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

Additional Practice 2.04

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

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

a What is the constant of proportionality?

2.50

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

$c = 2.50w$

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

Time (seconds)	Distance (meters)
15	
60	
x	

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

52.5

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

210

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

$3.5x$

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.

British pounds, x	Egyptian pounds, y
100	2,148
250	5,370
4.66	100

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.

$y = 21.48x$

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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.

Pineapple juice (oz)	Frozen lemonade (oz)
48	6
16	**2**
12	**$1\frac{1}{2}$**
4	**$\frac{1}{2}$**

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

$p = 8f$

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?

$9.98

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

$y = 9.98x$

c Use your equation to complete the table.

Weight (lb)	0.33	**0.68**	1.82	**2.70**
Price ($)	**3.29**	6.75	**18.16**	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

Andre; Sample response: If you multiply each value of x in the table by $\frac{2}{3}$, the result is its corresponding value of y.

Name: Date: Period:

Additional Practice 2.04

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a. What is the constant of proportionality?

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

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

52.5

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

210

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

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Time (seconds)	Distance (meters)
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x	

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Practice Problem Analysis

Problem	DOK	Standard(s)
1	1	7.RP.A.2.C
2	1	7.RP.A.2.C
3	2	7.RP.A.2.C
4	2	7.RP.A.2.C
5	3	7.RP.A.2.C
6	3	7.RP.A.2.C

Notes:

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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.

The ratio of 8:12 is equivalent to 2:3, or 1:1.5. So, one tomato can be used in 1.5 bowls of salad.

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.

$y = 1.5x$

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

$y = 1.5(24) = 36$ **bowls of salad**

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?

One foot of copper wire costs $1.27.

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

$c = 1.27(50) = \$63.50$

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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	448
Houston to San Antonio	2.3	197.4	448
San Antonio to Phoenix	2.2	980	448

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.

$d = 448t$

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?

$3\frac{1}{10} \div \frac{3}{5} = \frac{31}{10} \cdot \frac{5}{3} = \frac{31}{6}$, or $5\frac{1}{6}$ hours or 5 hours and 10 minutes.

Name: Date: Period:

Additional Practice 2.05

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

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Practice Problem Analysis

Problem	DOK	Standard(s)
1	1	7.RP.A.2.C
2	2	7.RP.A.
3	2	7.RP.A.2.C
4	1	7.RP.A.2.C
5	1	7.RP.A.2.B
6	1	7.RP.A.2.C
7	2	7.RP.A.2.B
8	1	7.RP.A.2.C
9	1	7.RP.A.2.B

Notes:

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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

Proportional; Sample response: All the ratios representing the relationship between cost and weight of cherries are equivalent. They all are equivalent to $\frac{1}{4.99}$.

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

Kiran: nonproportional; Lin: proportional; Mai: nonproportional. The constant of proportionality in Lin's table is 23.

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.

Proportional; Sample response: The ratios are all equivalent. There is a constant of proportionality of 110.

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

$22,000

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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

No; Sample response: The ratios in the table are not equivalent. $\frac{2}{1}$ and $\frac{4}{2}$ are equivalent but $\frac{8}{3}$ and $\frac{16}{4}$ are not.

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?

Nonproportional; proportional.

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

Fruit B; Fruit A; Sample response: The ratios of price to number of Fruit B are all equivalent and the ratios of the price to the total weight of Fruit A are all equivalent. Fruit B is $0.50 for each fruit and Fruit A is $0.10 per ounce.

Name: Date: Period:

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3	69
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5	115

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Days	Pages Read
1	20
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20	8
100	40

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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?

Nonproportional; proportional.

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

Fruit B; Fruit A; Sample response: The ratios of price to number of Fruit B are all equivalent and the ratios of the price to the total weight of Fruit A are all equivalent. Fruit B is $0.50 for each fruit and Fruit A is $0.10 per ounce.

