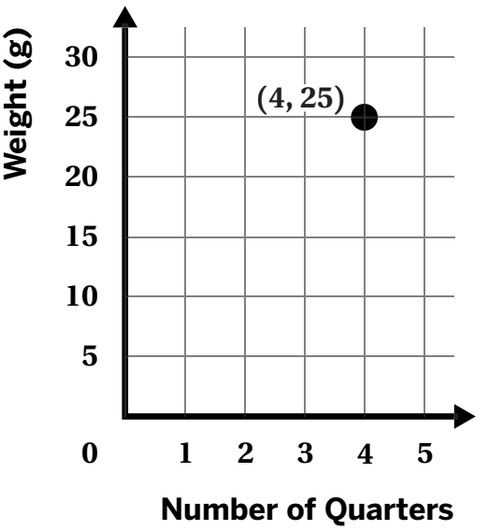
- ☐ **A.** $s = 8p$
- ☐ **B.** $p = 8s$
- ☐ **C.** $s = \frac{p}{8}$
- ☐ **D.** $p = \frac{s}{8}$

6. Noah says he can draw the graph of any proportional relationship if he knows the coordinate of one point that is on the graph. Elena says a single coordinate is not enough information to draw the graph that represents the relationship. Do you agree with Noah or Elena? Explain your thinking.

Name: Date: Period:

Problems 7–9: There is a proportional relationship between the number of quarters x and their total weight y in grams. 4 quarters weigh a total of 25 grams. The point $(4, 25)$ is shown on the graph.

7. Plot and label at least two more points that fit this relationship, then draw a line to represent the relationship.



8. For which value of y is the point $(1, y)$ on the line?

9. Write two equations for this relationship.

10. Write two equations representing the relationship shown in the table.

x	y
4	14
6	21
9	31.5

Name: Date: Period:

Additional Practice 2.13

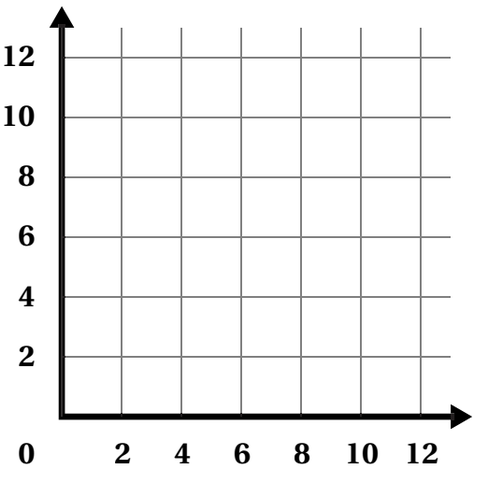
Problems 1–4: Hadley goes to a store where customers can scoop their own ice cream and pay by the ounce. She buys 10 ounces of popcorn for $\$2.50$.

1. How much does the ice cream cost per ounce?

2. How much ice cream can Hadley buy per dollar?

3. Write two different equations that represent this situation. Use c for ounces of ice cream and d for cost in dollars.

4. Graph the line of one of the equations. Be sure to label the axes.



Name: Date: Period:

Problems 5–6: Here is a table of values that represents the relationship between the number of apples, x, and the number of strawberries, y, in a recipe.

x	y
2	8
4	16
5	20

5. Write two equations representing the relationship shown in the table.

6. Use one of the two equations to find another set of points (x, y).

Grade 7 | Unit 3

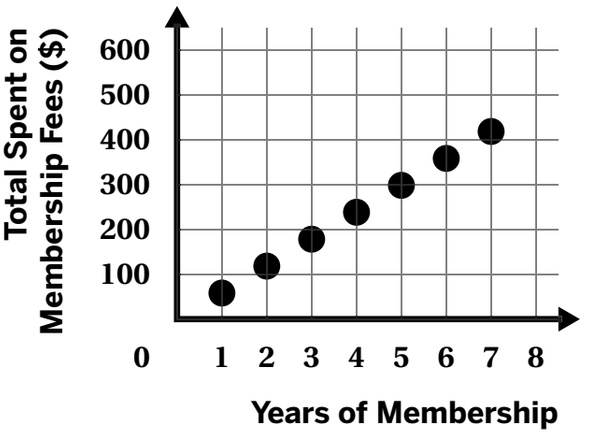
Additional Practice

Practice Problems

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

Additional Practice 3.01

Problems 1–4: A wholesale store charges an annual membership fee for its customers to shop there. The graph shows the relationship between the total amount spent on membership fees and the number of years that a customer is a member.



1. Explain how the graph shows that the relationship between the number of years a customer has been a member and the total amount of money spent on membership fees is proportional.

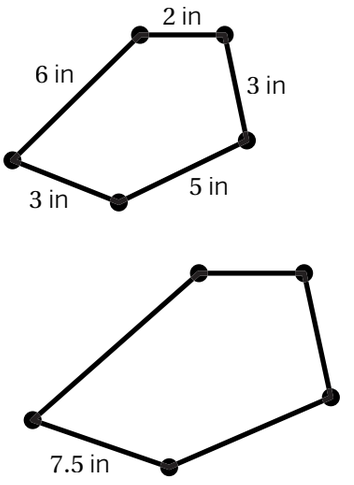
2. Calculate a constant of proportionality for this relationship.

3. Write an equation that relates years of membership, m, to the total amount of money spent on membership fees, C.

4. If a customer paid a total amount of $\$840$ in membership fees, for how many years have they been a customer?

Name: Date: Period:

5. These polygons are scaled copies. Determine the perimeter of the larger polygon. Show or explain your thinking.



Problems 6–9: The relationship between the number of guests g invited to a wedding reception and the number of tables t that are needed to accommodate them is proportional.

6. Complete the table.

Number of guests, g	Number of tables, t
80	10
	15
200	
	35

7. What are the two constants of proportionality for this relationship?

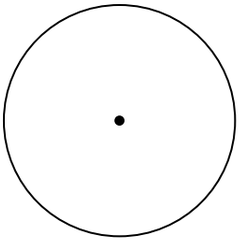
8. Write two equations using the constants of proportionality from Problem 7.

9. Use one of your equations from Problem 8 to determine how many tables will be needed to accommodate 300 guests.

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

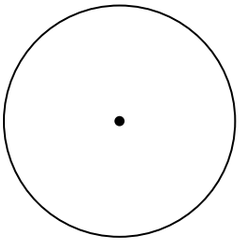
Additional Practice 3.02

1. Consider the circle shown, with the center provided.

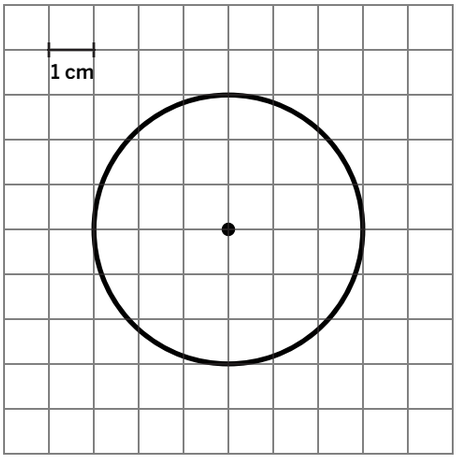


a Draw and label a radius.

b Draw and label a diameter.

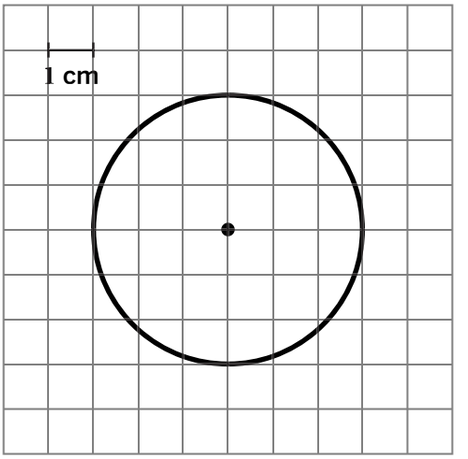


2. Consider the circle shown on grid paper, with the center provided.



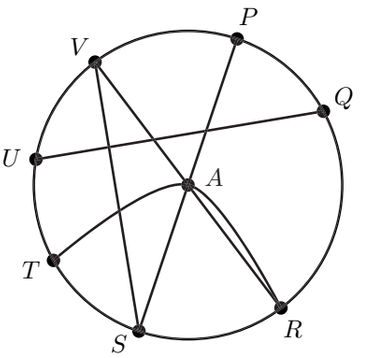
a Draw and label a radius. What is the length of the radius?

b Draw and label a diameter. What is the length of the diameter?



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

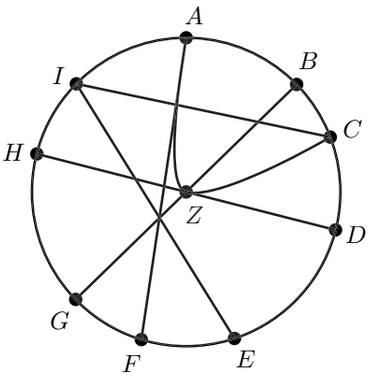
3. A circle with a center at point A is shown.



a Identify *all* the diameters. Explain your thinking.

b Identify *all* the radii. Explain your thinking.

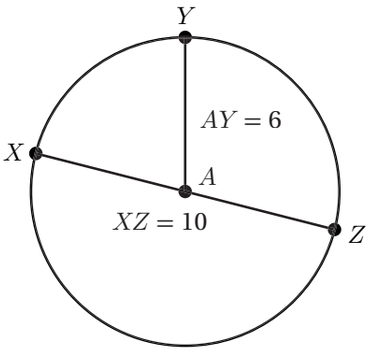
4. A circle with a center at point Z is shown.



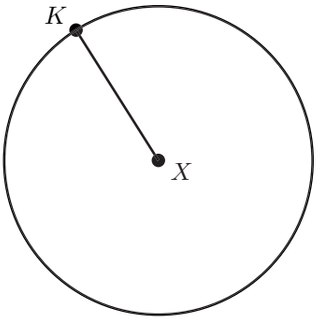
a Identify *all* the diameters. Explain your thinking.

b Identify *all* the radii. Explain your thinking.

5. Explain why the following figure is not a circle.



6. A circle with a center at point X is shown. After studying the circle, Mai said, "I think if XK is any value less than 10, then the diameter will always be less than 5." Is Mai's thinking correct? Show or explain your thinking.



Name: Date: Period:

Additional Practice 3.03

1. The tires on a sports car are 2.5 feet tall. Which part of a circle does this measurement represent?

A. Diameter

B. Radius

C. Circumference

D. Area

2. Select *all* the possible values for the circumference of a circle with a diameter of 8 in.

☐ **A.** 21

☐ **B.** 25

☐ **C.** 26

☐ **D.** 32

☐ **E.** 38

☐ **F.** 40

3. Elena measured the diameter and circumference of several circular objects and recorded her measurements in the table. Fill in the missing values of the table.

Real World Object	Radius (mm)	Diameter (mm)	Circumference (mm)
Button	6		
Quarter			75
Cucumber Slice		38	
Ring			52

4. Elena is painting on a circular canvas. The circumference of the canvas is 16π inches. Determine the diameter of the canvas Elena is painting on.

Name: Date: Period:

5. Determine whether each pair of measurements could be a reasonable approximation for the diameter and circumference of a circle. Show or explain your thinking.

a 11 in. and 45 in.

b 20 in. and 47 in.

c 16 in. and 50 in.

6. Complete the table with a possible length for each diameter or circumference, given the other measurement. Verify your answers by calculating the ratio of circumference to diameter for each pair of lengths.

Diameter	Circumference	$\frac{\text{Circumference}}{\text{Diameter}}$
9		
48		
	116	

Name: Date: Period:

Additional Practice 3.04

1. Determine the *exact* measurements of the diameter and the radius if the circumference of a circle is 7π.

A. Radius: 7, Diameter: 14

B. Radius: 7, Diameter: 3.5

C. Radius: 3.5, Diameter: 7

D. Radius: 1.75, Diameter: 3.5

2. Determine the exact measurements of the diameter and the radius if the circumference of a circle is 24.

A. Radius: 12, Diameter: 24

B. Radius: $\frac{6}{\pi}$, Diameter: $\frac{12}{\pi}$

C. Radius: $\frac{24}{\pi}$ Diameter: $\frac{48}{\pi}$

D. Radius: $\frac{12}{\pi}$, Diameter: $\frac{24}{\pi}$

3. For each measurement, determine whether it represents the *radius, diameter,* or *circumference*. Place a check mark in the appropriate column and record the measurement in that cell. Then determine the *exact* lengths for the other two measurements of the circle.

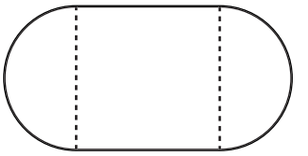
	Radius	Diameter	Circumference
The decorative border around a watch face measures 85 mm.			
The center to the edge of a circular pond measures 19 m.			
The length across the top of a vinyl record measures 25.4 cm.			

4. For each measurement, determine whether it represents the *radius, diameter,* or *circumference*. Place a checkmark in the appropriate column and record the measurement in that cell. Then determine the *exact* lengths for the other two measurements of the circle.

	Radius	Diameter	Circumference
The center to the edge of a quarter measures 12 mm.			
The rubber around a bike tire measures 86 in.			
The length across a circular slice of cucumber measures 1.3 in.			

Name: Date: Period:

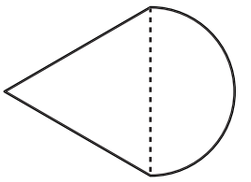
5. A semicircle is joined to a square with side lengths of 8 units. Noah tried to determine the perimeter of the resulting shape. Determine and correct the mistake that Noah made in his work.



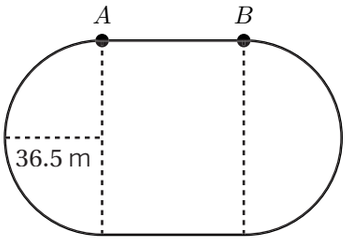
Noah's work:
2 semicircles + square
1 circle + square

$\pi \cdot d + 4 \cdot s$
$= \pi(8) + 4(8)$
$= 8\pi + 32$

6. A semicircle is joined to an equilateral triangle with side lengths of 14 units. Determine the *exact* perimeter of the resulting shape. Show your thinking.



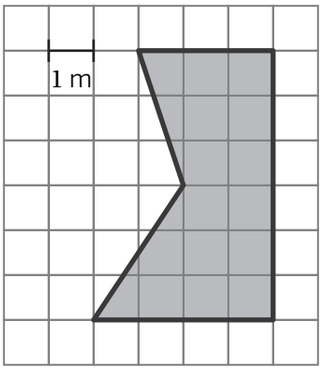
7. A track is in the shape of a rectangle with a semicircle on each end. If the distance around the entire track is 400 m, determine the *exact* distance from point A to point B. Show your thinking.



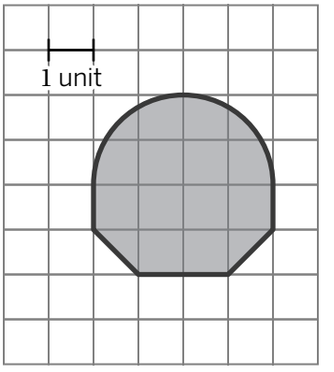
Name: ..... Date: ..... Period: .....

Additional Practice 3.05

1. What is the area of this shape? Show your thinking.

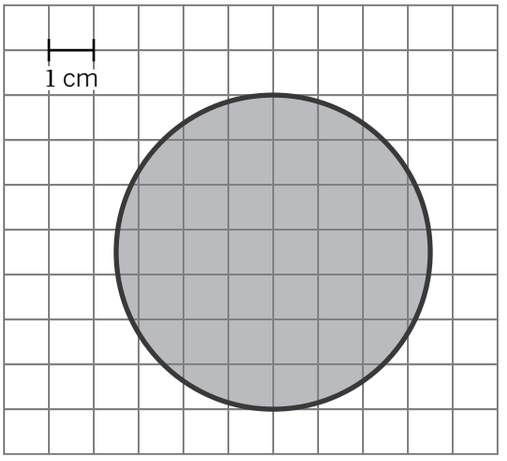


2. Here is a diagram of two squares and a shape. Explain why the area of the figure is more than 8 square units but less than 16 square units.



Problems 3–4: Estimate the area of each shape.

3.



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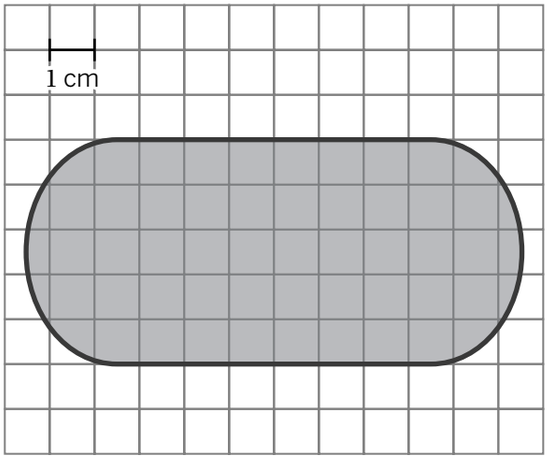
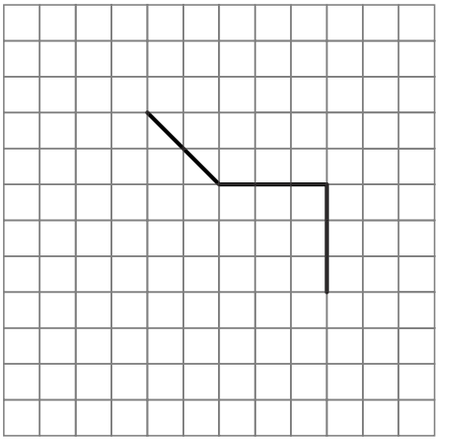


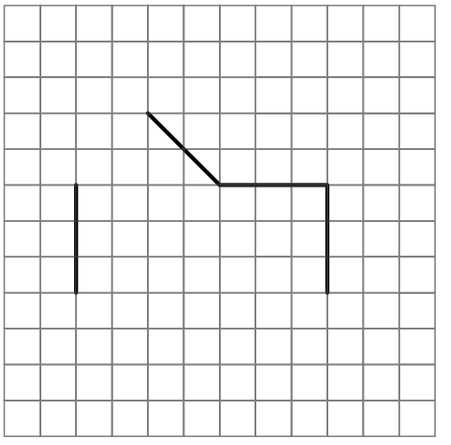
Name: Date: Period:

Problems 5–6: Priya started drawing a polygon.

5. Complete Priya's drawing so that the polygon has an area of 25 square units.



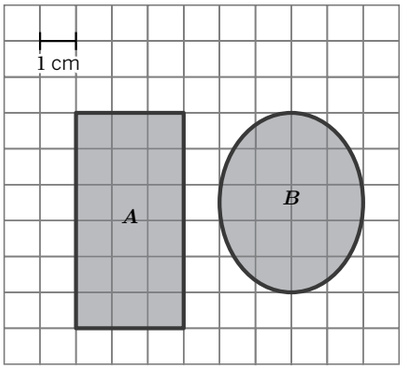
6. Complete Priya's drawing in a different way so that the polygon has an area of 25 square units.



7. Which shape has a larger area? Circle one.

Shape A Shape B They are the same.

Show or explain how you know.



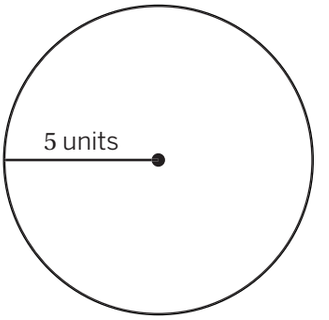
Name: ..... Date: ..... Period: .....

Additional Practice 3.06

1. Select *all* the reasonable formulas to estimate the area of a circle, given a radius r.

- ☐ **A.** $A \approx 3r$
- ☐ **B.** $A \approx 3.25r$
- ☐ **C.** $A \approx 3 \cdot 2r$
- ☐ **D.** $A \approx 3r^2$
- ☐ **E.** $A \approx 3.5r^2$
- ☐ **F.** $A \approx 3.25r^2$

2. Determine a reasonable estimate for the area of the circle.



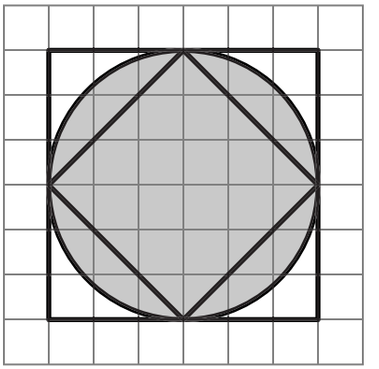
A. 3.5 square units

B. 31 square units

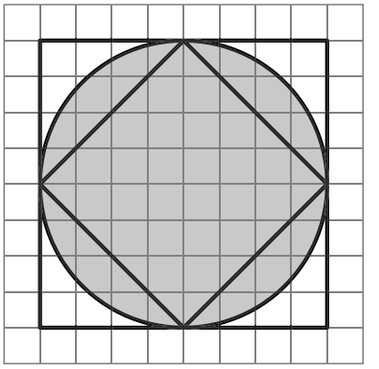
C. 80 square units

D. 100 square units

3. Refer to the image that shows two squares and a circle. Use the image to explain why the area of the circle is greater than 18 square units, but less than 36 square units.

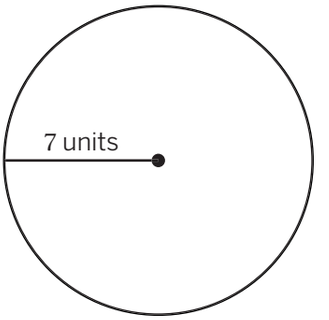


4. Refer to the image that shows two squares and a circle. Use the image to explain why the area of the circle is greater than 32 square units, but less than 64 square units.

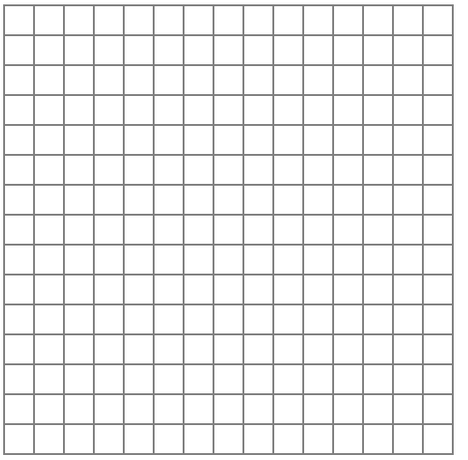


Name: ..... Date: ..... Period: .....

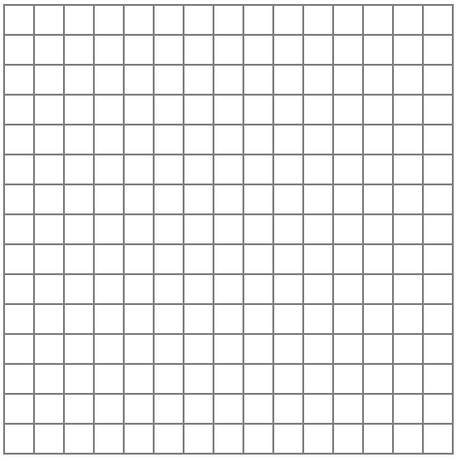
5. Diego is asked to estimate the area of the circle. Diego thinks the area of the circle is about 22 square units. Do you agree with Diego? Explain your thinking.



6. Use the grid to draw the best freehand circle you can with an area of 3 square units. You may need to make a few attempts. Explain your thinking.



7. Use the grid to draw the best freehand circle you can with an area of 112 square units. You may need to make a few attempts. Explain your thinking.



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

Additional Practice 3.07

1. A circle's radius is 5 cm. Which of the following is *true*?

A. The circle's area is exactly 5π cm^2

B. The circle's area is exactly 25π cm^2.

C. The circle's area is exactly 10π cm^2.

D. The circle's area is exactly 15π cm^2.

2. A circle's diameter is 12 in. Which of the following is *true*?

A. The circle's area is approximately 37.7 in^2.

B. The circle's area is approximately 452.4 in^2.

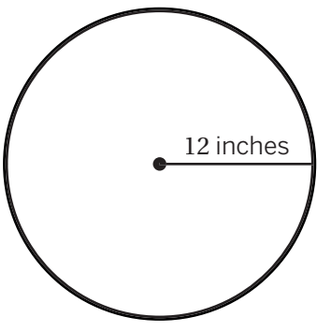
C. The circle's area is approximately 18.85 in^2.

D. The circle's area is approximately 113.1 in^2.

3. A circle has a diameter of 102 in. What is the *exact* area of the circle, in terms of π? Show or explain your thinking.

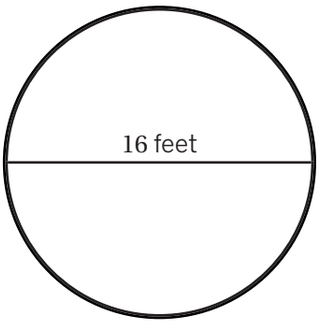
Problems 4–5: Find the exact area of each circle.

4.



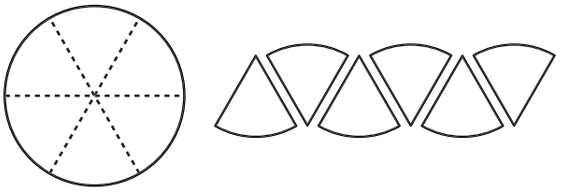
Name: ..... Date: ..... Period: .....

5.



6. The radius of Mars is approximately $3{,}390$ kilometers. The Martian dichotomy divides the northern and southern hemispheres. Is the circumference of a circle or the area of a circle more useful for finding the length of the Martian dichotomy?

7. The circle shown is divided into 6 equal wedges which are rearranged. Let r represent the radius of the circle. The circle's circumference is represented by the expression $2\pi r$.

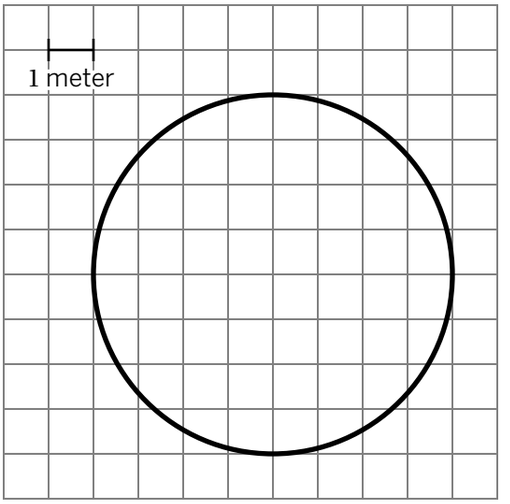


Explain how the image helps to understand why the area of the circle is represented by the expression πr^2.

Name: Date: Period:

Additional Practice 3.08

Problems 1–2. Here is a diagram of a circle. It represents a circular road in a town. Within the circular road is a park.



1. Estimate the area of the park.

2. Estimate the length of the circular road.

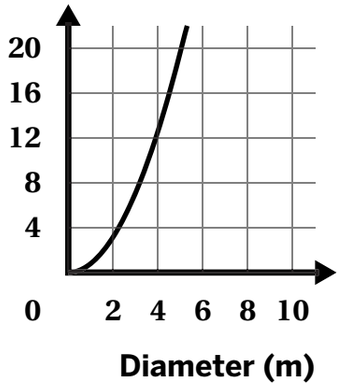
3. Are the radius and area measurements of a circle proportional to each other?

Yes No Maybe

4. Write an equation that relates radius and diameter.

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

5. Which phrase describes the relationship within a circle that this graph represents?



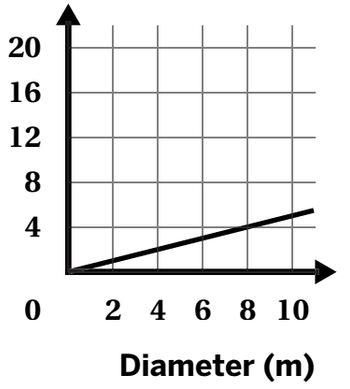
A. Radius vs. diameter

B. Circumference vs. diameter

C. Area vs. diameter

D. Circumference vs. area

6. Which phrase describes the relationship within a circle that this graph represents?



A. Radius vs. diameter

C. Circumference vs. diameter

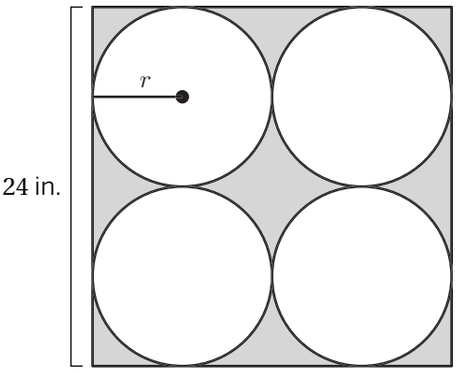
B. Area vs. diameter

D. Circumference vs. area

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

Additional Practice 3.09

1. Four circles are arranged in a square as shown. What is the radius of each circle?



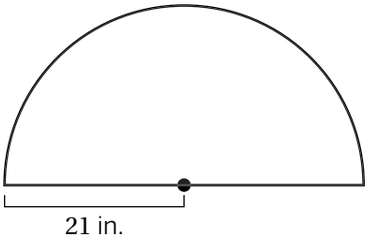
A. $r = 3$ in.

B. $r = 4$ in.

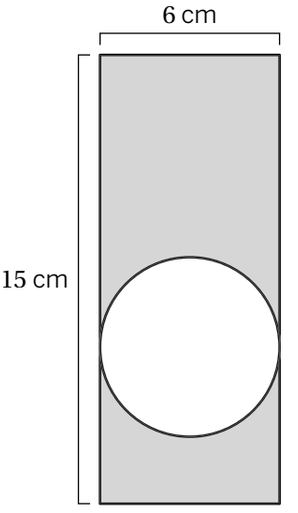
C. $r = 6$ in.

D. $r = 12$ in.

2. Calculate the area of the semicircle. Show or explain your thinking.



3. Calculate the *exact* area of the shaded region. Express your answer in terms of π. Show or explain your thinking.

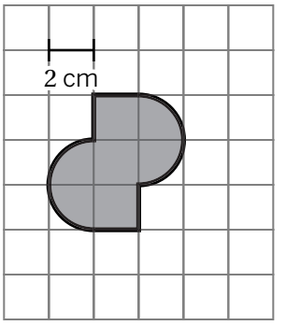


Name: Date: Period:

4. A circle with a 32 in. diameter is folded in half and then folded in half again in the other direction. What is the *exact* area of the resulting shape? Express your answer in terms of π. Show or explain your thinking.

5. A circle with a 12-inch long diameter is folded in half and then folded in half again. What is the exact area of the new shape? Write your answer in terms of π, and explain your thinking.

6. Calculate the area of this shape.



Name: Date: Period:

Additional Practice 3.10

1. A circle has a circumference of 18π cm. Calculate the *exact* values of the radius, diameter, and area of the circle in terms of π. Show or explain your thinking.

2. A circle's circumference is approximately 12 cm. Estimate the radius, diameter, and area of the circle to the nearest tenth. Show or explain your thinking.

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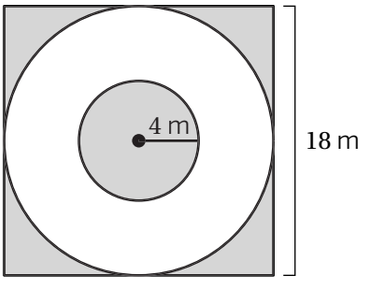
3. A circle's circumference is approximately 235 cm. Estimate the radius, diameter, and area of the circle to the nearest tenth. Show or explain your thinking.

4. Determine the total *shaded* area. Show or explain your thinking. Write your answer as the exact value, not an approximation.



Grade 7 | Unit 4

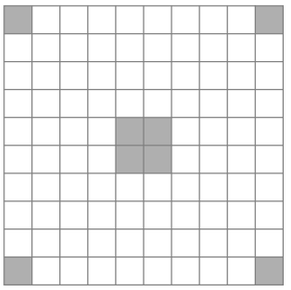
Additional Practice

Practice Problems

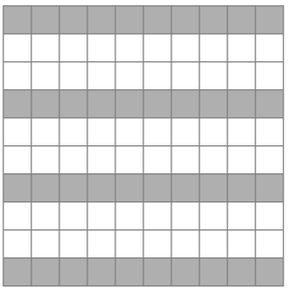
Name: ..... Date: ..... Period: .....

Additional Practice 4.01

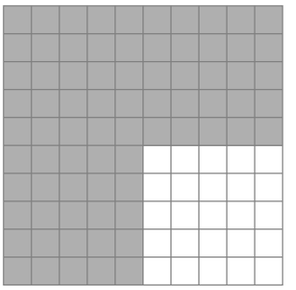
1. What percent of each grid is shaded?

a 

..... %

b 

..... %

c 

..... %

2. What percent of a dollar is the value of each coin combination?

a 2 quarters

b 6 nickels

c 11 pennies

3. What is 12% of 200? Show or explain your thinking.

4. The student council raised $210 from their fundraiser. Their goal was to raise $300. What percent of their goal did they raise?

A. 0.7%

B. 7%

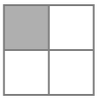
C. 70%

D. 700%

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

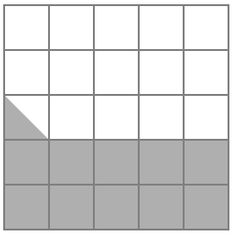
5. Determine what percent of each grid is shaded. Show or explain your thinking.

a



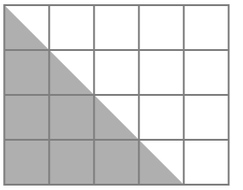
..... %

b



..... %

c



..... %

6. Can a percentage be greater than 100%? What do you think it means when the value of a percentage is larger than 100?

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

Additional Practice 4.02

1. Write each percent increase or decrease as a percentage of the original amount.

a A store manager decides on a 10% markdown on the retail price of the last pair of jeans in stock.

b Tickets to a pro basketball game are resold online with a 50% markup from their original price.

c The number of students enrolled at a local university dropped 14.5% from last year.

2. At the start of the day, there was 12 inches of snow on the ground. Since then, 20% of the snow has melted. Which expression represents the inches of snow left on the ground?

a. $0.2 \cdot 12$

b. $0.8 \cdot 12$

c. $(1 + 0.2) \cdot 12$

d. $8 - 0.20$

Problems 3–4: Fill in the blanks to describe each increase or decrease as a percentage of the original amount.

3. This month, there was 30% more rain than last month.

The amount of rain this month is ..... % of the amount last month.

4. This month, there were 15% fewer cloudy days than last month.

The number of cloudy days this month is ..... of the number of cloudy days last month.

Name: Date: Period:

5. Elena is trying to decide which of two dresses to buy. The first dress has a retail price of $\$65$ with a 20% markdown. The second dress has a retail price of $\$75$ with a 25% markdown.

a Which dress costs less with its markdown? Show or explain your thinking.

b Which dress has a larger markdown value, or *discount*? Show or explain your thinking.

6. Noah wants to buy a pair of sneakers that has a retail price of $\$160$ and checks the websites of two stores to see if they have them. At the first store, the sneakers are marked down by 25%. At the second store, the sneakers are marked down by 15%. Noah can also get an additional 10% markdown for being a student if he shows his school I.D. at the second store. He thinks the sneakers will cost the same price at both stores because $25\% = 15\% + 10\%$. Do you agree? Explain your thinking.

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

Additional Practice 4.03

1. There are 17% more girls in the eighth grade than in the seventh grade. If s is the number of girls in the seventh grade and e is the number of girls in the eighth grade, which equations represent the relationship between the number of girls in the seventh and eighth grade? Select *all* that apply.

- ☐ **A.** $e = 17 + s$
- ☐ **B.** $e = 1.17s$
- ☐ **C.** $e = (1 + 0.17)s$
- ☐ **D.** $e = s + 0.17s$
- ☐ **E.** $e = 17 + 0.17$

2. The retail price of a dress is marked down by 30%. If r is the retail price of the dress and s is the sale price after the markdown, which of the following equations do *not* represent the relationship between r and s?

- **A.** $s = (1-0.30)r$
- **B.** $s = 1.30r$
- **C.** $s = 0.7r$
- **D.** $s = r - 0.30r$

2. Match each situation to the equation(s) that can be used to determine the unknown value.

a. The population of geese in a northern city decreases by 68% from last season. If there are now 2,200 geese, how many geese were there last season?

b. The population of a certain type of beetle is now 2,200 after a 68% increase. What was the original population?

c. There are 2,200 fish in a pond. This is after a 32% decrease in the fish population. What was the original population of fish in the pond?

- ..... $2200 = 1.68x$
- ..... $2200 = 0.68x$
- ..... $2200 = (1 - 0.68)x$
- ..... $2200 = 0.32x$
- ..... $2200 = x - 0.32x$
- ..... $2200 = (1 + 0.68)x$
- ..... $2200 = (1 - 0.32)x$
- ..... $2200 = x + 0.68x$
- ..... $2200 = x - 0.68x$

Name: Date: Period:

3. Write and solve an equation for each problem.

a Han's older brother works at the local department store. If Han shops there while his brother is working, he can get an 18% family discount on anything he buys. How much will a $\$77$ hoodie cost if Han uses his family discount?

b A townhouse that was built several years ago has a current market value of $\$130{,}000$. If this represents an 18% increase in its market value since it was built, how much was it originally worth?

4. A summer camp has 200 children enrolled this year.

a If there were 125 children enrolled last year, what was the percent increase in enrollment from last year to this year?

b The camp director uses the percent increase from last year to predict the number of children that will enroll next year. Write and solve an equation to represent the number of children enrolled in the summer camp next year, y, given the number of children that were enrolled this year, x.

5. Kiran's grandfather gave him a vintage comic book that is now worth $\$3{,}000$. This represents a $1{,}250\%$ increase in its value from the time his grandfather bought the comic book when he was a child. Kiran writes the equation $y = 12.50x$ to determine the price his grandfather paid for the comic book, using y to represent the new value and x to represent the original value. Is his equation correct? Explain your thinking.

6. Explain why a percent increase can be greater than 100% but a percent decrease cannot be.

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

Additional Practice 4.04

1. The number of tomatoes in a garden decreased by 25% between last season and this season. This season, there are 63 tomatoes in the garden. What was the tomato population last season? Use a diagram, if needed, to help you make sense of the situation.

2. Chloe noticed that a bag of lemons at the grocery store increased from $\$2.00$ to $\$3.00$ a bag. Chloe told the cashier that this represents a 150% increase. Without determining the actual percent increase, explain why Chloe's observation is not reasonable.

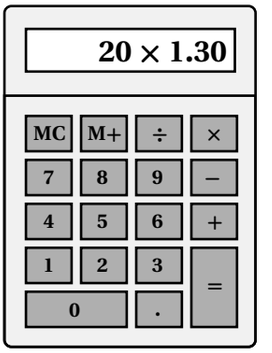
3. A movie theater sells 8% more tickets this week than last week. If they sell 270 tickets this week, how many tickets did they sell last week? Use a diagram, if needed, to help you make sense of the situation.

4. The label on a carton of soup says that it has "20% less sodium than the original recipe." If the soup has $2{,}000$ mg of sodium in it, how much sodium is in the original recipe? Use a diagram, if needed, to help you make sense of the situation.

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

5. Kiran purchases two game systems so he can keep one and resell the other one when they sell out in stores. He finds a buyer who is willing to purchase one game system for $\$900$, which represents an 125% increase in the retail price of the game system. What was the price of the game system in the store? Use a diagram, if needed, to help you make sense of the situation.

6. An employee at a clothing store is asked to add a 130% markup on all $\$20$ shirts by their supervisor. The employee enters the expression shown into their calculator and then changes the prices of all the $\$20$ shirts to $\$26$.



a What mistake did the employee make? Explain your thinking.

b How much more should the shirts cost after a 130% markup?

7. Next month, the price of a carton of strawberries at a grocery store will decrease by 30%. The price of a carton of strawberries this week is $\$6.50$. What will the price be next month?

A. $\$8.45$

B. $\$6.75$

C. $\$4.55$

D. $\$3.45$

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

Additional Practice 4.05

1. Determine the percent change. Use a tape diagram, if needed, to solve each problem. Show or explain your work. Round to the nearest tenth, if necessary.

a Original Price: $135
Markup Price: $162

b Original Price: $162
Markdown Price: $135

2. Jada plans to buy a pair of jeans on sale for $45 with money from her next paycheck. When the sale is over, the jeans will return to their original retail price of $75.

a What is the percent change from the retail price to the sale price?

b What is the percent change from the sale price back to the retail price?

c Explain why the percent change in part a is *not* equal to the percent change in part b.

3. A brand new car has a price tag of $12,500.

a If the same car is worth $9,875 one year later, what is the percent change in the car's value from the previous year?

b If the same car is worth $8,295 one year after that, what is the percent change in the car's value from the previous year?

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

4. Han drinks 1 pt of water a day. He makes it a goal to increase his water intake.

a By what percentage does Han's water intake increase if he switches from a pint-sized water bottle to a quart-sized water bottle? **Hint:** $1 \text{ qt} = 2 \text{ pt}$.

b By what percentage does Han's water intake increase if he switches from a quart-sized water bottle to a gallon-sized water bottle? **Hint:** $1 \text{ gallon} = 4 \text{ qt}$.

5. Last month, the price of windshield wiper fluid at a particular windshield wiper fluid station was $\$1.29$ per gallon. This month, it is $\$2.70$ per gallon. Without determining the actual percent increase, explain how you know the percent change in the price of windshield wiper fluid from last month to this month is greater than 100%.

6. The population of a new middle school in its first year is 120 students.

a If the population of the school in its second year is 252 students, what is the percent change in the student population from the first year?

b If the population of the school in its third year is 363 students, what is the percent change in the student population from the second year?

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

Additional Practice 4.06

1. Determine if the value of $1\frac{1}{3} \div \frac{2}{3}$ is:

Less than 1 Greater than 1

2. Calculate the value of the expression in Problem 1.

3. Determine if the value of $\frac{4}{5} \div 1\frac{2}{5}$ is:

Less than 1 Greater than 1

4. Calculate the value of the expression in Problem 1.

5. Select *all* the expressions whose value is greater than 1.

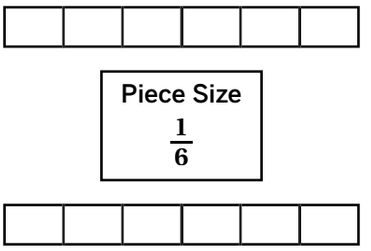
- ☐ **A.** $\frac{4}{7} \div 1\frac{2}{7}$
- ☐ **B.** $1\frac{1}{5} \div \frac{2}{5}$
- ☐ **C.** $1\frac{1}{3} \div \frac{2}{3}$
- ☐ **D.** $\frac{2}{3} \div 7$
- ☐ **E.** $\frac{3}{2} \div 4$

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

6. Brianna uses a $\frac{1}{3}$-cup scoop for flour. How many scoops does Brianna need for each amount of flour? Draw a diagram if it helps with your thinking.

Flour (cups)	Number of Scoops
1	
$\frac{1}{6}$	
$\frac{1}{2}$	

7. Calculate $\frac{1}{3} \div \frac{1}{2}$. Use the diagram if it helps you with your thinking.



Name: Date: Period:

Additional Practice 4.07

1. Han is charged $\$11.70$ sales tax on an item that costs $\$195.00$. Which of the following represents the tax rate in Han's state?

A. 0.06% **B.** 6%

C. 16.7% **D.** 167%

2. Clare buys an outfit when visiting a mall in Atlanta, GA, where the combined sales tax rate as of 2024 is 8.9%. Complete the table to show the sales tax and the total price including tax for each item that Clare purchased at the mall.

Item	Price before tax ($)	Sales tax ($)	Total cost ($)
Blouse	30		
Jeans	65		
Jacket	88		

3. Jada orders a takeout dinner for $\$18$ using a food delivery app. She has the option to tip the delivery driver 15%, 18%, or 20%.

a Complete the table.

Percent of tip (%)	15	18	20
Tip amount ($)			

b If the sales tax rate is 8.5%, how much sales tax does Jada pay?

c If Jada chooses to tip 20% on the cost before sales tax, what is the total cost of Jada's food delivery, including tax and tip?

Name: Date: Period:

4. Lin gets a pedicure for $\$24$ at her local nail salon.

a If a sales tax of $\$2.10$ is added to her bill, what is the sales tax rate in the city where the nail salon is located? Show your thinking.

b If Lin can only afford to tip her nail technician 12% of the cost of her pedicure before sales tax, how much does Lin pay in total at the nail salon, including the tax and tip? Show your thinking.

5. Kiran and Priya eat at a restaurant together. Kiran orders an entree that costs $\$38$. Priya orders an appetizer for $\$24$ and a dessert for $\$14$.

a Kiran says the cost of their meals, including tax, will be exactly the same. Do you agree with Kiran? Explain your thinking.

b Kiran and Priya are given a single receipt with both their orders on it. What is the tip amount if 18% gratuity is automatically added to their bill? Show your thinking.

c If the sales tax rate is 6.5% and Kiran and Priya decide to split the cost of the meal evenly, including tax and tip, how much does each person pay? Show or explain your thinking.

Name: Date: Period:

Additional Practice 4.08

Problems 1–2: A customer leaves a 20% tip on a $\$25$ meal.

1. Select the expression that represents the value of the tip.

- ☐ **A.** $20 \cdot 25$
- ☐ **B.** $25 + 2 \cdot 25$
- ☐ **C.** $1.20 \cdot 25$
- ☐ **D.** $\frac{20}{100} \cdot 25$

2. Select the expression that represents the total bill.

- ☐ **A.** $20 \cdot 25$
- ☐ **B.** $25 + 2 \cdot 25$
- ☐ **C.** $1.20 \cdot 25$
- ☐ **D.** $\frac{20}{100} \cdot 25$

Problems 3 – 4: Luciana works at a cafe. In an average 8-hour work day, she serves 15 customers, with an average bill of $\$25$ per customer. She typically receives a 15% tip on each bill and earns $\$10.50$ per hour.

3. How much money does Luciana earn on a typical day?

4. Let's say the typical tip increased to 20% of the bill. By what amount did Luciana's earnings increase by? Explain your thinking.

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

Problems 5–7: Here is some information about three local parks in a town. Complete each sentence.

Park	Area (acres)
Sunset Cove	12
Cozy Corner	22
Morning Stroll	30

5. Cozy Corner is about _____ % larger than Sunset Cove.

6. Morning Stroll is about _____ % larger than Cozy Corner.

7. If the size of Sunset Cove increased by 150%, would it be larger than Morning Stroll? Explain your thinking.

Problems 8–9: Jose is expanding the size of his house. He wants to add 10% to the square footage of his home. His home is currently $1{,}500$ square feet.

8. Select the expression that represents the value of the tip.

- ☐ **A.** $\frac{10}{100} \cdot 1{,}500$
- ☐ **B.** $10 + 1.1 \cdot 1{,}500$
- ☐ **C.** $1.10 \cdot 1{,}500$
- ☐ **D.** $10 \cdot 1500$

9. Select the expression that represents the total square footage of Jose's home after the expansion is complete.

- ☐ **A.** $\frac{10}{100} \cdot 1{,}500$
- ☐ **B.** $10 + 1.1 \cdot 1{,}500$
- ☐ **C.** $1.10 \cdot 1{,}500$
- ☐ **D.** $10 \cdot 1500$

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

Additional Practice 4.09

1. Noah goes to the deli to order 2 lb of turkey breast. When he receives his order, the weight is 1.95 lb. Which expression represents the percent error?