Practice Problem Analysis

Problem	DOK	Standard(s)
1	1	7.RP.A.2.A
2	1	7.RP.A.2.A, 7.RP.A.2.B
3	2	7.RP.A.2.A
4	2	7.RP.A.2.A, 7.RP.A.2.B
5	2	7.RP.A.2.A
6	3	7.RP.A.2.A

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

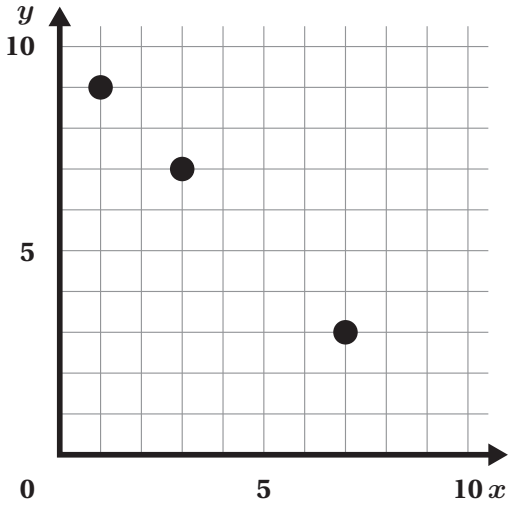
Additional Practice 2.08

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.

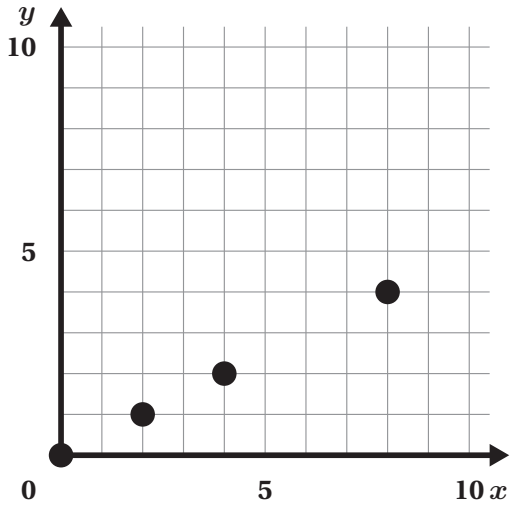
Problems 2–5: Determine if each graph or table represents a proportional relationship. Explain your thinking.

2.



This is not a proportional relationship because it doesn't pass through the origin.

3.



This is a proportional relationship because it increases at a constant ratio and passes through the origin.

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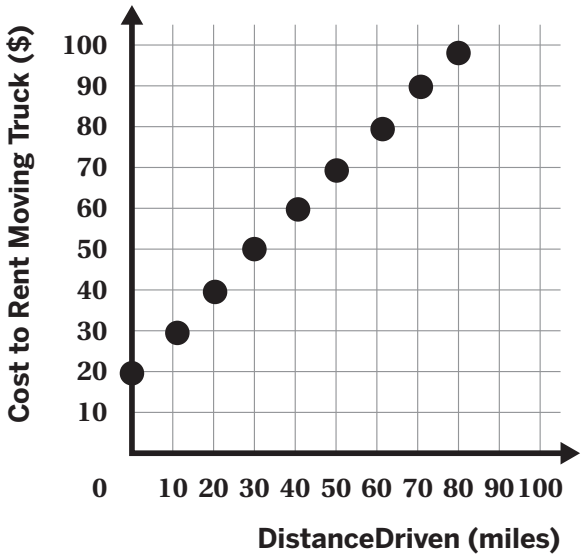
Name: ..... Date: ..... Period: .....

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.

Although this relationship is increasing at a constant rate, the line doesn't pass through the origin.



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

x	0	2	4	6
y	0	6	12	18

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.

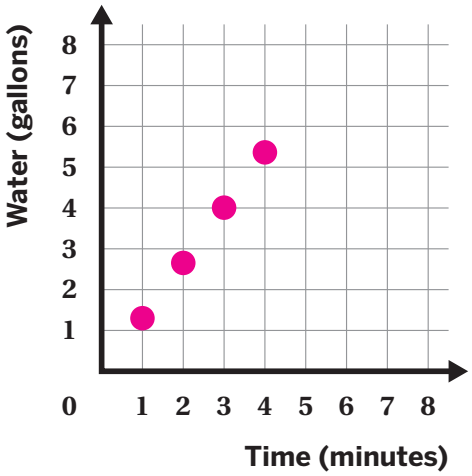
Explanations vary. $\$75$. She earned $\frac{50}{4}$ or $\$12.50$ per lawn. If we multiply 12.50 by 6, she will earn $\$75$.

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.

Explanations vary. Yes, the rate at which the tub is filling is a constant $1\frac{1}{3}$ gallons per minute. And, at 0 minutes, there are 0 gallons of water in the tub.