A. $\frac{0.5}{1.95} \cdot 100$

B. $\frac{0.05}{1.95} \cdot 100$

C. $\frac{0.5}{2} \cdot 100$

D. $\frac{0.05}{2} \cdot 100$

2. A particular game at a carnival invites players to guess the number of marbles in a jar. One player makes a guess of 225 marbles. The actual number of marbles is 299. What is the percent error, to the nearest tenth of a percent?

3. According to the U.S. Bureau of Engraving and Printing, the actual weight of an average dollar bill is 1 g. When Diego weighs a single dollar bill on his scale, he gets a weight of 1.03 g. Determine the percent error of this measurement.

4. The thermostat in Andre's house gives a reading with an error of 4% below the actual temperature. If the actual temperature in Andre's house is $71°\text{F}$, what is the reading on the thermostat, to the nearest tenth of a degree?

5. The water in the deep side of a pool has a depth of 80 in.

a Mai gets in the pool and accurately estimates its depth to the nearest foot. What measurement did Mai get?

b By how many inches does Mai's measured depth differ from the actual depth of the pool?

c Determine the percent error of this measurement.

Name: Date: Period:

6. Jada sends invitations to 80 people for a barbecue she plans to have at the end of the school year. 68 people accept the invitation. On the day of the barbecue, 63 people attend.

a Which value is the exact, or correct, value for the number of attendees to the barbecue? Which is the expected value? Explain your thinking.

b Determine the percent error of this measurement.

7. Han estimates his puppy weighs 40 lb. During a visit to the vet, Han learns that his puppy actually weighs 44.6 lb.

a What is the error, expressed as a percent of the puppy's actual weight?

b What is another value for the puppy's weight that would result in the same percent error? Show or explain your thinking.

c Is it possible to have 3 values that have the same percent error? Explain your thinking.

Name: Date: Period:

Additional Practice 4.10

1. A notebook costs $8 before tax. A customer has a coupon for a 10% discount. Then a 5% sales tax is added. How much will the customer pay for the notebook?

Problems 2–3: Dalia needs to buy chili peppers for a recipe. At the grocery store, she finds red chili peppers that are available per ounce. The grocery store charges $14 per ounce.

2. At the farmers market in the next town, Dalia remembers that the red chili peppers cost $10 per ounce. By what percent did the price increase at the grocery store?

A. 10%

B. 25%

C. 40%

D. 60%

3. Dalia needs the chili peppers quickly for an upcoming dinner party, so she buys them at the grocery store. While checking out at the grocery store, she finds a coupon for a 25% discount. Then a 6% sales tax is added. How much will Dalia pay for the chili peppers if she buys 1 ounce, 3 ounces, and 4 ounces? Fill the missing values in the table.

Red chili peppers (in ounces)	Cost (in $)	Amount of coupon discount (in $)	Amount of sales tax (in $)	Amount Dalia will pay
1	14	3.50	0.63	
3	42		1.89	
4		14		

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

Problems 4–6: A clothing store allows customers to use multiple coupons when checking out. You want to buy a jacket that costs $\$57$. Suppose you have a $\$7$ off coupon and a 15% off coupon. The cashier will calculate the new price of the jacket after each coupon is used.

4. You use the $\$7$ off coupon first and then the 15% off coupon. What is the total price of the jacket after you hand the cashier the coupons in this order?

5. Your friend, Jackie, buys the same jacket. However, Jackie hands the cashier the 15% off coupon first. Then, she hands the cashier the $\$7$ off coupon. How much does Jackie pay for the jacket?

6. Does the order you use the coupons make a difference? Explain your thinking.

Problems 7–9: An art shop in town has a 5% sales tax.

7. A pack of pencils costs $\$6.80$ before tax. How much does it cost including tax?

8. A paintbrush set costs $\$31.50$ after tax. How much did it cost before tax?

9. A sketchbook costs $\$18.00$ after tax. How much did it cost before tax?

Name: Date: Period:

Additional Practice 4.11

1. Juniper is painting her kitchen. She wants to paint her kitchen with a shade of paint called Sunset Yellow. To make this shade of paint, Juniper needs to mix 6 quarts of yellow paint with $\frac{1}{3}$ of a cup of orange paint. How much yellow paint should be mixed with 2 cups of orange paint to make Sunset Yellow?

Problems 2–3: A local organic spice store offers:

$3\frac{1}{2}$ ounces of basil for $\$21.00$	$\frac{5}{8}$ ounces of rosemary for $\$3.50$	$1\frac{1}{2}$ ounces of oregano for $\$9.90$

2. Which spice is the least expensive per ounce? Show or explain your thinking.

3. Which spice is the most expensive per ounce?

Problems 4–5: Emilia wants to buy stickers at a stationary store. The stickers are sold by the sheet.

4. Emilia has $\$60$ to spend on stickers. How many sheets of stickers can she buy? Fill the missing value into the table.

Number of Sheets	Total Cost ($)
2	6
	60

5. What equation represents the relationship between the total cost, c, and the number of sticker sheets, s?

A. $s = \frac{1}{3}c$

B. $s = 3c$

C. $c = \frac{1}{3}s$

D. $c = 2s$

Name: Date: Period:

Problems 6–8: A tortoise is moving away from the beach at a constant rate. This table shows the distance the tortoise is from the beach at certain times.

Distance (ft)	Time (min)
0	0
1	$1\frac{2}{3}$

6. How many minutes does it take for the tortoise to reach a distance of 5 feet from the beach?

7. How far will the tortoise be from the beach after 8 minutes?

8. Select *all* the equations that represent the relationship between the distance in feet, d, and time in minutes, t.

- ☐ **A.** $t = \frac{5}{3}d$
- ☐ **B.** $t = \frac{3}{5}d$
- ☐ **C.** $d = \frac{5}{3}t$
- ☐ **D.** $d = \frac{3}{5}t$

Name: Date: Period:

Additional Practice 4.12

1. Select *all* the ratios that are equivalent to $3 : 4$.

- ☐ **A.** $6 : 8$
- ☐ **B.** $1.5 : 2$
- ☐ **C.** $4 : 5$
- ☐ **D.** $9 : 12$
- ☐ **E.** $15 : 16$

2. On a map, the library is 1.5 inches from Cordelia's house. The map has a scale of 1 inch to 10 miles. How far apart, in inches, would Cordelia's house be from the library on a map that has a scale of 1 inch to 60 miles?

3. What is 30% of 180?

4. What is 180% of 60?

5. Complete the table based on $y = \frac{1}{3}x$

x	y
12	
	$6\frac{1}{3}$
24	

Problems 6–7: To make a specific color of purple paint, a painter mixes $\frac{1}{3}$ of a gallon of red paint with $\frac{3}{5}$ of a gallon of blue paint.

6. How many gallons of red paint are needed to mix with 3 gallons of blue paint?

Name: Date: Period:

7. How many gallons of blue paint are needed to mix with 10 gallons of red paint?

A. 12

B. 14

C. 16

D. 18

8. A brownie recipe calls for $\frac{1}{4}$ teaspoon of baking powder and 1 cup of flour. Complete the table to show how much baking powder and flour is needed for different batches of the brownie recipe.

Baking powder (teaspoon)	Flour (cups)
$\frac{1}{4}$	1
$\frac{3}{4}$	3
$1\frac{1}{2}$	6
	8
	$10\frac{1}{2}$

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

Additional Practice 4.13

1. Match the repeating decimal with its appropriate bar notation.

a. $0.388388388\ldots$ ..... $0.\overline{3388}$

b. $0.333333333\ldots$ ..... $0.\overline{3}$

c. $0.388888888\ldots$ ..... $0.3\overline{8}$

d. $0.33883388\ldots$ ..... $0.\overline{388}$

Problems 2–4: write the fraction as a decimal. If you recognize repetition, stop and write the decimal using bar notation.

2. a $\frac{1}{12}$

3. b $\frac{7}{24}$

4. c $\frac{14}{25}$

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

Problems 5–7: Use the fractions $\frac{5}{6}$, $\frac{4}{5}$, and $\frac{83}{99}$.

5. Match each fraction to its decimal equivalent.

Fraction	Decimal
a. $\frac{5}{6}$	..... 0.8
b. $\frac{4}{5}$	..... $0.8\underline{3}$
c. $\frac{83}{99}$	..... $0.\underline{83}$

6. Which of these fractions has the greatest value? Explain how you know.

7. Select *all* the true statements.

- ☐ **A.** $\frac{5}{6} > \frac{4}{5}$
- ☐ **B.** $\frac{5}{6} < \frac{4}{5}$
- ☐ **C.** $\frac{5}{6} > \frac{83}{99}$
- ☐ **D.** $\frac{5}{6} < \frac{83}{99}$

8. Shawn claimed the the decimal representation of the fraction $\frac{1}{6}$ terminates. Shawn's reasoning is shown:

On my calculator, the screen shows $\frac{1}{6} = 0.166666667$. Because the last digit is not the same as the others, it terminates.

Do you agree with Shawn? Explain your thinking.

Grade 7 | Unit 5

Additional Practice

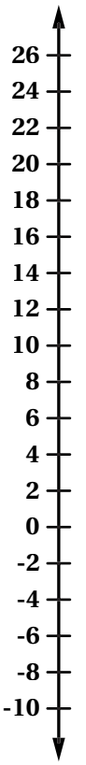
Practice Problems

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

Additional Practice 5.01

Problems 1–5: Melanie is studying different cities' elevations using a vertical number line. She wants to compare the heights of cities above and below sea level. Here are the elevations of four cities:

- Miami, FL: 3 feet above sea level
- New Orleans, LA: 6 feet below sea level
- Amsterdam, Netherlands: 7 feet below sea level
- Hamburg, Germany: 24 feet above sea level



1. Which city has the lowest height in relation to sea level?

2. The height of Venice, Italy is at sea level. Which of these 4 cities has the greatest difference between their height above sea level and Venice's?

3. How much higher is Miami than New Orleans?

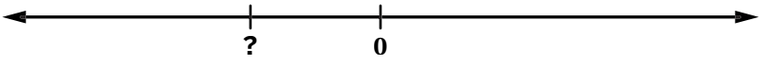
4. How much higher is Hamburg than Amsterdam?

5. How much higher is Hamburg than New Orleans?

6. Jericho is the lowest city on Earth, with a height of 250 meters below sea level and Jerusalem is 400 meters above sea level. What is the difference between their heights? Show your thinking.

Name: Date: Period:

7. Which of the following could be a possible value of the unknown number on the number line?



A. $\frac{1}{2}$

B. 3

C. -5

D. 2.5

Problems 8–10: The table shows the submarine's starting position and the action that will change its position. Each float will increase the submarine's position by 1 unit. Each anchor will decrease the submarine's position by 1 unit. Determine the submarine's final position for each scenario of actions.

	Starting Position	Submarine Actions	Final Position
8.	-4	Add 3 floats Add 2 anchors	
9.	1	Add 6 anchors Add 1 float	
10.	-2	Remove 1 float Add 1 anchor	

Name: Date: Period:

Additional Practice 5.02

Problems 1–4: Determine the value of each expression.

1. $6 + -2$

2. $-6 + 2$

3. $-6 - 2$

4. $-6 - (-2)$

5. The temperature was 16°F and then it dropped 12 degrees. What was the temperature?

6. The temperature was -16°F and then it dropped 12 degrees. What was the temperature?

7. The temperature was -16°F and then it rose to 12 degrees. What was the change in temperature?

8. A swimmer was 6 feet underwater. Then he swam 4 feet deeper. Katrina wrote the expression $-6 - 4$. Rodney wrote the expression $-6 + (-4)$. Explain why both Katrina and Rodney are correct.

Name: Date: Period:

Problems 9–10: The table shows eight expressions.

9. Determine the value of each expression.

	Expression	Value
Expression 1	$2 + 4 - 6$	
Expression 2	$2 + 4 - 6 + 8$	
Expression 3	$2 + 4 - 6 + 8 - 10$	
Expression 4	$2 + 4 - 6 + 8 - 10 + 12$	
Expression 5	$2 + 4 - 6 + 8 - 10 + 12 - 14$	
Expression 6	$2 + 4 - 6 + 8 - 10 + 12 - 14 + 16$	
Expression 7	$2 + 4 - 6 + 8 - 10 + 12 - 14 + 16 - 18$	
Expression 8	$2 + 4 - 6 + 8 - 10 + 12 - 14 + 16 - 18 + 20$	

10. What is the value of the next expression? The 10th expression? The 20th expression? Show or explain your thinking.

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

Additional Practice 5.03

Problems 1–3: Determine the value of the variable that makes each equation true.

1. $12 + a = 5$

2. $-4.5 + b = 6.5$

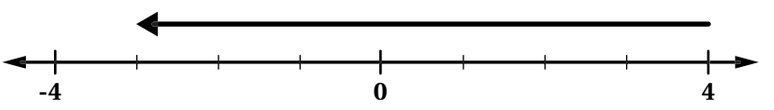
3. $c + 5.1 = 2.8$

Problems 4–5: Evaluate each expression.

4. $6 - 8$

5. $-6 - 8$

6. Select the equation that is represented by this number line.



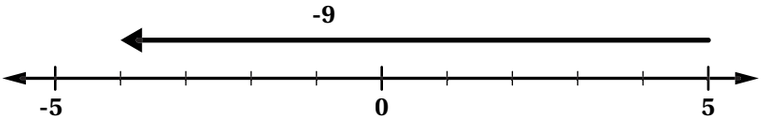
A. $x + (-3) = 4$

B. $4 + x = -3$

C. $-3 + x = 4$

D. $4 + (-3) = x$

7. Select the equation that is represented by this number line.



A. $x + (-9) = 5$

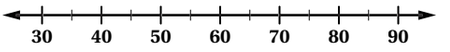
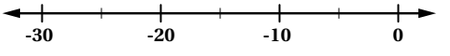
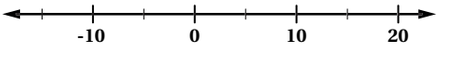
B. $-9 + x = 5$

C. $5 + x = -9$

D. $5 + (-9) = x$

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

Problems 8–10: Draw an arrow diagram to represent each situation. Then write an addition equation that represents the change in temperature and the final temperature.

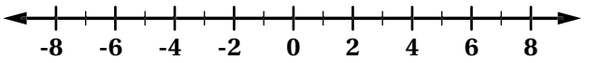
	Situation	Arrow Diagram	Addition Equation
8.	The temperature was 60°F and then fell 15°F.		
9.	The temperature was -20°F and then rose 5°F.		
10.	At sunrise, the temperature was -10°F. At noon, the temperature is 15°F. By how much did the temperature rise?		

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

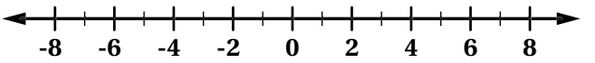
Additional Practice 5.04

Problems 1–3: Use the number lines to determine the value of each expression.

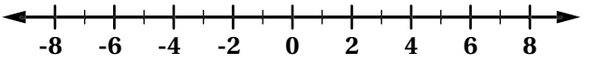
1. $2 - 6$



2. $(-1) + (-4)$



3. $-4 - (-8)$



Problems 4–6: Complete the tables and answer the follow-up question.

4.

Expression	Value
$4 + (-5)$	
$-5 + 3$	
$-3 + (-10)$	
$-1.5 + (-3.7)$	

5.

Expression	Value
$-5 + 4$	
$3 + (-5)$	
$(-10) + (-3)$	
$-3.7 + (-1.5)$	

6. Use your work from the previous tables to describe any patterns you notice.

Name: Date: Period:

Problems 7–9: Complete the tables and answer the follow-up question.

7.

Expression	Value
$4 - 5$	
$-5 - 3$	
$-3 - (-10)$	
$-1.5 - (-3.7)$	

8.

Expression	Value
$5 - 4$	
$3 - (-5)$	
$(-10) - (-3)$	
$-3.7 - (-1.5)$	

9. Use your work from the previous tables to describe any patterns you notice.

10. The expression $x + y$ equals -3. For what values of x, will y be greater than 5? Show or explain your thinking.

Name: Date: Period:

Additional Practice 5.05

Problems 1–2: Order the expressions from *least* to *greatest*.

1.

$7 + (-5)$	$-7 + 5$	$7 + 5$	$-7 + (-5)$

Least **Greatest**

2.

$7 - (-5)$	$-7 - 5$	$7 - 5$	$-7 - (-5)$

Least **Greatest**

3. Without calculating, select *all* the expressions below whose sum or difference will result in a negative value.

- ☐ **A.** $105 + (-74)$
- ☐ **B.** $-266 + (-87)$
- ☐ **C.** $141 - (-74)$
- ☐ **D.** $-130 - (-43)$
- ☐ **E.** $-100 - (-101)$
- ☐ **F.** $120 + (-121)$

4. Explain your thinking for Problem 3.

5. A bird flies above the sea but dives below the surface for food. If the bird is 15.2 feet over the ocean's surface and the fish it catches is 3.5 feet below the surface, which expression represents the total distance the bird dived?

A. $15.2 - 3.5$

B. $15.2 - (-3.5)$

C. $15.2 + (-3.5)$

D. $-3.5 + (-15.2)$

Name: Date: Period:

Problems 6–9: Determine the value of the variable that makes each equation true. Show your thinking.

6. $24 + w = -24.6$

7. $-12 - x = 10.6$

8. $y = \left(-\frac{1}{4}\right) + \frac{3}{8}$

9. $z + 8.9 = -16$

10. One of the coldest places on Earth is Denali, Alaska, where it can get as low as -73.8°C. One of the hottest locations on Earth is Death Valley, California, where it can get as high as 56.7°C.

a Write two different expressions that would represent the difference between the temperatures in these two locations.

b Calculate the difference in temperatures between these two locations.

Name: Date: Period:

Additional Practice 5.06

Problems 1–3: Determine the value of the variable that makes each equation true.

1. $6 \cdot a = -18$

2. $-6 \cdot (3) = b$

3. $-6 \cdot c = 18$

Problems 4–6: A weather station on top of a mountain reports that the temperature is currently $-10°\text{F}$ and has been decreasing at a constant rate of 2 degrees per hour.

4. What will the temperature be in 5 hours?

5. What was the temperature 2 hours ago?

6. What was the temperature 4 hours ago?

Problems 7–9: For each equation, check the box to show whether it is *true* or *false*. If the equation is false, change one value of the equation to make it true, and write the revised equation on the line.

		True	False	Revised Equation
7.	$(-4) \cdot (-5) = -20$			
8.	$8 \cdot (-3) = 24$			
9.	$(-6) \cdot (-1) = 6$			

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

10. Complete the table below for each action the submarine takes when starting at 0 units. Provide a representation as a multiplication expression, determine the direction of the submarine, and its final value.

Action	Representation	submarine's Direction	Final Value
Adding 2 groups of 4 floats			
Removing 3 groups of 2 floats			
Adding 4 groups of 3 anchors			
Removing 3 groups of 1.5 anchors			

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

Additional Practice 5.07

1. Match each addition expression to the equivalent multiplication expression.

a. $3 + 3 + 3 + 3$ ..... $5 \cdot (-1)$

b. $-2 + (-2)$ ..... $4 \cdot (-3)$

c. $-3 + (-3) + (-3) + (-3)$ ..... $1 \cdot (-5)$

d. $-1 + (-1) + (-1) + (-1) + (-1)$ ..... $4 \cdot 3$

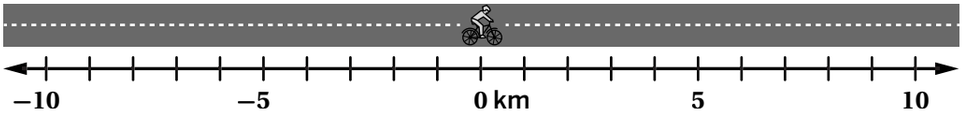
e. -5 ..... $2 \cdot (-2)$

2. Sort each multiplication expression according to whether its product is positive or negative.

$2 \cdot (-2)$	$2 \cdot 2$	$\frac{1}{2} \cdot \left(-\frac{1}{4}\right)$	$3.5 \cdot 43$	$0.001 \cdot \frac{1}{10}$

Positive	Negative

Use the diagram shown for problems 3 and 4.



3. The cyclist is moving at a steady speed and is currently at kilometer 0. Complete the table to determine the cyclist's position at various times.

Time (minutes)	-6	-4	-2	0	2	4
Position (km)			-4	0	4	

4. Write and evaluate an expression for the position of the cyclist at each time.

a 5 minutes

b -10 minutes

Name: Date: Period:

5. Determine the number that belongs in each box to make the equation true.

a $\square \cdot (-2) = -24$

b $\square \cdot (-8) = -24$

c $2 \cdot \square = -12$

d $4 \cdot \square = -24$

6. Complete the missing expressions and values in the table.

Expression as a product	Expression as a sum	Value of the expressions
$2 \cdot (-3)$		
	$-\frac{1}{4} + \left(-\frac{1}{4}\right) + \left(-\frac{1}{4}\right) + \left(-\frac{1}{4}\right)$	
$5 \cdot 0.4$		
	$\left(-2\frac{1}{3}\right) + \left(-2\frac{1}{3}\right) + \left(-2\frac{1}{3}\right)$	
$6 \cdot (-0.1)$		

7. Tyler and Bard are cycling on the boardwalk at the same time. When they pass the pier, Bard is cycling at a speed of 15 ft/s and Tyler is cycling at a speed of 10 ft/s.

a If 0 represents the location of the pier, what values represent the location of each person In 5 seconds? Show or explain your thinking.

b 8 seconds before arriving at the pier, how many feet in front of Bard was Tyler? Show or explain your thinking.

8. Han says that $-(a \cdot b)$ will always be equal to $a \cdot (-b)$. Do you agree with Han? Explain your thinking.

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

Additional Practice 5.08

1. Select *all* the expressions that have a negative value.

- ☐ **A.** $-\frac{12}{10}$
- ☐ **B.** $\frac{-12}{10}$
- ☐ **C.** $\frac{12}{10}$
- ☐ **D.** $\frac{-12}{-10}$
- ☐ **E.** $\frac{12}{-10}$

Problems 2–3: Determine the value of x that makes each equation true.

2. $-5x = -30$

3. $\frac{x}{-2.5} = 15$

Problems 4–5: Daniel pays for streaming services through an automatic monthly payment from his checking account. Over the course of the year (12 months), his account showed a total of $-\$83.88$ for the year's payments.

4. How much was the monthly payment for the streaming services? Make sure you show whether the charge was negative or positive. Show or explain your thinking.

5. What was the payment for 5 months of streaming services?

6. Select *all* the values that are equivalent to $-\frac{15}{8}$.

- ☐ **A.** $-\frac{17}{8}$
- ☐ **B.** $\frac{17}{8}$
- ☐ **C.** $-\frac{15}{8}$
- ☐ **D.** $-\frac{15}{-8}$
- ☐ **E.** $\frac{15}{-8}$

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

7. Order these expressions from *least* to *greatest*.

$-12 \div (-4)$	$-12 \div \left(-\frac{1}{4}\right)$	$12 \div (-4)$	$-12 \div \left(\frac{1}{4}\right)$

Least **Greatest**

8. Determine the missing value in each equation.

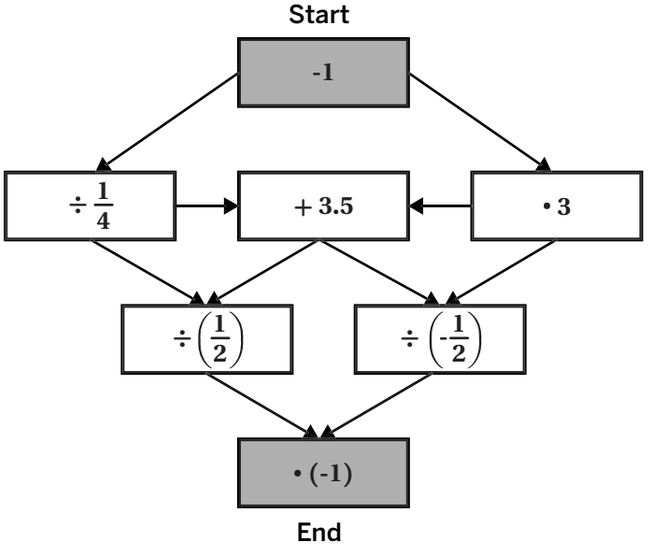
a $-45 \div$ ..... $= -9$

b $-21 \div$ ..... $= 3$

c ..... $\div 8 = -9$

d ..... $\div 2 = -\frac{1}{4}$

9. Move from box to box, starting from the value of -1, performing the indicated operation as you reach each new box. Choose a path that will give you the least possible value. You must follow the direction of the arrows. What is the *least* possible value you were able to determine?