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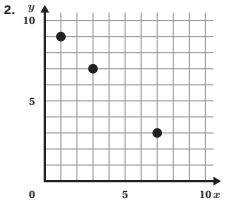

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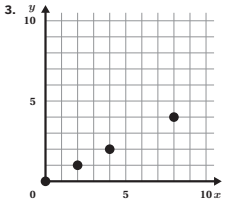

This is a proportional relationship because it increases at a constant ratio and passes through the origin.

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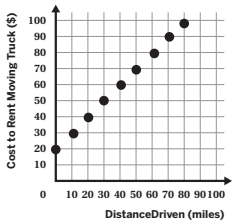

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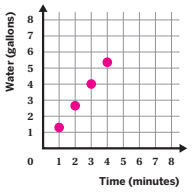
Explain your thinking.

Explanations vary. Yes, the rate at which the tub is filling is a constant $1\frac{1}{3}$ gallons per minute. And, at 0 minutes, there are 0 gallons of water in the tub.



Practice Problem Analysis

Problem	DOK	Standard(s)
1	1	7.RP.A.2.A
2	1	7.RP.A.2.A
3	1	7.RP.A.2.A
4	1	7.RP.A.2.A
5	1	7.RP.A.2.B
6	2	7.RP.A.2.B
7	2	7.RP.A.2.A

Notes:

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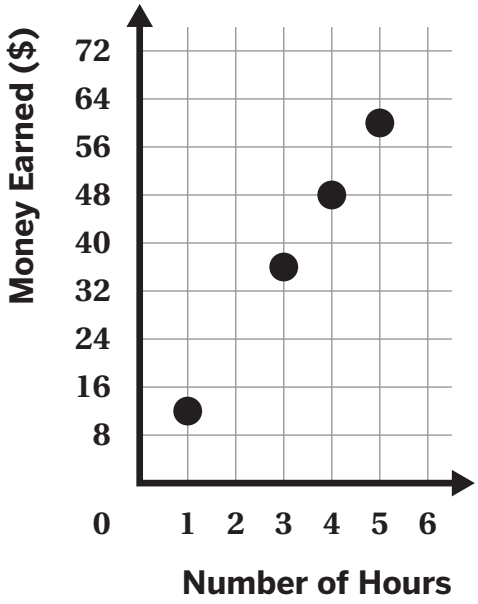
Name: ..... Date: ..... Period: .....

Additional Practice 2.09

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



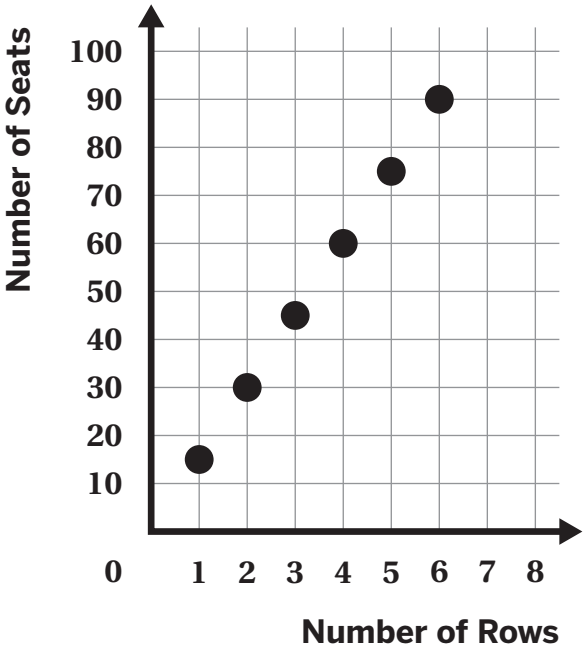
a What is the constant of proportionality in this relationship?

The constant of proportionality is 12.

b Write an equation that represents this relationship.

$y = 12x$

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?

The point (5, 75) represents 5 rows and 75 seats in the school auditorium.

b What is the constant of proportionality in this relationship?

15

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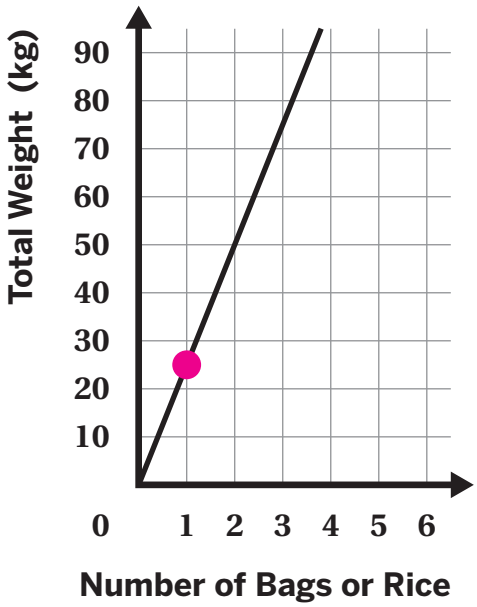
Name: ..... Date: ..... Period: .....

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.



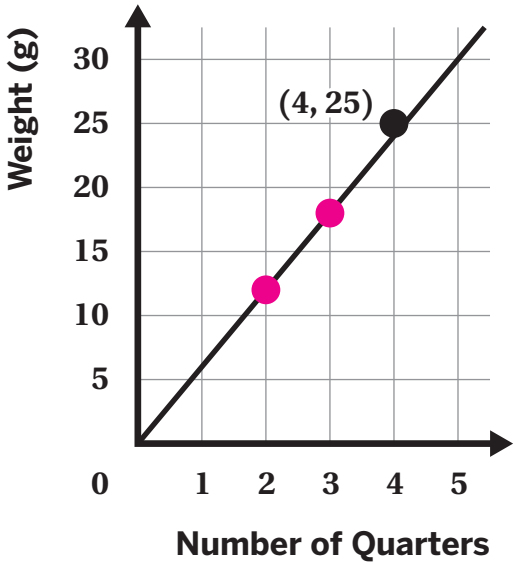
a Determine the constant of proportionality and explain its meaning.

The constant of proportionality is 25. It means that the number of bags of rice is directly proportional to the total weight. Every bag of rice weighs 25 kg.

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

The point (1, 25) is labeled 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?

The constant of proportionality is 6.25.

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

Every quarter weighs 6.25 grams.

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

Answers will vary. The points (2, 12.5) and (3, 18.75) are plotted.

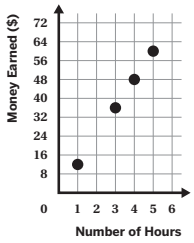
d Using the constant of proportionality from part a, write an equation that represents the relationship between w and q.

$y = 6.25x$

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.



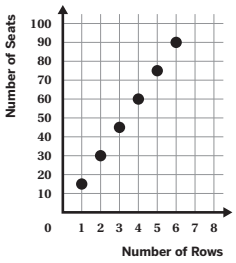
a. What is the constant of proportionality in this relationship?

The constant of proportionality is 12.

b. Write an equation that represents this relationship.

$y = 12x$

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?

The point (5, 75) represents 5 rows and 75 seats in the school auditorium.

b. What is the constant of proportionality in this relationship?

15

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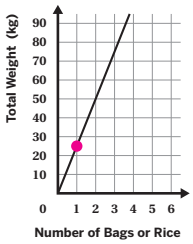
Name: Date: Period:

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.

The constant of proportionality is 25. It means that the number of bags of rice is directly proportional to the total weight. Every bag of rice weighs 25 kg.

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

The point (1, 25) is labeled on the graph.

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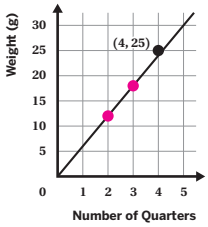

a. What is the constant of proportionality?

The constant of proportionality is 6.25.

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

Every quarter weighs 6.25 grams.

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

Answers will vary. The points (2, 12.5) and (3, 18.75) are plotted.

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

$y = 6.25x$

Practice Problem Analysis

Problem	DOK	Standard(s)
1	1	7.RP.A.2, 7.RP.A.2.B
2	2	7.RP.A.2, 7.RP.A.2.B, 7.RP.A.2.D
3	2	7.RP.A.2, 7.RP.A.2.B, 7.RP.A.2.D
4	2	7.RP.A.2, 7.RP.A.2.B

Notes:

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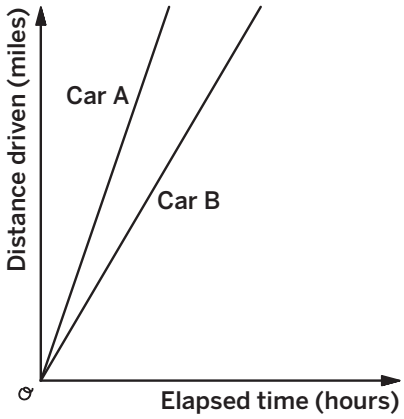
Name: ..... Date: ..... Period: .....