Name: Date: Period:

Additional Practice 5.09

1. Evaluate each expression. Show your thinking.

a $-17 + (-3)$

b $(-17)\,(-3)$

c $-17 - (-3)$

d $-17 \div \left(-\frac{1}{3}\right)$

2. Match equivalent expressions. Show your thinking.

a. $-4 + 5$ ..... $-4 \div \frac{1}{5}$

b. $-4 \cdot \frac{1}{5}$ ..... $-4 + \left(-\frac{1}{5}\right)$

c. $-4 - \frac{1}{5}$ ..... $-4 - (-5)$

d. $-4 \cdot 5$ ..... $-4 \div 5$

3. The value of x is $-\frac{2}{3}$. Order the values of these expressions from least to greatest:

$-x$	$-2x$	$\frac{3}{2}x$	$1 \div x$

Least **Greatest**

4. For each set of values for c and d, evaluate the given expressions and record your results in the table.

c	d	$c + d$	$-c + d$	$c - d$
$\frac{1}{4}$	$3\frac{1}{2}$			
$-\frac{1}{4}$	$-3\frac{1}{2}$			

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

5. Evaluate each expression for when a is $-\frac{3}{10}$, b is -10 and c is -0.1.

a $-a-(-b)$ **b** $\frac{1}{2}b \div c$ **c** $-a-b-c$

6. For each equation, select an operation ($+$, $-$, $\cdot$, $\div$) to make the equation true.

a $18 \square 2 = 36$

b $9 \square -\frac{2}{3} = -6$

c $-9 \square -\frac{3}{4} = 12$

d $11 \square -15 = -4$

e $-12 \square -15 = 3$

7. Using exactly four 4's, any of the four operations, and as many parentheses as you like, create expressions that equal each of the given values. The first one is done as an example.

$(4+4) \div (4+4)$ ..... $= 1$

a ..... $= 2$

b ..... $= 3$

c ..... $= 4$

d ..... $= 5$

e ..... $= 6$

f ..... $= 7$

g ..... $= 8$

h ..... $= 9$

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

Additional Practice 5.10

Problems 1–4: Determine the value of the variable that makes each equation true.

1. $-12 + a = -16$

2. $-12 - 16 = b$

3. $-4c = -12$

4. $\frac{d}{-4} = 12$

5. Which expression has the *lesser* value? Explain your thinking.

A. $(-12) - (-4)$ **B.** $(-4) - (-12)$ **C.** They have the same value

Problems 6–7: Let $x = 3$, $y = -4$, and $z = -3$

6. Order these expressions from *least* to *greatest*.

$x - z$	$x - 2y$	$x \cdot y$	xyz

Least **Greatest**

7. Would your order be different if the value of x was -3 instead? Explain your thinking.

Name: Date: Period:

8. For the expressions $\frac{a}{b}$ and $a + b$, choose values for a and b so that $\frac{a}{b}$ is negative and $a + b$ is positive.

9. For each set of values for c and d, evaluate the given expressions and record your results in the table.

c	d	$c + d$	$c - d$	$-c + d$
$-\frac{2}{3}$	$2\frac{5}{6}$			
$\frac{2}{3}$	$-2\frac{5}{6}$			

10. Describe any patterns you notice.

Name: Date: Period:

Additional Practice 5.11

Problems 1–4: Determine the value of the variable that makes each equation true.

1. $4 \cdot (-3.4) = a$

2. $-10b = 40$

3. $-4 - \frac{2}{5} = c$

4. $\frac{d}{4} = -8.2$

5. A submarine starts at the surface and descends toward the ocean floor at a rate of -25 meters per minute for 30 minutes. Select the expression that could represent the depth of the submarine after its descent.

A. $-25 \div 30$

B. $-25 \cdot 30$

C. $-25 + 30$

D. $-25 - 30$

6. For each equation, select an operation ($+$, $-$, $\cdot$, $\div$) to make the equation true.

a $-18 \ldots\ldots 2 = -9$

b $9 \ldots\ldots \left(-\frac{2}{3}\right) = -6$

c $-9 \ldots\ldots \left(-\frac{3}{4}\right) = 12$

d $11 \ldots\ldots (-15) = -4$

e $-12 \ldots\ldots (-15) = 3$

f $-12 \ldots\ldots (-10) = 120$

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

7. Each table shows deposits and withdrawals for different bank accounts. Select the bank account that currently has the highest balance. Assume each account started with the same amount.

A.

Andre
−30.50
19.50
42.40

B.

Elena
45.50
−14.00
14.00

C.

Clare
−23.70
95.70
−60.40

D.

Tyler
25.50
−70.30
50.40

8. Match each situation to an equation that could represent it.

.....	The temperature was decreasing at a rate of 1.5 m/s. How long will it take for the temperature to be $6°$ colder than it is now?	**a.** $1.5c = -6$
.....	A penguin descended below the surface of the ocean. After 1.5 seconds, the penguin was 6 feet below the surface. At what rate was the penguin diving?	**b.** $-6 + 1.5 = c$
.....	A seal was swimming at -6 m compared to sea level and then swam 1.5 m toward the surface. What is the seal's elevation now?	**c.** $-1.5c = -6$
.....	The temperature was $-1.5°$C and changed to $-6°$C. What was the change in temperature?	**d.** $-1.5 + c = -6$

Name: Date: Period:

Additional Practice 5.12

1. Order these expressions from *least* to *greatest*.

$-2.4 - 6$	$14.4 \div (-6)$	$(-6)(-2.4)$	$-2.4 + 6$	$-14.4 \div (2.4)$

Least **Greatest**

Problems 2–3: Starting at sunrise, the temperature is decreasing at a rate of 4°F per hour.

2. How many hours will it take for the temperature to decrease by 12°F? Show or explain your thinking.

3. If the temperature at sunrise was -2°F, how many hours will it take until it is -18°F? Show or explain your thinking.

4. The table shows the amount of loss of glacier ice mass, measured in meters of water equivalent, since 1970, according to the World Glacier Monitoring Service (WGMS).

What is the average change in glacier ice mass between 2010 to 2020?

A. 10 meters

B. -5.6 meters

C. 0.56 meters

D. -0.56 meters

Year	Glacier Ice Mass
1970	0
1980	−3.3
1990	−7.6
2000	−12.8
2010	−18.6
2020	−24.2
2023	−26.0

Name: Date: Period:

Problems 5–7: The table shows the change in the price of a stock from the previous day during a week of trading.

Day	Change ($)
Monday	-0.32
Tuesday	1.02
Wednesday	0.64
Thursday	-0.83
Friday	1.72

5. Between which two consecutive days of the week is the price change the greatest? Show or explain your thinking.

6. What is the average change in the price of stock between Wednesday and Friday? Show or explain your thinking.

7. What is the average change in the price of the stock between Monday and Thursday? Show or explain your thinking.

Name: Date: Period:

Additional Practice 5.13

Problems 1–2: The carton of milk in Kyle.'s refrigerator has 32 ounces of milk in it. Kyle drinks 6.4 ounces of milk each morning.

1. How much does the amount of milk in the carton change with each glass of milk poured? Show whether the change is positive or negative.

2. How many glasses of milk can Kyle drink before he runs out of milk? Show or explain your thinking.

Problems 3–4: Lynn brings 8 cups of water to soccer practice in her water bottle. She drinks $\frac{1}{2}$ a cup of water every 15 minutes.

3. How much does the amount of water in the water bottle change with each drink? Show whether the change is positive or negative.

4. How many drinks of water can Lynn take before she runs out of water? Show or explain your thinking.

5. How long will it take before her water bottle is empty? Show or explain your thinking.

Name: Date: Period:

6. If the value of x is $1/3$, order these expressions from *least* to *greatest*.

x	$1 - x$	$x - 1$	$-3x$	$x - 2$

Least **Greatest**

Problems 7–8: The temperature was -10°F and increased to 6°F. What was the change in temperature?

7. Select the equation that matches the situation.

A. $-10 + 6 = x$

B. $-10 + x = 6$

C. $6x = 10$

D. $6 + x = -10$

8. Write the answer in a sentence.

9. If $a > b$, determine whether each statement is always, sometimes, or never true.

Statement	Always true	Sometimes true	Never true
$a - b > 0$			
$a \cdot b > 0$			
$a \div b < 1$			
$b \div a < 0$			
$b + (-a) > 0$			

Grade 7 | Unit 6

Additional Practice

Practice Problems

Name: Date: Period:

Additional Practice 6.01

Problems 1–4: A local gym charges $115 a month for a gym membership and 3 training sessions and $145 a month for a gym membership with 4 training sessions.

1. How much does the gym charge for the monthly membership only?

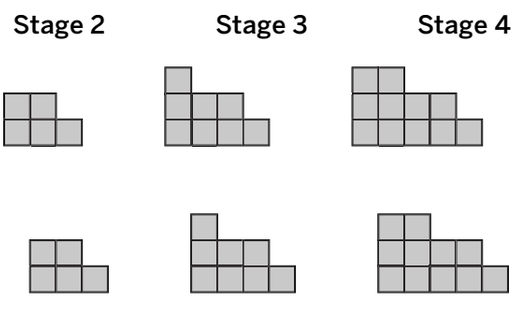
2. How much does the gym charge for each training session?

3. Is the relationship between the number of training sessions and the total amount charged proportional? Explain your thinking.

4. If the total monthly charge was $265, how many training sessions were purchased? Explain your thinking.

5. Here are scaled copies of a figure. The top three have a toothpick border and the bottom three have a tile border. Complete the table to show the number of toothpicks and tiles for different stages.

Stage	Border Toothpicks	Border Tiles
2		
3		
4		
5		
6		



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

Problems 6–10: Use the pattern below to answer the following questions.

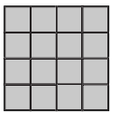
Stage 1	Stage 2	Stage 3
		
Border Tiles:	Border Tiles:	Border Tiles: .....

6. Determine the number of border tiles for each Stage.

7. Describe how you can determine the number of border tiles at any stage without drawing the figure.

8. Describe the pattern of the inner figure.

9. Sketch the figure for Stage 4 below and identify the number of border tiles it has.



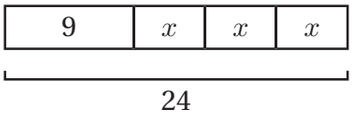
Border Tiles: .....

10. Without sketching it, determine how many border tiles Stage 6 will have. Explain your thinking.

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

Additional Practice 6.02

1. Refer to the tape diagram. Which equation does the tape diagram represent?



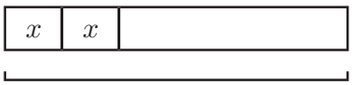
A. $24 = 3(x + 9)$

B. $9 + x = 24$

C. $9 = 3x + 24$

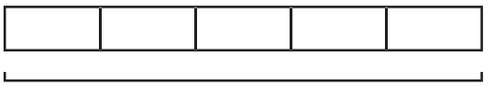
D. $24 = 9 + 3x$

2. Tyler's mother bought 24 pansies to plant. She plans to plant 16 pansies in the backyard and split the remainder evenly between 2 flower beds in the front yard. Complete the tape diagram shown to represent the story.



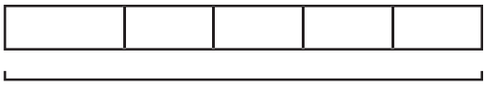
3. Label each part of each tape diagram shown with either a number, a variable, or an expression to match the story. Then write an equation that represents the diagram and the story.

a A florist made 5 bouquets of flowers. He arranged the same number of flowers per bouquet. Then he added 4 more flowers to each bouquet. Altogether he used 85 flowers.



Equation:

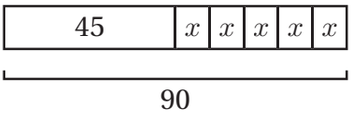
b A teacher received 32 new calculators. She put 8 calculators away. The remaining calculators were divided evenly among 4 tables of students.



Equation:

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

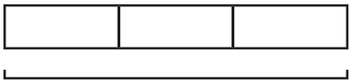
4. Select *all* the stories the tape diagram shown could represent.



- ☐ **A.** There are 90 family members at a family picnic. Half of them are eating and the remainder are evenly divided among 5 fun activities.
- ☐ **B.** Clare buys 5 packages of trading cards with 45 cards in each package. Then she gives 90 trading cards to her sister.
- ☐ **C.** Noah spent a total of $90 on 5 t-shirts that each cost the same amount and a pair of shoes that costs $45.
- ☐ **D.** At a school play, there are 90 parents and 45 siblings in the audience. The seating is partitioned into 5 equal rows.
- ☐ **E.** Mai buys a package of 90 stickers. She gives 45 stickers to her teacher and shares the remaining stickers evenly among herself and 4 friends.

5. Bard bought 3 boxes of markers. Each box contained the same number of markers. After taking 2 markers from each box, Bard has 24 markers left.

a Label each part of the tape diagram shown with either a number, a variable, or an expression to match the story.

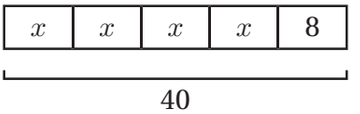
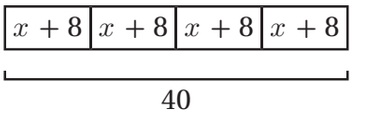


b What does the variable represent in the story?

c Write an equation that matches your diagram.

6. The equations $4x + 8 = 40$ and $4(x + 8) = 40$ each represent one of the following tape diagrams. For each tape diagram, complete the following tasks.

- Write each equation below the diagram it represents.
- Write an equivalent equation that could also represent the tape diagram.
- Write two stories that could each be described by each tape diagram.

Tape diagram		
Equation		
Equivalent equation		
Story		

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

Additional Practice 6.03

1. Han purchased 4 packs of tomato plants. He also purchased 5 pepper plants. He bought 17 plants in all. Which equation represents the scenario?

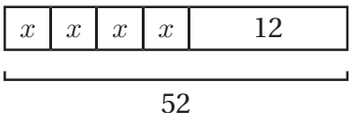
A. $17 = 4x + 5$

B. $17 = 4(x + 5)$

C. $17 - 5 = 4x$

D. $4x + 17 = 5$

2. Refer to the tape diagram shown. Clare had 4 packages of stickers. After her sister gave her 12 more stickers, she had a total of 52 stickers. In the tape diagram, what does x represent, the number of packages of stickers or the number of stickers in each package?



3. Read these real-world scenarios, and study the two equations shown.

Scenario 1: Lin's mother bought 4 kids-meals. She also bought a meal for herself that cost $\$8$. She spent a total of $\$28$ on lunch.

Scenario 2: A preschool teacher has 28 toy cars. She gives equal amounts of toy cars to 8 students. She has 4 toy cars left over.

$$8x + 4 = 28$$
$$4x + 8 = 28$$

a Decide which equation represents each scenario. What does x represent in each equation?

Scenario 1:

Scenario 2:

b Determine the solution to each equation. Show or explain your thinking.

Scenario 1:

Scenario 2:

c What does each solution tell you about its scenario?

Scenario 1:

Scenario 2:

Name: Date: Period:

4. Diego and two friends each spent $\$x$ on a round of mini-golf. They spent $\$16$ on a veggie pizza. The total cost of the mini-golf and the pizza was $\$34$.

a Draw a tape diagram and write an equation that represents the scenario.

b Solve the equation. Show your thinking. What is the cost of one round of mini-golf?

Problems 5–9: Priya wanted to run 54 miles. Each day that she goes out running, she runs 6 miles. She has already run 18 miles. Priya wants to know how many days she needs to run to meet her goal.

5. Identify what the variable, x, represents in this context.

6. Draw a tape diagram to represent this situation.

7. Using your tape diagram, write an equation to represent this situation.

8. What is the value of x? Explain how you arrived at this solution.

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

Additional Practice 6.04

1. Kiran gives away a total of 28 bouncy balls to his 4 cousins. He first gives an equal amount to each cousin, and then gives each cousin 2 more. Which equation represents this situation?

A. $6(x + 2) = 28$

B. $2(x + 4) = 28$

C. $4(x + 2) = 28$

D. $6(x + 4) = 28$

2. What is the solution to the equation $64 = 8(x + 2)$?

A. $x = 10$

B. $x = 8$

C. $x = 6$

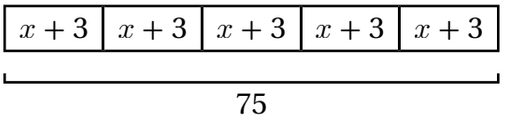
D. $x = -10$

3. Solve each equation. Show your thinking.

a $91 = 7(x + 6)$

b $\frac{3}{4}(x + 1) = 12$

4. Refer to the tape diagram shown. Clare says that the tape diagram could match the following scenario:



A kindergarten teacher placed an equal amount of stickers at 5 tables. Then he placed 3 more stickers at each table. He placed 75 stickers in all.

Do you agree with Clare? Explain your thinking.

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

5. Match each story with the equation that represents it.

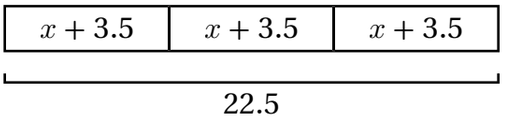
Stories	Equations
a. Mai packaged 48 cans of vegetable soup in 6 boxes for a canned food drive. She first placed an equal amount in each box and then added 4 cans to each box.	..... $6(x + 4) = 48$
	..... $4(x + 6) = 48$
b. A group of 4 friends each purchased a ticket to drive go-karts. Each friend also spent $\$6$ on a meal. They spent $\$48$ in all.	

6. Solve each equation. Show your thinking.

a $9 = 2.25(x + 1.5)$

b $\frac{2}{3}\left(x + \frac{9}{6}\right) = \frac{6}{3}$

7. Refer to the tape diagram shown.



a Write a scenario that could be represented by the tape diagram.

b Write an equation that represents the diagram and the scenario.

c What does x represent?

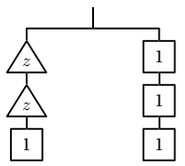
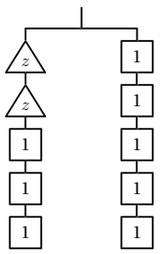
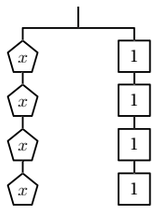
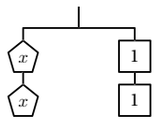
d Solve the equation.

e Interpret the solution.

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

Additional Practice 6.05

1. Determine what changes were made to the first hanger diagram that resulted in the second hanger diagram. Name the property (or properties) that tell you that if the first hanger is balanced, then the second hanger diagram remains balanced.

First hanger	Second hanger	What was done?	What property?
			
			

2. Each hanger diagram in the table from Problem 1 is balanced. Determine the weight of each lettered shape, and explain your thinking. You may draw on the diagrams to help with your thinking.

a $z =$ ..... **b** $x =$ ..... **c** $2z =$ ..... **d** $0.5x =$ .....

3. Refer to these hanger diagrams. What changes were made to the first hanger diagram that resulted in the second hanger diagram?

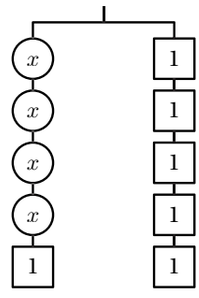
A. One unit was added to each side. Then each side was divided by 2.

B. One unit was removed from each side. Then each side was divided by 2.

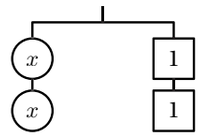
C. One unit was added to each side. Then each side was divided by 3.

D. Each side was partitioned into 2 equal groups, and one half of each side was removed.

First hanger

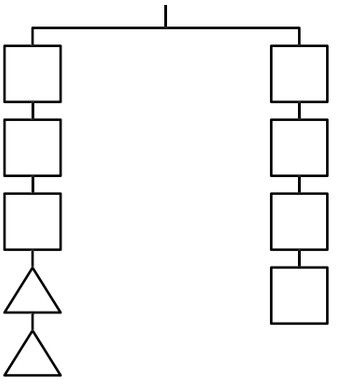


Second hanger



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

4. Refer to the balanced hanger diagram. Determine the weight of a triangle if each square weighs:



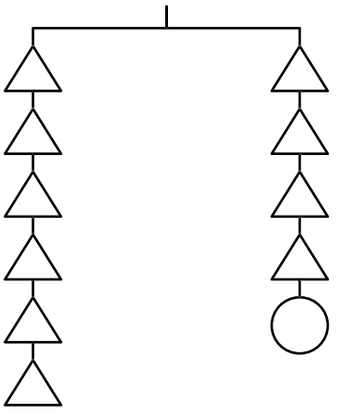
a 2 lb

b 3 lb

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

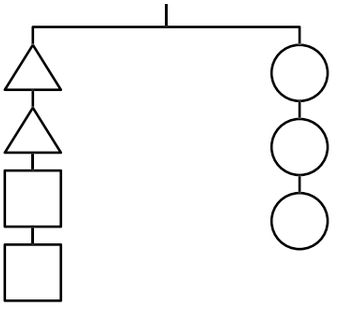
d $\frac{1}{2}$ lb

5. Refer to the balanced hanger diagram. The weight of each triangle is 2.5 g. What is the weight of the circle? Explain your thinking.

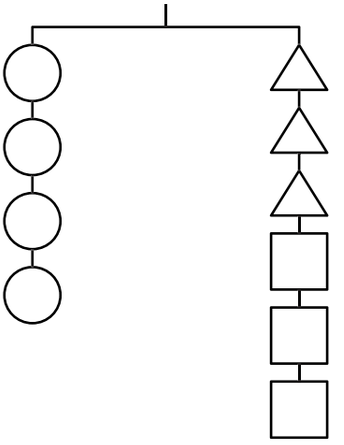


6. Suppose the weight of each triangle is x lb, the weight of each circle is 2 lb, and the weight of each square is $\frac{1}{4}$ lb. Write an equation to represent the hanger diagrams shown.

a



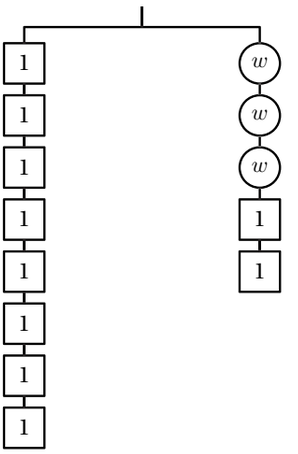
b



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

Additional Practice 6.06

1. Refer to the hanger diagram. Which equation is represented by the hanger diagram?



A. $8 = 2w + 3$

B. $10 = 3w$

C. $8 = 3w + 2$

D. $6 = 3w$

2. Clare described a hanger diagram as having three unknowns and two weights balanced with five weights. Which hanger diagram represents this description?

Diagram A

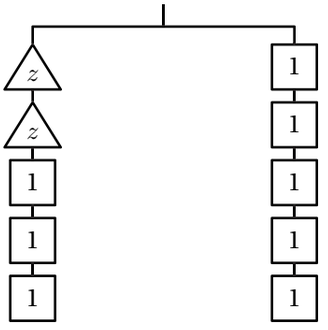
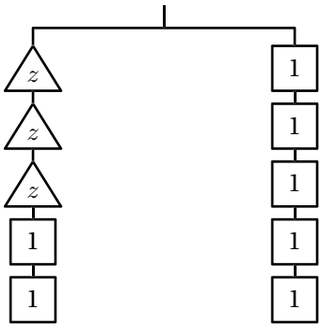
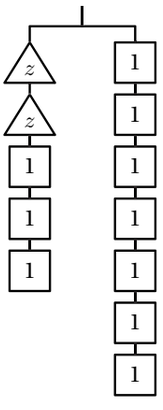


Diagram B

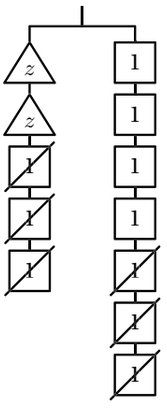


3. Andre used a hanger diagram to find the solution to the equation $2z + 3 = 7$. Write an equation to represent each step.

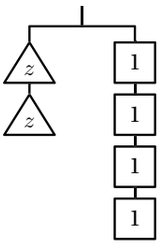
Step 1



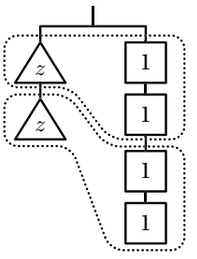
Step 2



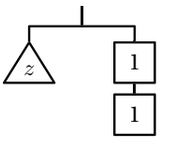
Step 3



Step 4

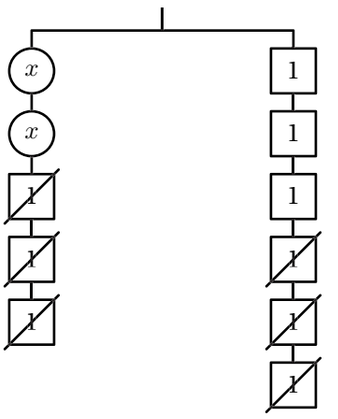


Step 5



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

4. Bard started to solve the equation $2x + 3 = 6$ using the hanger diagram shown. Complete Bard's response, including marking up the hanger diagram.



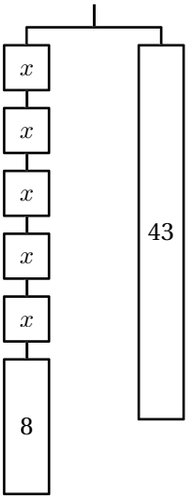
Bard's thinking:

$2x + 3 = 6$

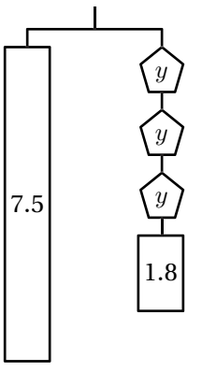
$2x + 3 - 3 = 6 - 3$

5. Solve each equation. Refer to the hanger to help with your thinking.

a $5x + 8 = 43$



b $7.5 = 3y + 1.8$



6. Solve each equation. Draw a hanger diagram, if needed.

a $1.25y + 6.2 = 11.2$

b $\frac{1}{2}x + \frac{3}{4} = 2\frac{3}{4}$

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

Additional Practice 6.07

Problems 1–3: Solve each equation by filling in the blanks.

1. $12x - 6 = 54$

$12x =$ .....

$x =$ .....

2. $5(x + 3) = -25$

$x + 3 =$ .....

$x =$ .....

3. $-75x + 150 = 0$

$-75x =$ .....

$x =$ .....

Problems 4–7: Solve each equation. Draw a hanger diagram to help with your thinking, if needed. Show your thinking.

4. $-10(x - 3) = 50$

5. $18 = \frac{2}{3}(w + 4)$

6. $15 = -0.5(y + 6)$

7. $-\frac{1}{3}(z - 12) = -2$

Name: Date: Period:

Problems 8–9: Matthew and Alice each solved the equation $-\frac{1}{3}(x+6)=12$ using different methods. The first steps of their methods are shown below.

8. Continue to solve the equation following each student's first steps. Show your thinking.

Matthew's Method	Alice's Method
$-\frac{1}{3}(x+6)=12$ $-3 \cdot -\frac{1}{3}(x+6)=12 \cdot -3$	$-\frac{1}{3}(x+6)=12$ $-\frac{1}{3}x+-\frac{1}{3}(6)=12$

9. What is different about each method? What is the same?

10. Which method do you prefer? Explain.

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

Additional Practice 6.08

Problems 1–3: Write each expression in expanded form.

1. $-3(-2)$

2. $-9(1-y)$

3. $-14(-2y)$

Problems 4–6: Complete the missing information in the puzzle and complete the table.

4.

	w	-8
2		

Factored	Expanded
$2(w-8)$	

5.

6	$12a$	-24

Factored	Expanded
	$12a-24$

6.

Factored	Expanded
	$8y-20$

Name: Date: Period:

Problems 7–10: Solve each equation. Show your thinking.

7. $-3(x - 5) = 12$

8. $-4(x + 2) = 32$

9. $\frac{2}{3}(x + 3) = -18$

10. $-\frac{1}{4}(x - 7) = -10$

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

Additional Practice 6.09

1. Gina says that $4x - 8$ and $3x + 4$ are equivalent because they equal 40 when x is 12. Do you agree with Gina? Explain your thinking.

2. Write at least three different expressions that are equivalent to $12w + 18$.

3. Write at least three different expressions that are equivalent to $-1/4(16m - 40)$.

Problems 4-7: Write an equivalent expression in expanded form.

4. $-3(-a + 4) =$ .....

5. $-12\left(z - \frac{1}{2}\right) =$ .....

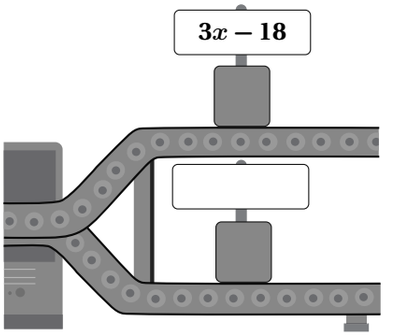
6. $\frac{1}{4}(20y - 10) =$ .....

7. $3(2x + 6y - 1) =$ .....

Name: Date: Period:

Problems 8–9: A never-equal machine is given.

8. Write an expression that will always be equal to $3x - 18$ and an expression that will never be equal to $3x - 18$. Use x as the variable in each expression.



9. Explain how you know that your two expressions will never be equal.

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

Additional Practice 6.10

1. Select *all* of the expressions that are equivalent to $12x + 7 - 2x$.

- ☐ **A.** $17x$
- ☐ **B.** $10x + 7$
- ☐ **C.** $14x + 7$
- ☐ **D.** $12x + 7 + (-2x)$
- ☐ **E.** $12x - 2x + 7$

2. Fill in the blanks to make each equation true.

a $4x +$ ..... $= 7x$

b $4x +$ ..... $= x$

c $4x +$ ..... $= -6x$

d $4x +$ ..... $= 7x - 2$

e $4x -$ ..... $= x$

f $4x -$ ..... $= -6x$

g $4x +$ ..... $= 8$

h $4x - ($ ..... $) = 2x - 6$

Name: Date: Period:

Problems 3–6: Collect all the squares by choosing two or more expressions to combine using appropriate operations. Then, write an equivalent expression using the fewest number of terms.

All squares must be used.

$-3x$	$6 - x$	$3(x - 2)$
$2(x - 1)$	$5 + x$	$10x$
$9x + 4$	$4x$	$\frac{1}{2}x + 6$

	Original Expression	Equivalent Expression
3		
4		
5		
6		

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

Additional Practice 6.11

1. Which is the solution to the equation $3x + 7 = -11$?

A. 9

B. 6

C. -6

D. -9

2. Which is the solution to the equation $\frac{2}{3}(x + 8) = -4$?

A. 14

B. 2

C. -2

D. -14

3. Solve each equation. Show your thinking.

a $41 = 11 + 4z$

b $3w + 3.1 = 9.7$

4. Solve each equation. Show your thinking.

a $-\frac{5}{4}(x - 6) = \frac{10}{4}$

b $8000 = 4000(x - 0.06)$

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

5. Select *all* expressions that represent a correct solution to the equation $4(x + 6) = 22$.

- ☐ **A.** $22 - 4 - 6$
- ☐ **B.** $22 \div 4 - 6$
- ☐ **C.** $\frac{1}{4}(22 - 24)$
- ☐ **D.** $\frac{1}{4}(22 - 6)$
- ☐ **E.** $(22 - 6) \div 4$
- ☐ **F.** $(22 - 24) \div 4$

6. Solve the equation $-\frac{3}{4}(x - 8) = -6$ using two different methods. Show your thinking.

7. Diego solved the equation $-\frac{3}{2}(x + 6) = \frac{21}{2}$. His response is shown. Diego made a mistake. Identify his mistake, and then correct his response. Show your thinking.

$$-\frac{3}{2}(x + 6) \div \left(-\frac{3}{2}\right) = \frac{21}{2} \div \left(-\frac{3}{2}\right)$$

$$x + 6 = -6\frac{3}{4}$$

$$x + 6 = -15\,\frac{3}{4}$$

$$x + 6 - 6 = -15\,\frac{3}{4} - 6$$

$$x = -21\,\frac{3}{4}$$

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

Additional Practice 6.12

1. Elena had 100 fliers to pass out. She gave an equal amount of fliers to 5 volunteers and she passed out 10 fliers. Which equation represents this situation?

A. $100 = 5(x + 10)$

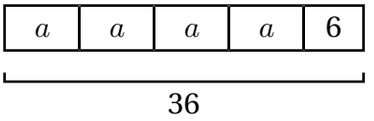
B. $10(x + 5) = 100$

C. $10x + 5 = 100$

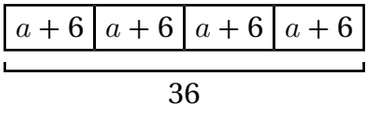
D. $100 = 5x + 10$

2. Which tape diagram represents the equation $4(a + 6) = 36$?

Tape diagram A



Tape diagram B



3. Match each scenario with the equation that it could represent. Some scenarios may be represented by the same equation.

Equation		Scenario
a.	$4(x + 2) = 18$	..... Jada has 4 dimes and 2 times as many quarters as Han. She has 18 dimes and quarters altogether. How many quarters does Han have?
b.	$2x + 4 = 18$	..... Lin's father spent $\$18$ and purchased each of his 4 children a $\$2$ yo-yo and a bottle of bubbles. How much does each bottle of bubbles cost?
c.	$4x + 2 = 18$	..... Diego made two fruit baskets using 18 pieces of fruit. He placed an equal number of pieces in each basket and then added 4 more pieces to each basket. How many pieces of fruit did Diego originally put in each basket?
d.	$2(x + 4) = 18$	..... Clare has 18 gel pens. She gives an equal amount of gel pens to 4 friends and keeps 2 for herself. How many gel pens did she give each friend?
		..... A teacher had 18 copies of a class chapter book. She stacked an equal number of copies in 4 piles. Then she placed 2 more copies in each pile. How many copies of the book were first placed in each pile?

Name: Date: Period:

For Problems 4–6: write and solve an equation, including identifying what the variable in each equation represents. After solving each equation, describe what the solution represents in the scenario. Draw a tape diagram to help if needed.

4. Andre tutored 8 times this past month and earned the same amount each time he tutored. To thank him, the family gave him an extra $\$6$ at the end of the month. Andre earned $\$110$ from tutoring.

a **Equation:**

b **Description:**

5. Mai spent 5 more minutes reading than Clare. Lin read 3 times as many minutes as Mai. If Lin read for 30 minutes, how many minutes did Clare spend reading?

a **Equation:**

b **Description:**

6. Priya and Tyler both run for 1 hour every day. In that time, Priya runs 1.5 miles less than Tyler. If after 4 days Priya has run a total of 20 miles, how far does Tyler run in 1 day?

a **Equation:**

b **Description:**

7. Write a scenario that could be represented by each of the following equations.

a $3(x - 7) = 21$

b $2y - 20 = -5$

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

Additional Practice 6.13

1. For each scenario, circle the inequality that represents it.

a The temperature is above $32°$.

$x > 32$ $x < 32$ $x \geq 32$ $x \leq 32$

b Kiran has no more $\$20$ to spend.

$x > 20$ $x < 20$ $x \geq 20$ $x \leq 20$

2. Consider the inequality $c \leq 9$. Circle *all* the solutions to the inequality.

7 8 9 10

3. Express each statement as an inequality, and write two values which will make the inequality true.

a x is greater than 2.

b b is less than or equal 4.5.

c 5 is at least w.

d d is no less than 16.

e t is at most 8.

4. Write an inequality that represents each scenario.

a A student must have at least 5 hours of community service completed.

b Practice will be no more than 50 minutes.

c Children under the age of 3 are free.

d During hibernation, an arctic ground squirrel's body temperature never goes below $-2.9°\text{C}$.

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

5. Consider the inequality $-2x < 14$.

a List four values for x that would make this inequality true.

b How are the solutions to the inequality $-2x < 14$ different from the solutions to the inequality $-2x \leq 14$?

6. Noah and Elena each wrote an inequality to represent the following situation.

Jada wants to take, at minimum, $\$15$ to the store.

Noah's inequality: $x \geq 15$ **Elena's inequality:** $15 \leq x$

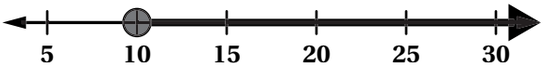
Who is correct? Explain your thinking.

7. Refer to the following situations.

a The Art Club spent $\$249$ on supplies last year. This is at most $\$75$ more than the Spanish club spent. Write an inequality that represents the amount of money that the Spanish Club spent.

b In the first week of a canned food drive 480 cans were collected. In the last week of the canned food drive, at least twice that amount was collected. Write an inequality that represents the amount of cans that were collected in the last week of the canned food drive.

8. The number line shows a solution to an inequality. Write a real-world scenario that the inequality could represent.

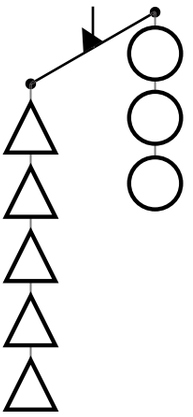


Name: ..... Date: ..... Period: .....

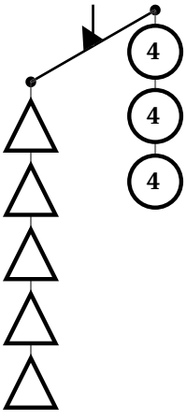
Additional Practice 6.14

Problems 1–2: Here are two unbalanced hangers. Write an inequality to represent the relationship between the weights on each hanger. Use t to represent the weight of the triangle in grams. Use c to represent the weight of the circle in grams.

1.



2.

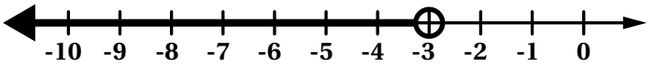


3. Select all values of x that make the inequality $x - 7 \geq -3$ true.

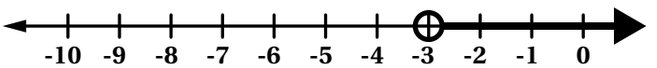
- ☐ **A.** 3.9
- ☐ **B.** 0
- ☐ **C.** 4
- ☐ **D.** 4.1
- ☐ **E.** 5
- ☐ **F.** -1
- ☐ **G.** -4
- ☐ **H.** 8

4. Which number line shows the solution to $-3x > 9$?

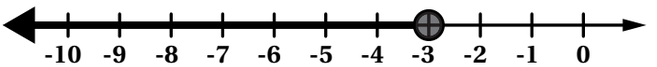
A.



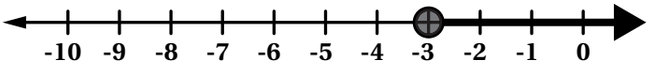
B.



C.



D.



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

5. Melanie is asked to solve the inequality $-5x \leq -40$. She solves the equation $-5x = -40$ and determines $x = 8$. What is the solution to the inequality?

A. $x \leq 8$

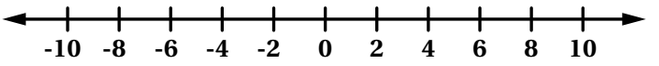
B. $x \geq 8$

C. $x < 8$

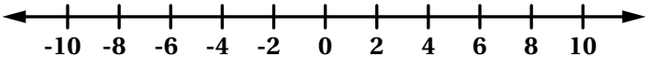
D. $x > 8$

Problems 6–7: Solve each inequality. Show your solution as a graph on the number line and write an inequality to represent it.

6. $-3x < 18$

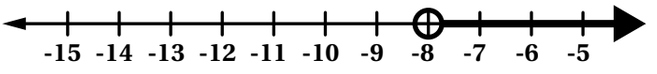


7. $\frac{2}{3}x \leq \frac{14}{3}$



8. Shawn solved the inequality $-\frac{1}{2}x > 4$. Shawn's solution is shown.

Shawn's response:



Is Shawn correct? Explain your thinking.

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

Additional Practice 6.15

1. Priya has $\$30$ to spend at the school festival. Admission is $\$4$ and each ride ticket is $\$2$. Which inequality represents the greatest number of ride tickets she can buy?

A. $2n + 4 < 30$ **B.** $2n + 4 > 30$ **C.** $2n + 4 \leq 30$ **D.** $2n + 4 \geq 30$

2. It is currently 8 degrees outside, and the temperature will drop 2 degrees every hour. When the temperature falls below zero degrees, it can be represented by the inequality $8 - 2h < 0$, where h represents the number hours the temperature has been dropping. Does $h < 4$ or $h > 4$ represent the solution of the inequality?

3. Clare currently has a $\$0$ allowance balance. She has been borrowing $\$5$ each day from her father. Her allowance balance after d days is $-5d$.

a Explain what the equation $-5d = -25$ represents.

b What value of d makes the equation true?

c Explain what the inequality $-5d < -25$ represents.

d What values of d make the inequality true?

4. The 20 members of the photography club are trying to raise at least $\$1{,}400$ for new photography equipment. They have already raised $\$540$.

a Let m represent the amount of money each member must raise, on average, to meet their goal. Write an expression for the total amount of money going to be raised.

b Write an equation that represents the club raising all the money.

c Solve the equation. What does the solution mean in context of the scenario?

d Write an inequality representing the amount of money each member must raise, on average, to meet or exceed their goal.

e Write an inequality showing the possible average amount of money each club member needs to raise.

Name: Date: Period:

5. Andre's dog weighs 84 lb. The vet put Andre's dog on a diet for 6 months. The dog's weight after losing p pounds monthly is $84 - 6p$.

a Explain what the equation $84 - 6p = 76$ represents.

b What value of p makes the equation true?

c Explain what the inequality $84 - 6p \leq 76$ represents.

d What values of p make the inequality true?

6. Noah spent $\$40$ on supplies for making 25 birdhouses. Noah wants to make a profit of more than $\$300$.

a What inequality can you write to find the price p Noah should charge per birdhouse if he wants to meet his goal?

b What values of p make the inequality true?

7. Elena scored 95, 91, 90 on 3 tests. She wants her average test score for 5 tests to be least 92.

a What inequality represents the average score she can get on her next two tests to meet her goal? Identify and define a variable.

b What values make the inequality true?

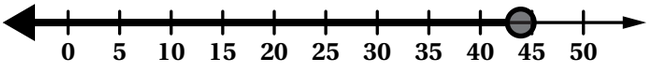
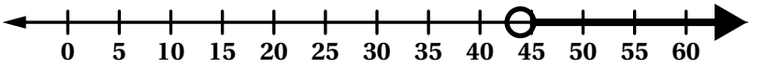
Name: ..... Date: ..... Period: .....

Additional Practice 6.16

1. Select *all* values of x that make the inequality $-x + 6 < 8$ true.

- ☐ **A.** 1.9
- ☐ **B.** 2
- ☐ **C.** 2.01
- ☐ **D.** -2.01
- ☐ **E.** -2
- ☐ **F.** -1.9
- ☐ **G.** 15
- ☐ **H.** -15

2. To ride on the Space *Mountain* rollercoaster at Disney World, guests must be at least 44 inches tall. Match each situation or number line graph with an inequality.

Situation/Graph	Inequality
a. Kira is x inches tall and cannot ride the rollercoaster.	..... $x > 4$
b. Jake is x inches tall and can ride the rollercoaster.	..... $x \leq 4$
c. 	..... $x < 44$
d. 	..... $x \geq 44$

Problems 3–4: Use the inequality $60 - 2x \geq -10$.

3. Select *all* values of x that make the inequality $60 - 2x \geq -10$ true.

- ..... **A.** 0
- ..... **B.** 35
- ..... **C.** -35
- ..... **D.** 35.1
- ..... **E.** 34.9

4. In order to solve the inequality $60 - 2x \geq -10$, Soorya solved the equation $60 - 2x = -10$ and got $x = 35$. What is the solution to the inequality? Show or explain your thinking.

Name: Date: Period:

5. Jasmine is solving the inequality $12x < -48$. She solves the equation $12x = -48$ to determine $x = -4$. What is the solution to the inequality?

A. $x < -4$

B. $x > -4$

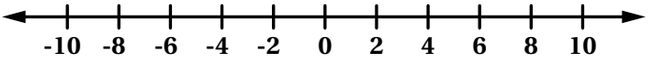
C. $x \leq -4$

D. $x \geq -4$

Problems 6–7: Complete the table to determine the solutions to each inequality. Write the solutions as an inequality and graph them on the number line.

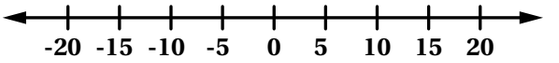
6. $-5x \geq 30$

x	-9	-8	-7	-6	-5	-4	-3
$-5x$							

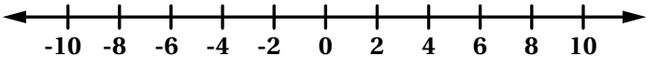


7. $\frac{4}{5}x > -12$

x	-20	-15	-10	-5	0	5	10
$\frac{4}{5}x$							



8. Solve the inequality $2x + 8 > 12$ and graph the solution on the number line. Show your thinking.



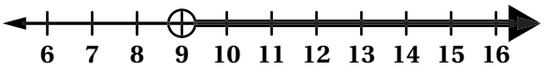
Name: ..... Date: ..... Period: .....

Additional Practice 6.17

1. Here is an inequality: Which numbers are solutions to the inequality $-2(x - 4) < 20$?

- ☐ **A.** -0.5
- ☐ **B.** -8
- ☐ **C.** -1
- ☐ **D.** 0
- ☐ **E.** -6
- ☐ **F.** 6
- ☐ **G.** -5.9
- ☐ **H.** -6.1

2. Which inequalities does the following graph represent? Circle *all* that apply.



$x > 9$ $x < 9$ $9 < x$ $x \geq 9$ $x \leq 9$

3. Bard is solving the inequality $-80 - 5x \leq -20$. Bard first solves the equation $-80 - 5x = -20$ and obtain $x = -12$. What is the solution to the inequality?

- **A.** $x < -12$
- **B.** $x > -12$
- **C.** $x \geq -12$
- **D.** $x \leq -12$

4. Solve each inequality. Show your solution as a graph on the number line.

a $7(x + 11) > -91$

b $-8x - 4 \geq -6$

Name: Date: Period:

5. Priya solved both inequalities below, but she mixed up her solutions. Help her by deciding if the solution to each inequality is represented by $x \leq 1\frac{1}{2}$ or $x \geq 1\frac{1}{2}$. Explain your thinking.

a $-2x - 3 \geq -6$

Solution:

Explanation:

b $-24 \geq -6(x + 2.5)$

Solution:

Explanation:

6. Solve the inequality $-3.8 > -1.2b + 2.2$.

a Solve the related equation and test values less than and greater than the solution.

b Graph the solution on the number line and write an inequality to represent the solution.