Additional Practice 2.10

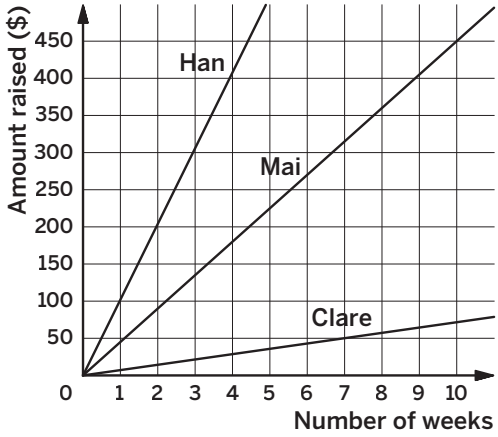
1. The graph shows two lines that represent the distance driven by two cars at a constant speed over time. Which car was driven at a faster speed?

Car A

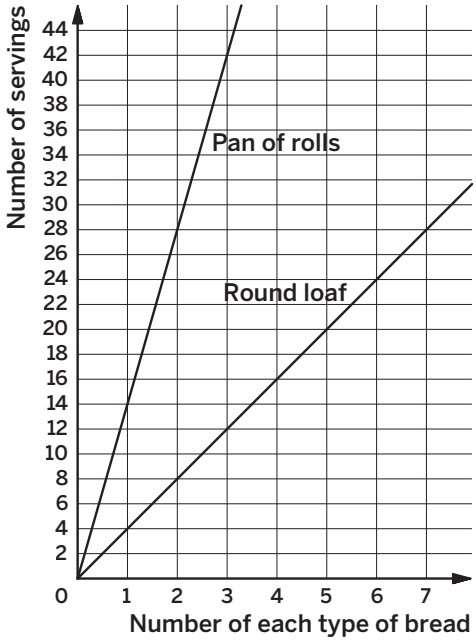


2. The graph shows three lines that represent the amount of money raised by three different students during a school fundraiser over several weeks. Order their names from the student who raised money at the slowest rate to the one who raised money at the fastest rate.

Clare, Mai, Han



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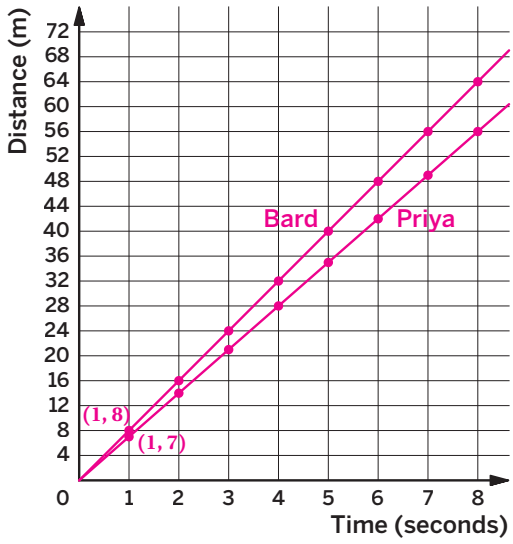
Name: ..... Date: ..... Period: .....

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.

Sample response:

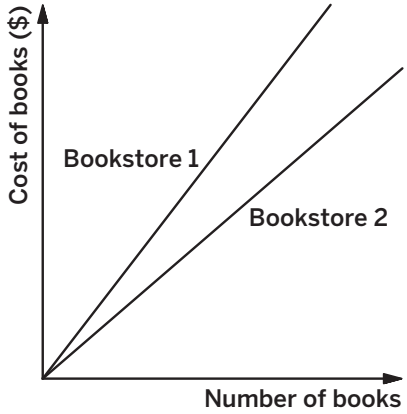
b For each line, label the point with coordinates $(1, k)$ and determine the value of k.

Bard: $k = 8$; Priya: $k = 7$

c Which student won the race? Explain your thinking.