7. Compare and contrast solving an equation and solving an inequality.

Grade 7 | Unit 7

Additional Practice

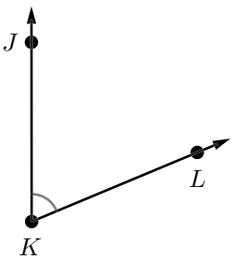
Practice Problems

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

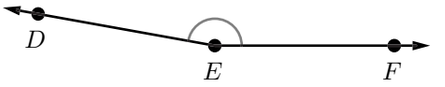
Additional Practice 7.01

1. Estimate the measure of each angle.

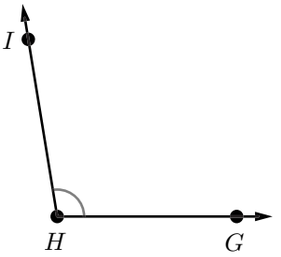
a



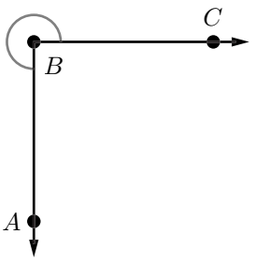
b



c



d



2. Which of the following is the *best* estimate for the measure of the angle shown?

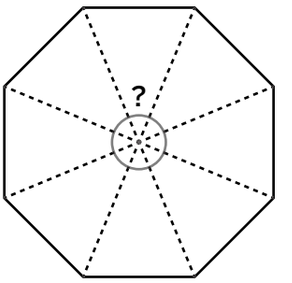
A. 15°

B. 270°

C. 300°

D. 350°

3. The figure shown illustrates a pattern created from identical isosceles triangles. Determine the measure of one of the angles. Show or explain your thinking.



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

4. Angle A measures $45°$. Can you arrange copies of angle A together to form each of the following angles? Explain your thinking.

a A straight angle.

b A right angle.

c A $360°$ angle.

5. Select the angle measure for which you could *not* arrange copies of it to form a straight angle.

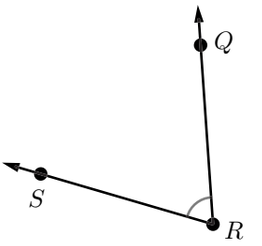
A. $15°$

B. $30°$

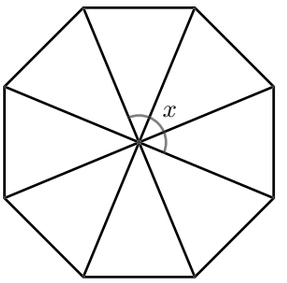
C. $40°$

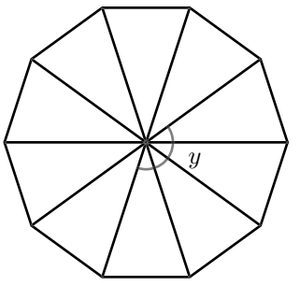
D. $90°$

6. Tyler claims that if he places four copies of angle R that are adjacent to each other around vertex R, he will form a full circle. Do you agree? Explain your thinking.



7. Which angle, x or y, has the greater measure? Explain your thinking.



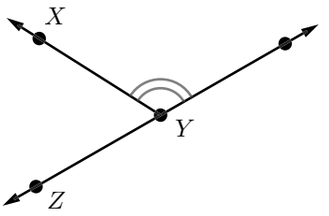


Name: ..... Date: ..... Period: .....

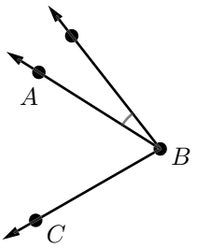
Additional Practice 7.02

1. Consider each diagram shown. For each angle specified, determine whether its adjacent angle is *complementary* or *supplementary* to it.

a $\angle XYZ$

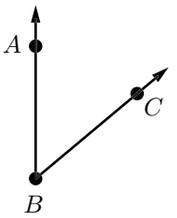


b $\angle ABC$

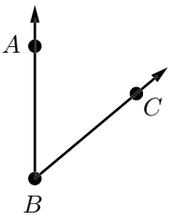


2. For each diagram, draw an angle that is:

a Complementary to $\angle ABC$.

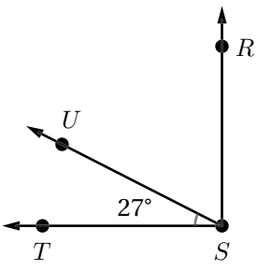


b Supplementary to $\angle ABC$.

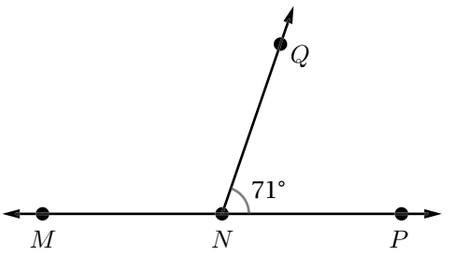


3. Determine the missing angle measure in each diagram.

a Angle RST is a right angle.
Determine the measure of $\angle RSU$.

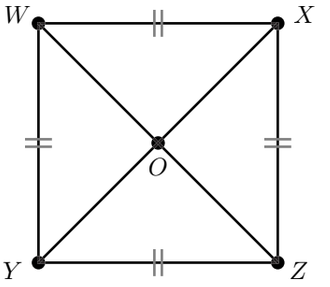


b Point N lies on line MP.
Determine the measure of $\angle MNQ$.

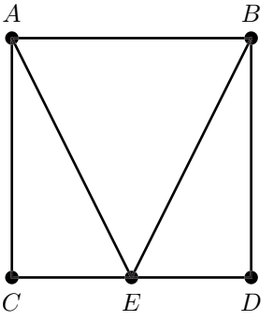


Name: ..... Date: ..... Period: .....

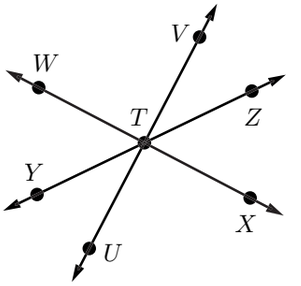
4. Refer to Square $WXZY$. Name two angles whose measures have a sum of $180°$.



5. Refer to Square $ABDC$. Name three angles whose measures have a sum of $180°$.



6. Segments WX, YZ, and UV intersect at point T. Angle VTW is a right angle. Select *all* the pairs of supplementary angles.



- ☐ **A.** $\angle VTZ$ and $\angle ZTX$
- ☐ **B.** $\angle WTV$ and VTX
- ☐ **C.** $\angle WTY$ and $\angle YTU$
- ☐ **D.** $\angle YTU$ and $\angle YTV$
- ☐ **E.** $\angle ZTX$ and $\angle VTZ$

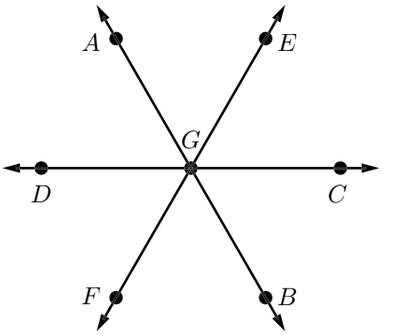
7. Angle A is supplementary to angle B. Angle C is complementary to angle B. Do you have enough information to determine which angle has the smallest measure? Explain your thinking.

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

Additional Practice 7.03

In Problems 1–6, the figures may not be drawn to scale.

1. Determine whether the pairs of angles are vertical angles. State *yes* or *no*.



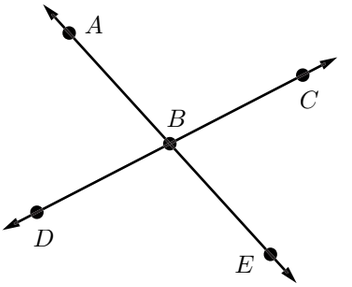
a $\angle AGE$ and $\angle FGB$

b $\angle AGD$ and $\angle AGE$

c $\angle EGC$ and $\angle CGB$

d $\angle BGC$ and $\angle AGD$

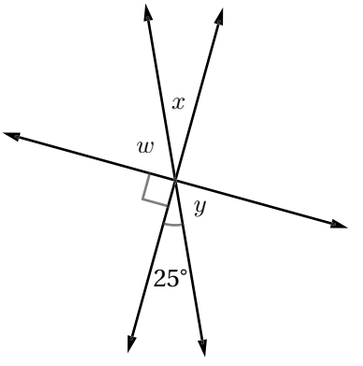
2. Lines AE and CD intersect at point B and $m\angle ABC = 105°$. Determine the measures of angles ABD and DBE.



$m\angle ABD =$ .....

$m\angle DBE =$ .....

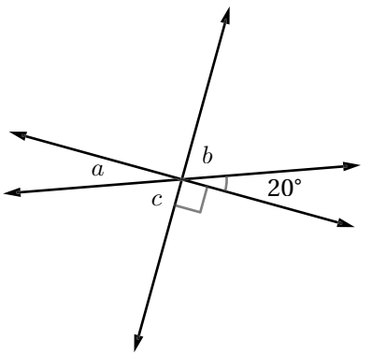
3. Select *all* the equations that represent a true relationship between the angles in the diagram shown.



- ☐ **A.** $x = 25$
- ☐ **B.** $w = 90$
- ☐ **C.** $y = 65$
- ☐ **D.** $90 + w + x = 180$
- ☐ **E.** $w + x + y = 90$

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

4. Determine whether the statements about the relationships between the angles in the figure are *true* or *false*.



a The value of a is $20°$.

b The value of a and the value of b are equal.

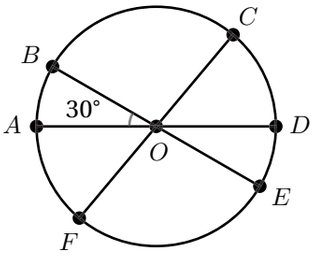
c The sum of the values of a, c, and 90 is 180.

d The sum of the values of a and c is 90.

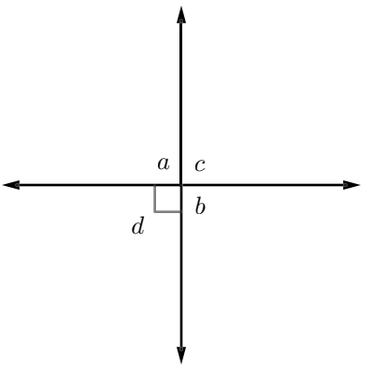
e The sum of the values of a, c, and 20 is 180.

f The sum of the values of b and c is 90.

5. Line segments AD, BE, and CF are all diameters of the circle. The measure of angle $DOF = 130°$. Determine the measure of $\angle BOC$. Explain your thinking.



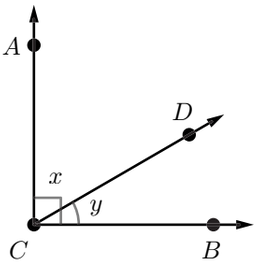
6. Mai says that angles a and b are vertical angles and complementary angles. Tyler says that angles c and d are vertical angles and supplementary angles. Who is correct? Explain your thinking.



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

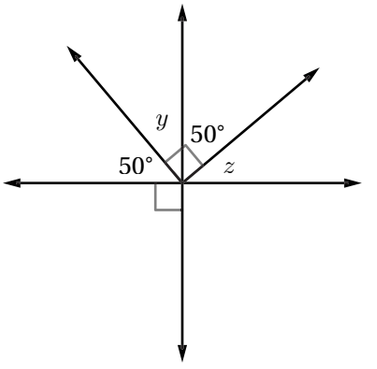
Additional Practice 7.04

1. Angle ACB is a right angle. Select *all* the equations that represent true relationships between the angles in the diagram.



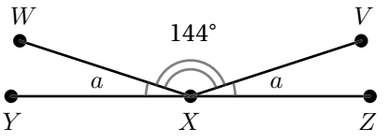
- ☐ **A.** $180 = x - y$
- ☐ **B.** $90 - y = x$
- ☐ **C.** $x - 90 = y$
- ☐ **D.** $x + y = 180$
- ☐ **E.** $x + y = 90$
- ☐ **F.** $x = y$

2. Refer to the diagram shown. Select *all* the equations that represent true relationships between the angles in the diagram.



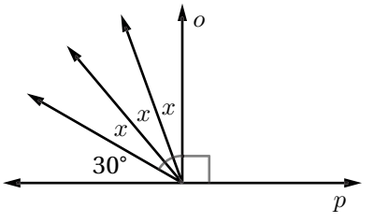
- ☐ **A.** $50 + y = 90$
- ☐ **B.** $y + z = 90$
- ☐ **C.** $z + 50 = 90$
- ☐ **D.** $180 + z = 90$
- ☐ **E.** $180 - z = 90$
- ☐ **F.** $50 + y + 50 + z = 180$

3. Segments YZ, WX, and VX intersect at point X. The measure of angle WXV is $144°$. Determine the value of a. Show or explain your thinking.

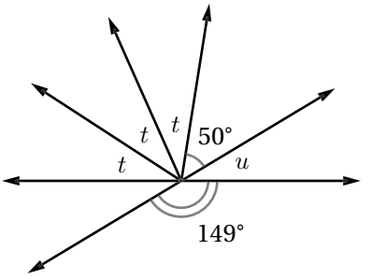


Name: ..... Date: ..... Period: .....

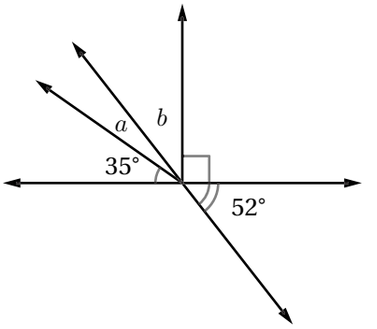
4. Ray o is perpendicular to line p in the diagram shown. Determine the value of x. Show or explain your thinking.



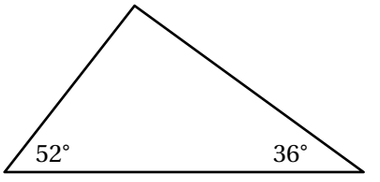
5. Refer to the diagram shown. Determine the values of t and u. Show or explain your thinking.



6. Refer to the diagram shown. Determine the values of a and b. Show or explain your thinking.



7. Consider the triangle shown. For each angle measure given, determine whether you can use this triangle to draw each of the following angles, without using a protractor. If yes, describe how you would create the angle. If no, describe why you cannot create the angle.



a 72°

b 88°

c 110°

d 144°

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

Additional Practice 7.05

1. Is it possible to form a triangle with the side lengths 4 cm, 3 cm, and 10 cm? Write *yes* or *no*.

2. A triangle has side lengths of 12 in. and 5 in. Which of the following side lengths is a possible length of the third side?

A. 13 in.

B. 2 in.

C. 30 in.

D. 32 in.

3. Diego was asked to determine all the possible values for the length of the third side of the triangle with side lengths of 6 in, 9 in., and an unknown third side length. His response is shown.

> Let x represent the length of the unknown side. The value of x can be any length that is greater than 3 in. because 6 + x > 9. It also has to be less than 15 in. because 6 + 9 > x.

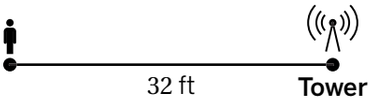
Is Diego correct? Explain your thinking.

Name: Date: Period:

4. Select *all* of the sets of three side lengths that will form a triangle.

- ☐ **A.** 7 in., 6 in., 11 in.
- ☐ **B.** 9 in., 5 in., 13 in.
- ☐ **C.** 8 in., 3 in., 12 in.
- ☐ **D.** 5 in., 5 in., 9 in.
- ☐ **E.** 5 in., 5 in., 10 in.

5. A cell phone is exactly 58 ft from the nearest cell phone tower. The phone's owner is currently standing 32 ft from the same cell phone tower. Han says the only distance the phone could be from the owner is 26 ft. Do you agree with Han? Explain your thinking.



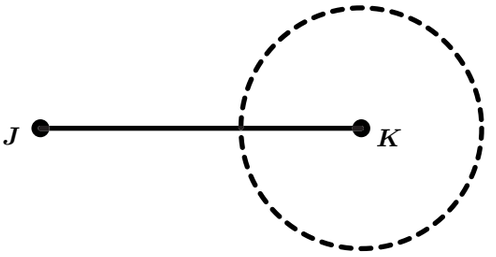
6. An isosceles triangle has one side with a length of 10 cm. If each side has a length that is a whole number, what are the possible lengths of the other two sides?

Name: Date: Period:

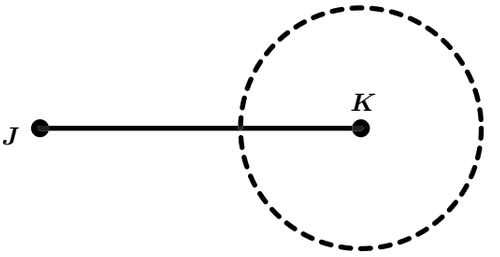
Additional Practice 7.06

1. Segment JK is 8 units long and the radius of the circle is 3 units. Draw two different triangles where one side is 8 units long and the other side is 3 units long.

Triangle 1



Triangle 2

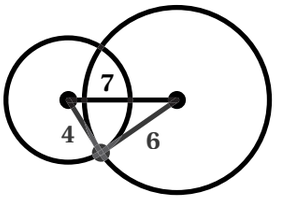


2. Daniel drew two triangles with side lengths of 4, 6, and 7 units.

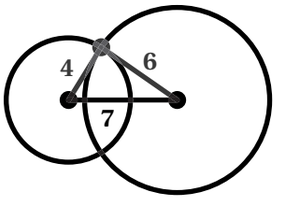
Are the triangles identical?

Explain your thinking.

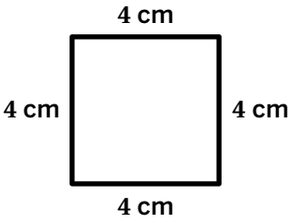
Triangle 1



Triangle 2



3. Megan was asked to draw a figure with 4 equal sides. Megan drew the figure shown.



Is the only possible figure Megan could have drawn?

If Yes, explain why. If No, provide a sketch of another figure with 4 equal sides different from Megan's.

Name: Date: Period:

4. Is it possible to form a triangle with the side lengths 4 cm, 3 cm, and 10 cm?

Circle your choice.

Yes No Need more information

Explain your thinking.

5. Noah drew two Circles A and B with the same center. One circle has a radius of 5 units and another has a radius of 8 units. Noah measures the distance between the points of Circles A and B. What are the maximum and minimum distances he can get? Draw a picture and explain your reasoning.

Problems 6–7: A box contains wood planks of several different lengths. There is one 2-foot plank, one 5-foot plank, one 6-foot plank, and one 8-foot plank.

6. What is the maximum number of different triangles that can be made using these planks as sides?

A. 1

B. 2

C. 3

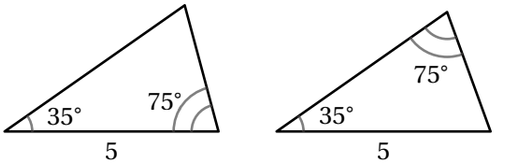
D. 4

7. Describe the lengths of the different triangles that can be made with the given planks.

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

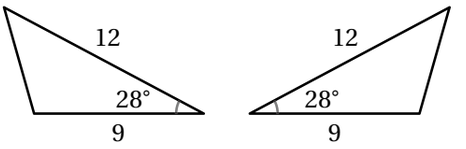
Additional Practice 7.07

1. Are these triangles identical based solely on the measurements indicated? Write *yes* or *no*.



The figures may not be drawn to scale.

2. Are these triangles identical based solely on the measurements indicated? Write *yes* or *no*.



The figures may not be drawn to scale.

3. Two triangles each have two angle measures of $60°$ and one angle measure of $20°$. Based on these measurements alone, can you guarantee these two triangles are identical? Explain your thinking.

4. Two triangles both have angles measuring $90°$ and $65°$ and both have a side of 15 units. Can you guarantee that the triangles are identical? If yes, explain your thinking. If no, provide an example.

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

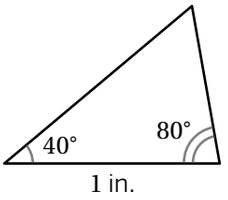
5. Priya wants to create two triangles, each with side measures of 3 units and 4 units, and an angle measuring $30°$. What other information is needed to guarantee that the triangles will be identical? Explain your thinking.

6. Which of the following measures of corresponding parts of two triangles could you use to determine whether two triangles are identical? Select *all* that apply.

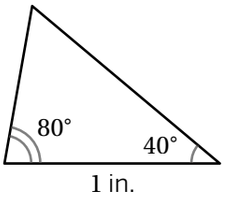
- ☐ **A.** Two angle measures
- ☐ **B.** Two sides measures
- ☐ **C.** One angle measure and one side length measure
- ☐ **D.** Two angle measures and one side length measure
- ☐ **E.** The two side length measures and one angle measure between the side lengths

7. Triangles 1 and 2 are identical and share three of the same measurements. Is it possible to draw a third triangle using the same three measurements that is not identical to the other two? Show or explain your thinking.

Triangle 1



Triangle 2



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

Additional Practice 7.08

Problems 1–2: A triangle has one 8-inch side, one 10-inch side and one 40° angle. Circle True or Need More Information for each statement about this triangle.

1.	More than one unique triangle can be made using these measurements.	True	Need More Information
2.	The triangle contains only acute angles.	True	Need More Information

Problems 3–5: For each set of three measurements, decide whether you can create zero triangles, one triangle, or more than one non-identical triangle.

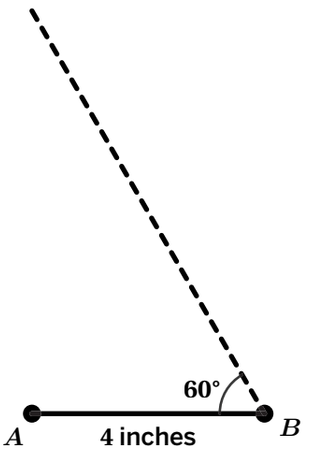
Circle your choice.

3.	One 5-centimeter side, one 7-centimeter side, and one 10-cm side.	Zero	One	More than One
4.	One 80° angle, one 60° angle, and one 50° angle.	Zero	One	More than One
5.	One 70° angle, one 12-inch side, and one 6-inch side.	Zero	One	More than One

6. A triangle has a 60° angle, a 90° angle, and a side that is 4 units long.

The 4-inch side is in between the 90° and 60° angles.

Complete the diagram and label your diagram with the given measurements.



Name: Date: Period:

Problems 7–9:

7. Write two side lengths and one angle measure so that more than one unique triangle can be created with these measurements.

8. Then, sketch a diagram of two different triangles with these measurements. Label each diagram with the given measurements.

Triangle 1	Triangle 2

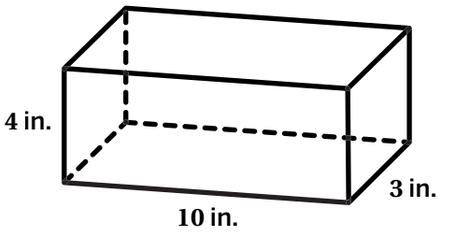
9. Change one measurement about your triangle so that only one triangle is possible. Explain or show your thinking.

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

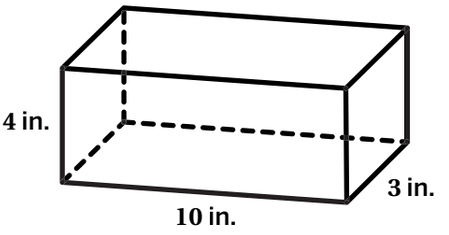
Additional Practice 7.09

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

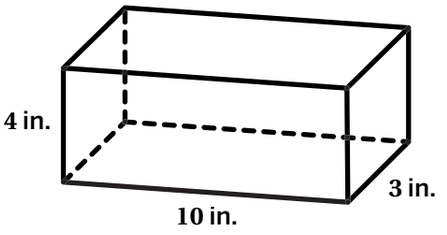
1. 3-in. by 4-in. Rectangle



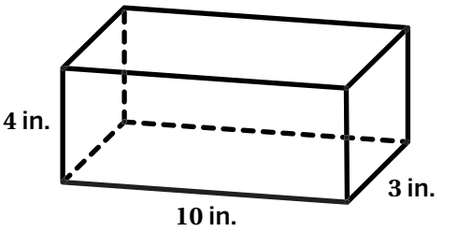
2. 4-in. by 10-in. Rectangle



3. A different rectangle than Problem 1 or 2

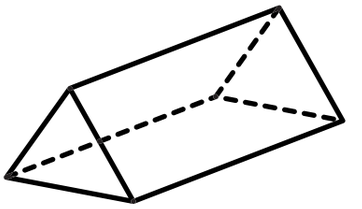


4. A triangle



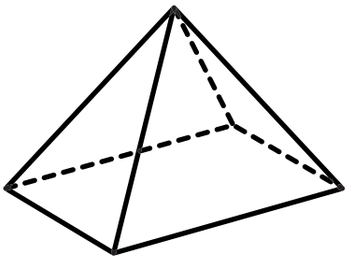
5. Select *all* of the cross sections you can make from the prism shown with a base that is an equiangular triangle.

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



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

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



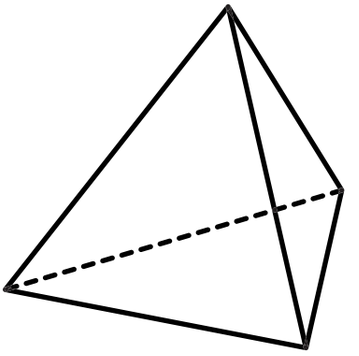
A. Slice the figure parallel to its base halfway up.

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

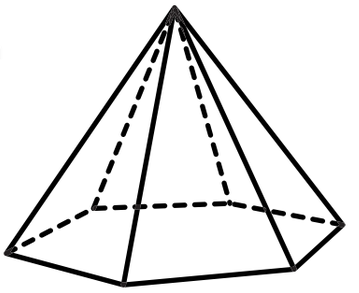
C. Slice the figure parallel to its base near the bottom.

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

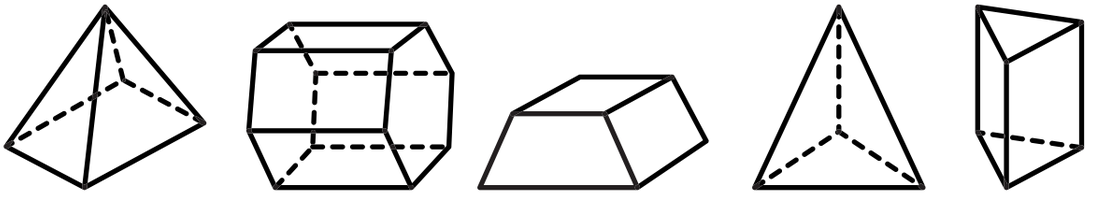
9. Vertical to the base through the top point of the pyramid.

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

Name: Date: Period:

Additional Practice 7.10

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



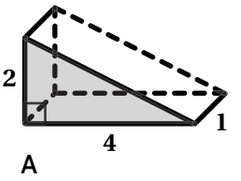
Object A Object B Object C Object D Object E

1. Circle all of the prisms.

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

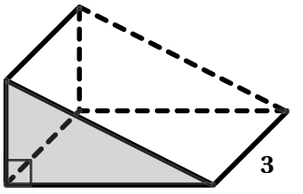
Problems 3–5: Here are three prisms with the same base.

3. Determine the volume of prism A.



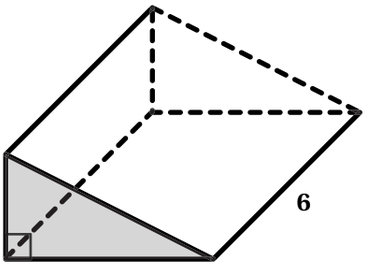
A

4. Determine the volume of prism B.



B

5. Determine the volume of prism C.



C

Name: Date: Period:

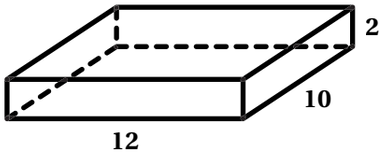
Problems 6–7: The base of a rectangular prism is a square with edges of 4 inches. The height of the prism is 6.6 inches.

6. Draw the prism and label the measurements.

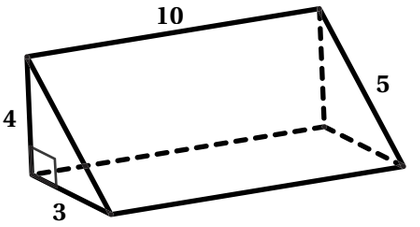
7. Calculate the volume of the prism. Show or explain your thinking.

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

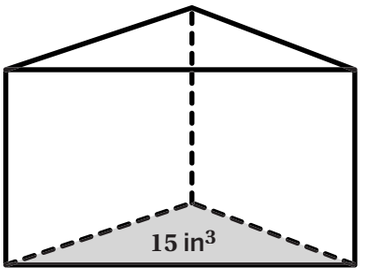
8.



9.



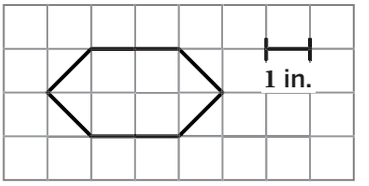
10. The volume of this prism is between 60 in^3 and 80 in^3. What are three possible heights of the prism? Show or explain your thinking.



Name: Date: Period:

Additional Practice 7.11

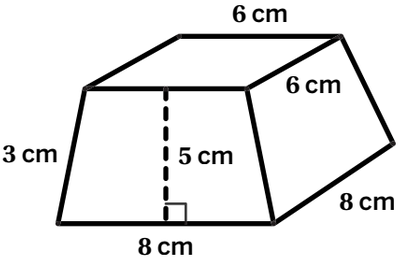
Problems 1–2: The base of a prism is shown.



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.



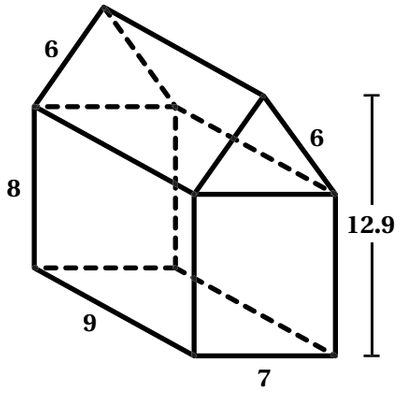
3. Identify and explain why Finnias' method is incorrect.

4. Calculate the volume of the prism.

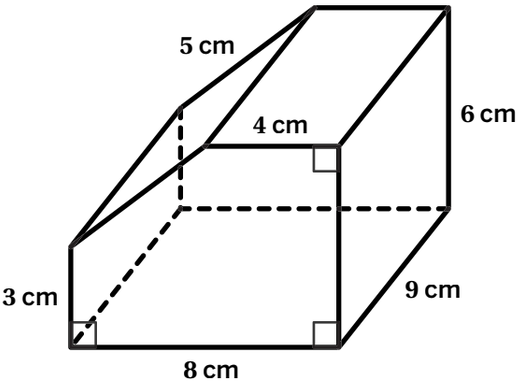
Name: ..... Date: ..... Period: .....

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

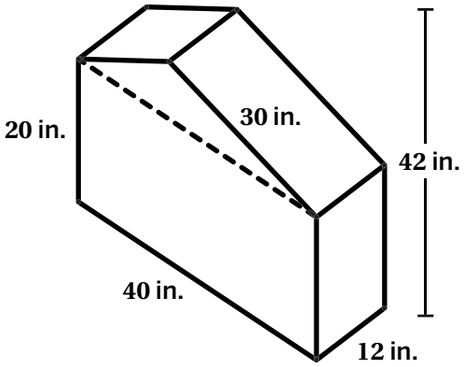
5.



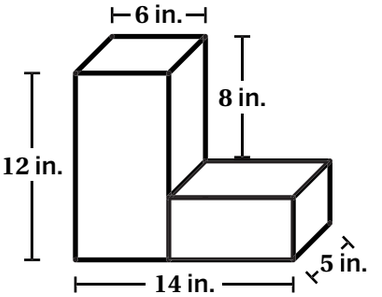
6.



7.



8.



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

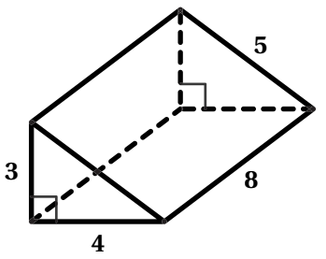
Additional Practice 7.12

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.

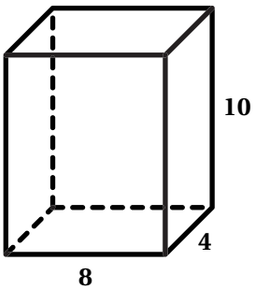
2.



Volume:

Surface Area:

3.

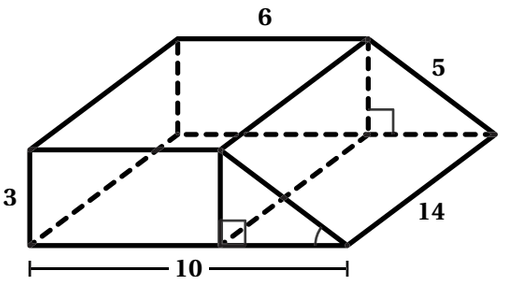


Volume:

Surface Area:

Name: Date: Period:

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:

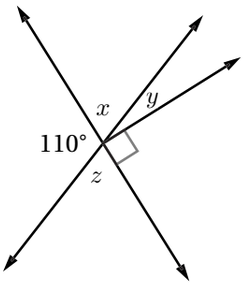
5. Determine the volume. Show your thinking.

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

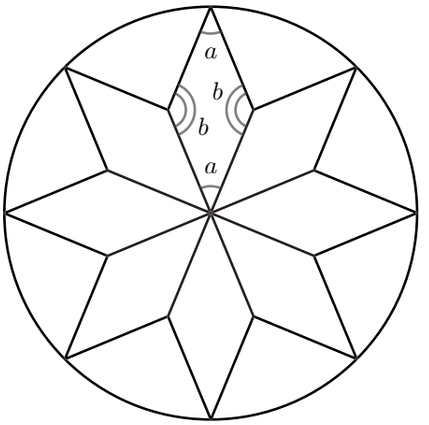
Additional Practice 7.13

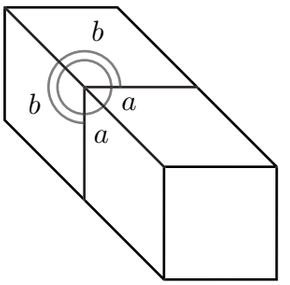
In Problems 1–4, you will apply your understanding of the skills and concepts you learned throughout this unit.

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.



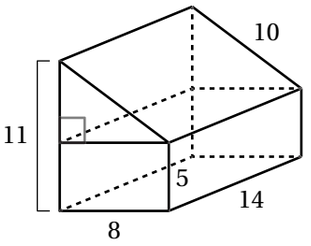


Name: ..... Date: ..... Period: .....

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.

Grade 7 | Unit 8

Additional Practice

Practice Problems

Name: Date: Period:

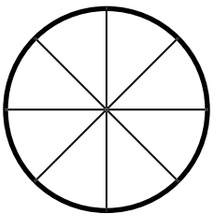
Additional Practice 8.01

Problems 1–5: Tomas has a bag of marbles. The bag contains 18 marbles. There are 8 blue, 9 yellow, and 1 green marble. Tomas selects one marble at random. Determine whether each statement is true or false.

Statement	True	False
1. It's certain that a blue, yellow, or green marble will be selected.		
2. It's impossible that a red marble will be selected.		
3. It's unlikely that a yellow marble will be selected.		
4. It's unlikely that a blue marble will be selected.		
5. It's likely that a yellow or blue marble will be selected.		

6. Label the sections on the spinner so that it has all of these likelihoods in one spin.

- Very unlikely to spin yellow (Y).
- Equally likely as not to spin red (R).
- Unlikely to spin blue (B).
- Very unlikely to spin green (G).



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

7. Fatima rolls a number cube. Write the letter that matches the likelihood of each event happening on Fatima's next roll. Each letter will be used only once.

Rolling a 2.	a. Certain
Rolling a number less than 9.	b. Equally likely as not
Rolling a number greater than 9.	c. Unlikely
Rolling an odd number.	d. Impossible

8. 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.

A. Both coins land on 6.

B. Both coins land on tails.

C. Both coins land on either heads or tails.

D. Both coins land on heads.

E. Both coins land on 3.

9. Leo wants to know how many of his classmates play an instrument. He asks his classmates in the hallway and gets the following responses:

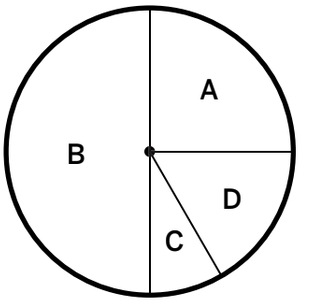
no no no no no yes no no no no no no yes

If he asks one more classmate randomly in the hallway, do you think they will say "yes" or "no"? Explain your thinking.

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

Additional Practice 8.02

Refer to the spinner for Problems 1–3.



1. Determine whether each event is *impossible*, *possible*, or *certain*.

a Landing on *A*

b Landing on *B*

c Landing on *C*

d Landing on *D*

e Landing on a number

f Landing on a letter

2. Order these events from *least likely* to *most likely*.

Landing on *A*, Landing on *B*, Landing on *C*, Landing on *D*

	Least likely
	Most likely

3. Mai spun the spinner one time and it landed on *C*. She claims that it is certain that the spinner will land on *C* on her next spin. Do you agree with Mai? Explain your thinking.

4. Andre will randomly select a letter from the word *COUCH*. Shawn will randomly select a letter from the word *CHAIR*. Which person is more likely to select the letter *C*? Explain your thinking.

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

5. Determine whether each event is *impossible*, *unlikely*, *equally likely as not*, *likely*, or *certain*.

a Selecting a white marble from a bag containing 5 red marbles and 6 black marbles.

b Selecting a vowel from the word *WORK* or from the word *MATH*.

c Rolling a 6 on a 10-sided die.

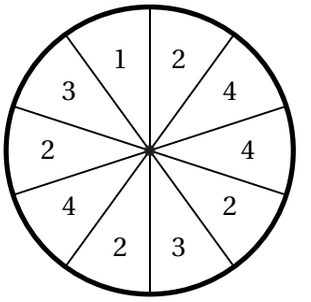
d A spinner has 6 equal-sized sections labeled 1 through 6. You spin the spinner and it lands on an even number.

e Selecting a black marble from a bag containing only black marbles.

f Selecting a consonant from the word *STUDY*.

6. A spinner has 10 equal-sized sections. Order these events from *least likely* to *most likely*.

Landing on 1, Landing on 2, Landing on 3, Landing on 4



	Least likely
	Most likely

7. A letter will randomly be selected from the word *ALGEBRA*. Describe the likelihood that the letter *A* will be chosen using the words *impossible*, *possible*, or *certain*. Explain your thinking.

8. There are 12 girls and 13 boys in Priya's homeroom class. If a student is selected at random, Priya says it will be unlikely that a girl will be selected because there are more boys in the class. Is Priya correct? Explain your thinking.

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

Additional Practice 8.03

The student council is surveying seventh grade students about what they typically do after dismissal. They surveyed students from two different schools in the district. The tables summarize the responses given by students on the survey. Use the information for Problems 1–4.

School 1

Activity	Number of students
Practice a sport	21
Play video games	9
Start homework	10
Watch a younger sibling	4
Hang out with friends	16
Other	5
Total	**65**

School 2

Activity	Number of students
Practice a sport	6
Play video games	4
Start homework	3
Watch a younger sibling	4
Hang out with friends	10
Other	3
Total	**30**

1. Suppose you randomly selected one seventh grader from the district. What is the probability that their typical after-school activity would be playing video games? Explain your thinking.

2. Suppose you randomly selected one seventh grader from the district. What is the probability that their typical after-school activity would be watching a younger sibling? Explain your thinking.

3. Suppose you randomly selected one seventh grader from each school. Which school has a greater probability that students will be hanging out with friends after school? Explain your thinking.

4. Suppose you randomly selected one seventh grader from each school. Which school has a greater probability that students will be practicing a sport after school? Explain your thinking.

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

5. A spinner has six equal sections, with one letter from the word *HONEST* in each section.

a Suppose you spin the spinner 24 times. About how many times do you expect it will land on *T*?

b Suppose you spin the spinner 72 times. About how many times do you expect it will land on something other than *T*?

6. A spinner has eight equal sections, with one letter from the word *RESEARCH* in each section.

a Suppose you spin the spinner 12 times. About how many times do you expect it will land on an *E*?

b Suppose you spin the spinner 96 times. About how many times do you expect it will land on something other than an *E*?

c Andre spun the spinner 32 times. The spinner landed on an *E* ten times. Is this greater or less than the expected probability? Explain your thinking.

7. A number cube labeled 1 through 6 is rolled once.

a What is the probability of rolling a 3?

b Han rolled the number cube 48 times. It landed on 3 four times. Is this greater or less than the expected probability? Explain your thinking.

8. Clare and Elena plan an experiment tossing a coin 60 times. Clare thinks the coin will land tails up exactly 30 times. Elena thinks the coin will land tails up close to 30 times. With whom do you agree? Explain your thinking.

Name: Date: Period:

Additional Practice 8.04

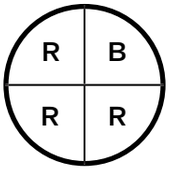
Problems 1–3: Kai flips a fair coin 300 times.

1. About how many times should Kai expect the coin to land on tails?

2. About how many times should Kai expect the coin to land on heads?

3. Kai flipped the coin 10 times so far. The coin landed on heads 10 times in a row. Is the next flip more likely to land on heads? Explain your thinking.

Problems 4–5: A spinner has four equal sections, with three sections labeled red (R) and one section labeled blue (B).

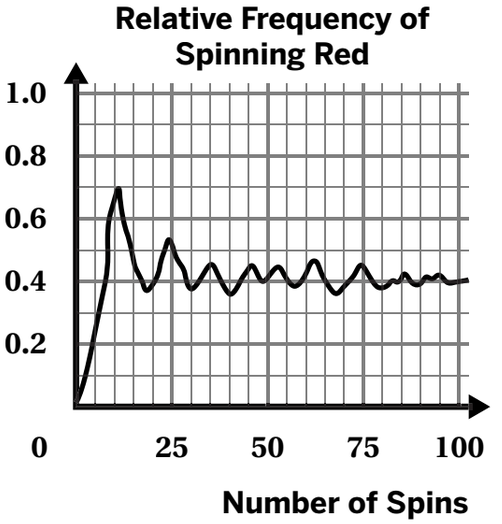


4. You spin the spinner 40 times. About how many times do you expect it will land on red (R)? Explain your thinking.

5. You spin the spinner 80 times. About how many times do you expect it will land on blue (B)? Explain your thinking.

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

Problems 6–7: A spinner is spun 125 times for a game. This graph shows the relative frequency of spinning red.



6. Based on the graph, what is the estimated probability of spinning red?

A. 0.70

B. 0.50

C. 0.45

D. 0.40

E. 0.30

Explain your thinking.

7. Based on the graph, is the estimated probability of not spinning red more likely than spinning red? Circle one.

Yes No Maybe

Explain your thinking.

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

Additional Practice 8.05

1. A survey asked students their music genre preference. The results in the table show that 30 students like pop, 15 students like country, 21 students like rap, and 9 students prefer other genres. Complete the table by finding the relative frequency for each music genre. Write each relative frequency as a decimal.

Music genre	Number of occurrences	Relative frequency
Pop	30	
Country	15	
Rap	21	
Other	9	
Total	**75**	**1**

2. The seventh-grade football team won 9 games and lost 3 games. What is the relative frequency of the games the team won? Select *all* that apply.

- ☐ **A.** $\frac{1}{3}$
- ☐ **B.** 0.25
- ☐ **C.** 33%
- ☐ **D.** 0.75
- ☐ **E.** $\frac{3}{4}$
- ☐ **F.** 25%
- ☐ **G.** 75%
- ☐ **H.** 0.33
- ☐ **I.** $\frac{1}{4}$

3. A survey asked students how they get to school. The results showed 6 students walk, 9 students ride the bus, 3 students ride in a car, and 12 students ride a bike. Determine each relative frequency and write it as a percentage.

a The relative frequency of students who walk to school.

b The relative frequency of students who ride the bus.

c The relative frequency of students who ride in a car.

d The relative frequency of students who ride a bike.

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

4. A survey asked middle school students about their favorite book series, and the results are shown on the table. What is the relative frequency of the Dragon's Land series, rounded to the nearest percent?

Book series	Frequency
Alex's Mysteries	28
The Soldier's Apprentice	36
The Land of Games	16
Dragon's Land	42

A. 30%

B. 34%

C. 23%

D. 36%

5. Refer to this quote by Dr. Martin Luther King, Jr.
Injustice anywhere is a threat to justice everywhere.

a Determine the relative frequency of the letter *E* occuring. Write the relative frequency as a fraction in simplest form.

b Determine the relative frequency of the letter *T* occuring. Write the relative frequency as a fraction in simplest form.

6. Refer to this quote by the 35th U.S. President, John F. Kennedy.
Ask not what your country can do for you, but what you can do for your country.

Complete the table to show the number of occurrences and relative frequency for a few of the letters from the quote. Write each relative frequency as a fraction.

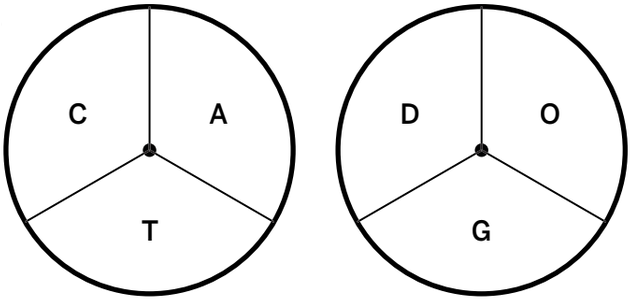
Letter	Number of occurrences	Relative frequency
N		
C		
U		
O		

7. Using the quote and table from Problem 6, identify two letters that have the same relative frequency, one of which is a letter from the table. Explain your thinking.

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

Additional Practice 8.06

1. Shawn spins the two fair spinners shown.



a List *all* of the possible outcomes.

b How many different possible outcomes are in the sample space?

2. Priya tosses a dime, rolls a standard number cube, and then tosses a penny. Use the table to list all of the possible outcomes.
Note: Use *H* for heads and *T* for tails.

3. Refer to the tables shown. For each event, use any method to determine the sample space. Then determine the number of outcomes.

a Andre selects one type of milk and one type of cereal to make breakfast.

Milk	Cereal
dairy soy	granola oatmeal rice squares

b Andre selects one type of base, one type of protein, and one type of vegetable to make a lunch bowl.

Base	Protein	Vegetable
rice lettuce	chicken beans	tomatoes corn

4. Clare rolls a standard number cube and spins a spinner with the letters *G*, *O*, *E*, and *S* on it. She claims there are 10 possible outcomes. Is Clare correct? Explain your thinking.

Name: Date: Period:

Refer to the following information for Problems 5–8.

A breakfast diner makes omelettes with one type of egg, one protein, one type of cheese, and one vegetable. Customers can choose from the options shown in the table.

Eggs	Proteins	Cheese	Vegetables
whole eggs egg whites	bacon sausage tofu	American Mozzarella none	onions peppers mushrooms tomatoes

5. How many different omelettes are possible, assuming customers must choose one type of egg, one protein, one type of cheese, and one vegetable? Show or explain your thinking.

6. How many different omelettes include whole eggs, sausage or bacon, and onions? Show or explain your thinking.

7. Tyler wants an omelette that has egg whites and tomatoes. He does not have a preference for a protein or cheese. How many different omelettes could Tyler choose? Show or explain your thinking.

8. Suppose an omelette is made by randomly choosing each of the options. What is the ratio of the number of omelettes that Tyler could choose to the total number of possible omelettes? Show or explain your thinking.

Name: Date: Period:

Additional Practice 8.07

1. A school district reports that 50% of students in the district ride the bus to school. In the table, an even number represents a student who rides the bus, and an odd number represents a student who does not ride the bus. Consider 0 an even number for this simulation. The digits in each cell represent 6 randomly selected students.

312569	983454	509364	234577	983465
315467	444828	014559	235538	402080
375206	926739	816353	482544	565914
248931	127324	678358	864533	294584

a Based on the top-left cell in the table, what is the probability of students riding the bus?

b Based on this simulation, what is the probability that at least 4 out of 6 randomly selected students ride the bus to school?

c Based on this simulation, what is the probability that fewer than 3 out of 6 randomly selected students ride the bus?

2. The weather forecast stated that there is a 40% chance of rain tomorrow. Which simulation can be used to find the indicated probability?

A. A spinner divided into 2 equal-sized sections is spun 40 times.

B. A spinner divided into 4 equal-sized sections is spun 1 time.

C. A spinner divided into 5 equal-sized sections is spun 1 time.

D. A spinner divided into 8 equal-sized sections is spun 40 times.

3. Over the last three basketball games, Andre has made 16 free throws and has missed 8 free throws. Which simulation can be used to find the probability of Andre missing the next free throw?

A. A bag of 6 marbles, with 3 marbles representing the made free throws and 3 marbles representing the missed free throws.

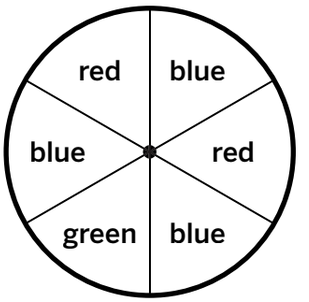
B. A number cube with 1 and 2 representing the made free throws and 4, 5, and 6 representing the missed free throws.

C. A coin with heads representing the made free throws and tails representing the missed free throws.

D. A spinner divided into 3 equal-sized parts, with two parts representing the made free throws and one part representing the missed free throws.

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

4. A spinner is divided into 6 equal-sized sections. What is the probability that the spinner will *not* land on red on the first spin and *will* land on red on the second spin?



A. $\frac{1}{8}$

B. $\frac{2}{9}$

C. $\frac{2}{3}$

D. 1

Shawn rolled 2 number cubes 50 times and recorded the results in the table shown. Refer to the table for Problems 5–7.

3, 1	4, 6	1, 6	1, 3	4, 4	6, 1	1, 6	4, 3	4, 5	5, 2
3, 5	1, 2	6, 1	5, 3	1, 4	5, 1	6, 5	3, 4	6, 6	3, 4
4, 3	5, 4	4, 2	6, 1	6, 4	4, 3	2, 1	4, 5	6, 3	6, 6
5, 5	1, 3	1, 5	4, 4	2, 1	2, 3	5, 6	4, 4	4, 4	6, 5
6, 4	4, 1	6, 2	3, 2	3, 5	2, 3	3, 4	1, 4	5, 1	2, 2

5. Based on this simulation, determine the probability of:

a Rolling doubles.

b Rolling an even number and an odd number (in any order).

c Rolling two even numbers.

6. The theoretical probability of rolling two odd numbers is $\frac{1}{4}$. Is the experimental probability greater or less than the theoretical probability? Explain your thinking.

7. The theoretical probability of rolling a sum of 7 is $\frac{1}{6}$. Is the experimental probability greater or less than the theoretical probability? Explain your thinking.

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

Additional Practice 8.08

1. Mai surveyed students in her class about their homework. Eight students had homework last night, and four students did not have homework last night. Mai used this data to design a spinner with 6 equal-sized sections that predicts whether a randomly selected student had homework last night. How many sections of Mai's spinner represent students who did not have homework?

A. 2 **B.** 4 **C.** 6 **D.** 8

2. A restaurant owner found that 80% of her customers return to the restaurant within one month. She wants to simulate the habits of her customers to help her predict the probability that three of the next four customers to visit her restaurant will return within one month. Which simulation can be used to find the indicated probability?

A. A spinner divided into 2 equal-sized sections, spun 4 times.

B. A spinner divided into 2 equal-sized sections, spun 3 times.

C. A spinner divided into 5 equal-sized sections, spun 4 times.

D. A spinner divided into 5 equal-sized sections, spun 3 times.

3. 12 of the 20 students in Lin's class are girls. Each month, Lin's teacher randomly selects a student to be an assistant. Which simulation can be used to find the probability that a girl will be chosen for August, September, October, and December?

A. A bag of 15 marbles, with 9 marbles representing the girls, has a marble drawn 4 times with replacement.

B. A number cube, with odd numbers representing girls, is rolled 12 times.

C. A coin, with heads representing girls, is tossed 4 times.

D. A spinner, divided into 4 equal-sized sections with three of the sections representing girls, is spun 12 times.

4. 15 of the last 20 winners of the school spelling bee have been seventh graders. Noah placed 3 yellow marbles and 1 red marble into a bag to create a simulation to predict whether future spelling bee winners will be seventh graders. According to Noah's model, what is the probability that the next 4 winners will be seventh graders?

A. $\frac{3}{4}$ **B.** $\frac{9}{16}$ **C.** $\frac{27}{64}$ **D.** $\frac{81}{256}$

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

5. The students at a local middle school are divided into four homerooms. A new student will be randomly assigned to one of the homerooms. Which methods can be used to simulate this scenario? Select *all* that apply.

- ☐ **A.** Spin a spinner with 8 equal-sized sections with 2 sections assigned to each homeroom.
- ☐ **B.** Roll a number cube with 1 representing Homeroom 1, 2 representing Homeroom 2, 3 representing Homeroom 3, and 4, 5, and 6 representing Homeroom 4.
- ☐ **C.** Draw a marble from a bag containing 3 white marbles, 3 blue marbles, 3 yellow marbles, and 3 green marbles, with each color representing a different homeroom.
- ☐ **D.** Toss a coin with heads representing Homerooms 1–3, and tails representing the Homeroom 4.

6. Priya's family cat just had two kittens. Priya wants to know the probability of a cat having two kittens in which one is male and one is female. To estimate the probability, Priya designed and conducted a simulation using a coin toss. She let heads represent a female kitten and tails represent a male kitten. Her results are shown on the table.

Trial (toss)	1	2	3	4	5	6	7	8	9	10
Results	HH	HT	TT	HT	HT	TT	HH	HH	TT	HT

a How many trials did Priya conduct?

b Based on this simulation, estimate the probability that a cat having two kittens will have one male and one female.

c Based on this simulation, estimate the probability that a cat having two kittens will have two females.

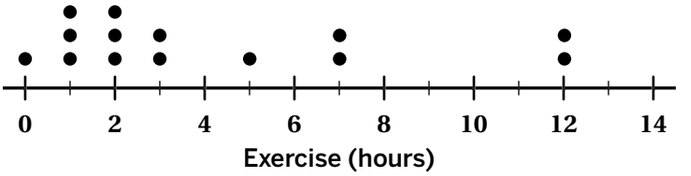
d Based on this simulation, estimate the probability that a cat having two kittens will have two males.

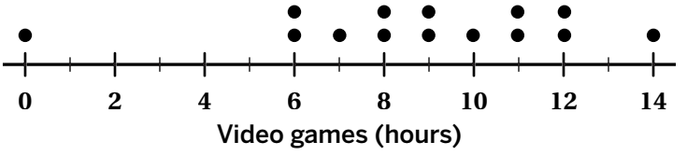
7. A class quiz has 6 multiple choice questions, and each question has 4 possible answers. Shawn and Tyler want to simulate the score of a student who guessed randomly on each question. Shawn claims it would be best to simulate this scenario with a spinner divided into 6 equal-sized sections. Tyler claims it would be best to simulate this scenario with a spinner divided into 4 equal-sized sections. Who is correct? Explain your thinking.

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

Additional Practice 8.09

The dot plots show how many hours a group of middle schoolers exercise in a week and how many hours they play video games in a week. Refer to the dot plots shown for Problems 1–4.





1. The mean describes a typical data value.

a Determine the mean number of hours middle schoolers exercise in a week. Round to the nearest hundredth.

b Determine the mean number of hours students play video games in a week. Round to the nearest hundredth.

2. The MAD describes the spread of the data.

a Determine the MAD for the number of hours of exercise per week. Round to the nearest hundredth.

b Determine the MAD for the number of hours playing video games per week. Round to the nearest hundredth.

3. Express the difference in means as a multiple of the larger MAD. Round to the nearest hundredth.

4. Using the mean and MAD, compare the data sets. Are the data sets very different from each other? Explain your thinking.

Name: Date: Period:

This data table shows scores on 8 tests for four different students. Use this data for Problems 5–8.

Diego	89, 90, 95, 72, 83, 100, 94, 81
Elena	87, 62, 79, 74, 92, 81, 80, 85
Han	92, 84, 100, 86, 95, 79, 85, 91
Jada	100, 94, 98, 88, 95, 90, 86, 93

5. Determine the mean test score for each student.

a Diego

b Elena

c Han

d Jada

6. Determine the MAD of the test scores for each student.

a Diego

b Elena

c Han

d Jada

7. The students' teacher said she will drop their lowest test score. Which student does this help the most? Explain your thinking.

8. The students have one more test to take. If any of the students score 100 on the next test, will their letter grade improve? Explain your thinking. (Assume an *A* represents scores from 90–100, a *B* represents scores from 80–89, and a *C* represents scores from 70–79.)

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

Additional Practice 8.10

1. Identify each statement as *true* or *false*. Explain your thinking.

a When information is being gathered about a group, the entire group is called the sample.

b Samples from the same population will vary from sample to sample.

c Different random samples of the same size and from the same population will be the same.

2. The student council at a local middle school surveyed a random sample of 100 students to see how they felt about the lunch offerings. Identify the population and sample in this scenario.

A. The population represents all of the seventh graders at the middle school. The sample represents the students surveyed.

B. The population represents all of the students surveyed. The sample represents all of the students at the school.

C. The population represents all of the students at the school. The sample represents the students surveyed.

D. The population represents all of the students at the school. The sample represents all of the seventh graders.

A bakery makes hundreds of muffins each day, including bran, blueberry, and cinnamon, as well as several other kinds. They are curious which muffin tastes the best to their customers. Consider this scenario for Problems 3–4.

3. Which statement best describes the population?

A. The population represents all of the bakers at the bakery.

B. The population represents all of the muffins that are made at the bakery.

C. The population represents all of the bran, blueberry, and cinnamon muffins.

D. The population represents one kind of muffin made at the bakery.

4. Which statement *best* describes the sample?

A. The sample represents all of the muffins made at the bakery.

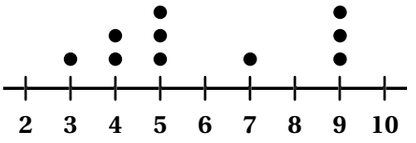
B. The sample represents one bran muffin, one blueberry muffin, and one cinnamon muffin.

C. The sample represents all of the customers that come into the bakery on one day.

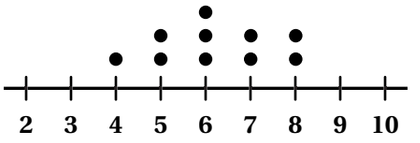
D. The sample represents randomly selected batches of muffins.

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

A random selection of students counted the number of letters in their first and last name. The results are shown in the following dot plots. Refer to the dot plots for Problems 5–6.



Number of letters in first name



Number of letters in last name

5. Calculate the mean and the mean absolute deviation (MAD) of each data set. Record the results in the table.

6. Which mean is greater, and by how much? Explain what the difference in the means tells you about the data.

	Mean	MAD
Letters in first name		
Letters in last name		

A random selection of students from two different grades reported their height, in inches. The results are shown in the table. Refer to the table for Problems 7–8.

Seventh graders	Eighth graders
59, 58, 58, 60, 64, 58	63, 68, 64, 61, 65, 62

7. Calculate the mean and the mean absolute deviation (MAD) of each data set. Record the results in the table.

8. Which mean is greater, and by how much? Explain what the difference in the means tells you about the data.

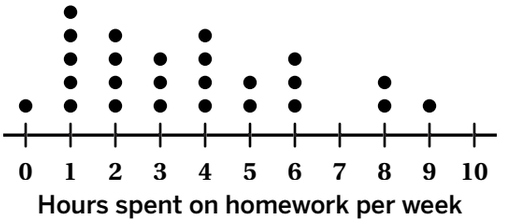
	Mean	MAD
Seventh graders		
Eighth graders		

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

Additional Practice 8.11

1. Lin's school had a fundraiser where about 60% of students paid $\$1$ to wear a hat all day at school. Lin selects a representative sample of 45 students and determines the sample's percentage of the students who paid $\$1$. Lin's sample showed that 80% of students paid $\$1$. Is this a good sample? Explain your thinking.

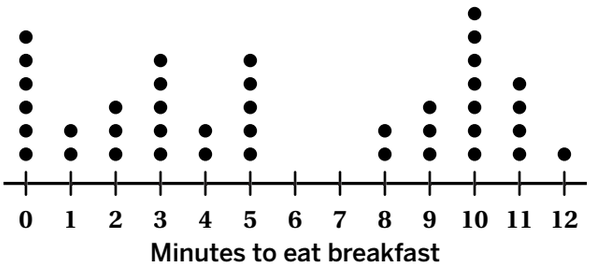
2. Tyler was asked how many hours students at his school spend on homework each week. The sample shown consists of 25 students and is representative of the population.



Because this sample is representative of the population, what might a dot plot for the entire population look like? Select *all* that apply.

- ☐ **A.** The center will be around 4.5.
- ☐ **B.** Very few data values will be below 8.
- ☐ **C.** The population will have more data on the left.
- ☐ **D.** The range will be from 0 to 9.

3. Shawn was asked how long it takes students at school to eat breakfast. The sample shown consists of 40 students and is representative of the population. Because this sample is representative of the population, complete these sentences to describe what a dot plot for the entire population would look like.

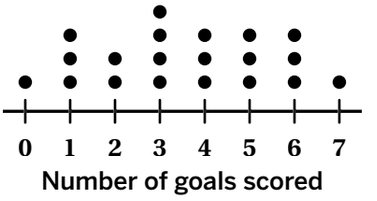


a The range will be from ..... to .....

b The center will be around ..... (Round to the nearest tenth.)

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

Priya surveyed soccer players to see how many goals they scored during their most recent soccer season. The results of the survey are shown in the dot plot. Refer to the dot plot for Problems 4–5.

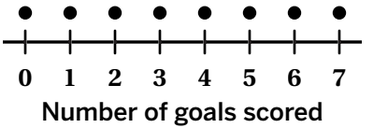


4. Calculate the mean and MAD for this data set.

a Mean .....

b MAD .....

5. Priya chose the sample shown to represent the number of goals scored. Priya thinks this dot plot shows a sample that is representative of the population. Do you agree with Priya? Explain your thinking.



Consider the following for Problems 6–8. There are 24 students in Tyler's math class. The average test score on the last test was 91.

6. Mai scored 100 on the test, and Noah scored 98. Are their scores representative of the 24 students? Show or explain your thinking.

7. Diego scored 81 on the test, Clare scored 94 on the test, and Tyler scored 98 on the test. Are their scores representative of the 24 students? Show or explain your thinking.

8. Andre scored 90 on the test, Elena scored 88 on the test, Han scored 90 on the test, and Jada scored 92 on the test. Are their scores representative of the 24 students? Show or explain your thinking.

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

Additional Practice 8.12

1. Diego surveyed a random sample of 20 students, and asked them whether they prefer math or science. Twelve students said they preferred math. Clare did not think Diego's estimate was very accurate, so she surveyed a random sample of 80 students, and 42 said they preferred math.

a Based on Diego's sample, estimate what fraction of the students preferred math.

b Based on Clare's sample, estimate what fraction of the students preferred math.

c Whose estimate is more likely to be accurate? Explain your thinking.

Andre and Elena surveyed a random sample of 24 students at each of their schools, asking each student how many people are in their household. Refer to the tables for Problems 2–4.

Andre's sample

6	2	6	8	2	3
4	3	3	7	3	6
6	4	5	4	5	4
5	8	5	4	4	4

Elena's sample

4	4	3	6	4	6
4	4	5	6	2	4
3	6	4	3	5	2
5	2	8	4	5	4

2. For each sample, what fraction of the students have 4 people in their household?

a Andre's sample:

b Elena's sample:

3. There are $1{,}050$ students at Andre's school. Estimate the number of students at Andre's school who have the following number of people in their household.

a 3 people in their household.

b 4 people in their household.

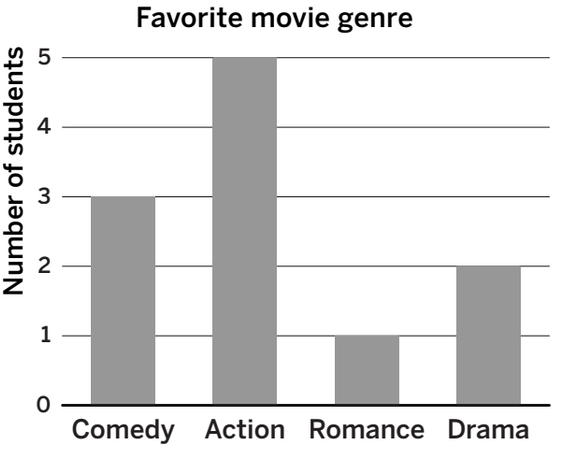
4. There are 975 students at Elena's school. Estimate the number of students at Elena's school who have the following number of people in their household.

a 6 people in their household.

b 4 people in their household.

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

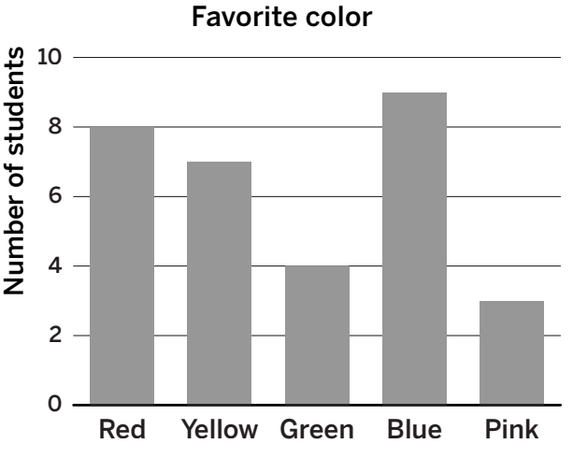
There are 978 students at Han's school. Han surveyed a random sample of students about their favorite movie genre. The bar graph shows the results. Refer to the bar graph for Problems 5–6.



5. Estimate the total number of students in the school who would choose action as their favorite movie genre.

6. Estimate the total number of students in the school who would choose romance or drama as their favorite movie genre.

There are 868 students at Shawn's school. Shawn surveyed a random sample of students about their favorite color. The bar graph shows the results. Refer to the bar graph for Problems 7–8.



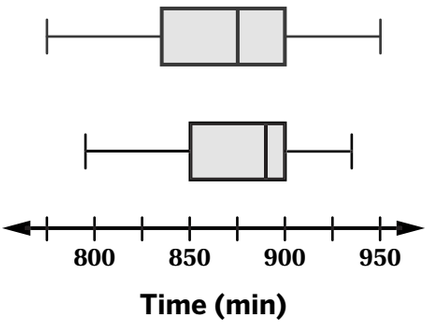
7. Shawn estimates that 196 students would choose yellow as their favorite color. Do you think Shawn's estimate is likely to be accurate? Explain your thinking.

8. Shawn estimates that 504 students would choose red or blue as their favorite color. Do you think Shawn's estimate is likely to be accurate? Explain your thinking.

Name: Date: Period:

Additional Practice 8.13

Problems 1–3: Priya wants to know how long it takes readers to finish reading a novel from her book club. She surveys two random samples of 30 readers and asks how long it took each of them to finish reading the novel.



1. What is the median of each random sample?

A. 875 minutes and 890 minutes

B. 750 minutes and 790 minutes

C. 950 minutes and 925 minutes

D. 825 minutes and 925 minutes

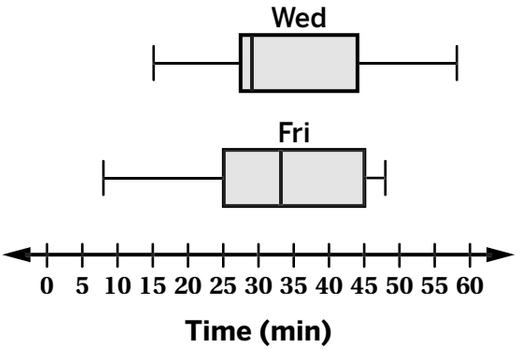
2. Estimate the median time it takes a reader to finish the novel.

3. How close do you think your estimate is to the actual median time? Explain your thinking.

Name: Date: Period:

Problems 4–5: Juniper is curious about how long it takes for students to walk to school. On Wednesday, Juniper surveyed random samples of students who walked to school. She repeated this on Friday.

Time to Get to School: Walking



4. What is the estimated IQR of the time it took to walk to school on Friday?

A. 30 minutes

B. 27 minutes

C. 17 minutes

D. 10 minutes

5. Do the random samples from Wednesday and Friday have similar IQRs? Explain your thinking.

6. How confident should Juniper be about her predictions about the amount of time it takes students to walk to school? Circle one.

More confident Less confident

Explain your thinking.

Name: Date: Period:

Additional Practice 8.14

Problems 1–3: Clare loves to read. This data shows the number of pages Clare read each week during her winter and spring breaks.

Winter				
260	200	250	240	290
200	190	190	250	300
MAD 33.6				

Spring				
200	260	250	240	280
190	210	200	250	260
MAD 27.2				

1. Determine the mean number of pages that Clare read during her winter and spring breaks.

2. Calculate how many MADs apart the means are. Use the larger MAD in your calculation.

3. Based on this data, did Clare read more pages during her winter break or her summer break? Explain your thinking.

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

Problems 4–5: Han compared the time that students and teachers spent driving to school each day over a week period. He took a random sample of 20 students and 20 teachers. She collected the data and placed his results in the table.

	Mean (min)	MAD (min)
Students	22.7	8.3
Teachers	34.5	7.4

4. How many MADs apart are the means? Use the larger MAD in your calculation.

A. 1.42 MADs

B. 1.59 MADs

C. 6.89 MADs

D. 7.73 MADs

5. Is there a big difference between the students' data and the teachers' data? Circle one.

Yes No Maybe

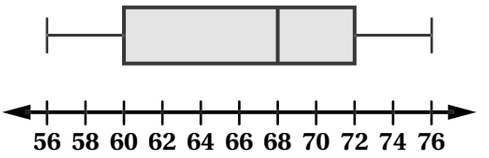
Explain your thinking.

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

Additional Practice 8.15

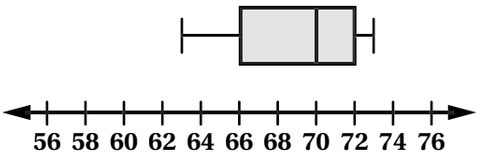
Problems 1-3: These two box plots show the heights, in inches, of randomly selected athletes from two different high schools.

Athletes at High School A



Heights, in inches

Athletes at High School B



Heights, in inches

1. Based on the data, are athletes at High School A taller or shorter than athletes at High School B? Use data to support your answer.

2. For which high school do you think it would be easier to predict the height of an athlete? Use data to support your answer.

3. What other information would it be helpful to know about the athletes in this data?

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

Problems 4-7: Here is a random sample of recent math test scores from Ms. Halley's Period 1 and Period 5 classes.

Results of Math Test (%)

Period 1	86	76	67	98	95	87	40	76	35	80
Period 4	73	59	62	67	78	80	85	77	73	74

4. Why is it easier to use a random sample to compare the results of the math test of these two classes?

5. What is one strategy that can be used to make sure the samples of test scores are chosen randomly?

6. Based on the data, which class performed better on the test? Use statistics to support your answer.

7. Based on the data, which class performed more consistently on the test? Use statistics to support your answer.