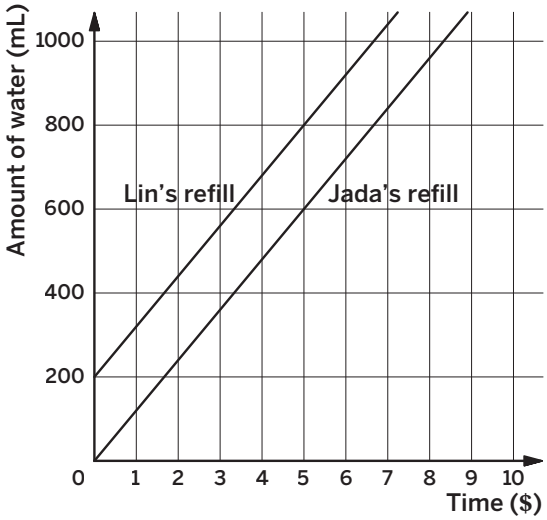
Bard; Sample response: Bard's line is steeper and the constant of proportionality, or speed, is greater.

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.



Bookstore 2; Sample response: The graph that represents Bookstore 1 is steeper which means the price per book is greater.

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.

The line that shows Jada's refill represents a proportional relationship because it's a straight line that goes through the origin.

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

At 0 seconds, there were 0 mL of water in Jada's water bottle.

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

At 0 seconds, there were 200 mL of water in Lin's water bottle.

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

Both bottles fill up at the same rate because one line is not steeper than the other.

Name: Date: Period:

Additional Practice 2.10

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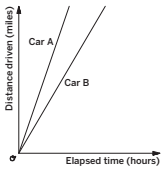

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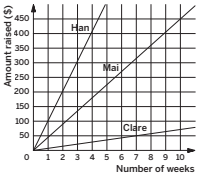
Clare, Mai, Han



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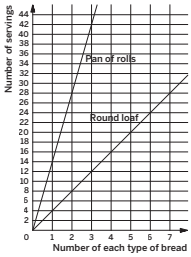

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Name: Date: Period:

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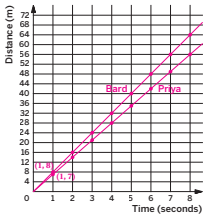

a. Graph the two lines that represent the distance that Bard and Priya run on the track. Label each line with the appropriate name.

Sample response:

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

Bard: $k = 8$; Priya: $k = 7$

c. Which student won the race? Explain your thinking.

Bard; Sample response: Bard's line is steeper and the constant of proportionality, or speed, is greater.

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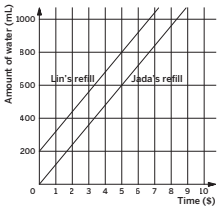

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Both bottles fill up at the same rate because one line is not steeper than the other.

Practice Problem Analysis

Problem	DOK	Standard(s)
1	1	7.RP.A.2
2	1	7.RP.A.2
3	2	7.RP.A.2
4	2	7.RP.A.2
5	2	7.RP.A.2
6	3	7.RP.A.2

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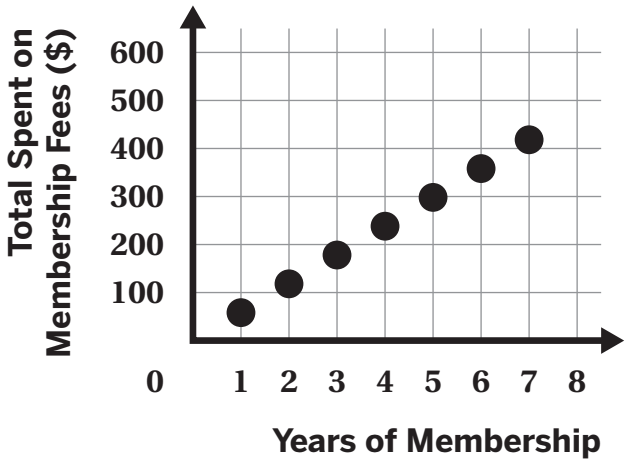
Name: ..... Date: ..... Period: .....

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.

It is a proportional relationship because it forms a straight line and passes through the origin.

2. Calculate a constant of proportionality for this relationship.

$60 per year

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

$C = 60m$

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

$840 = 60m$

$m = 14$ years

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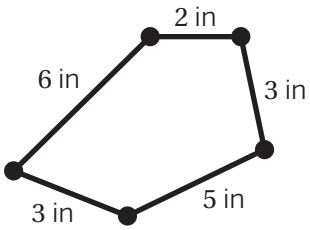
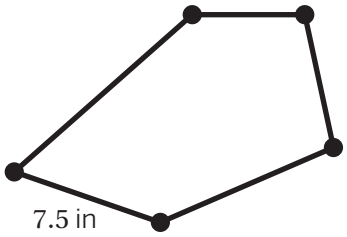
Name: ..... Date: ..... Period: .....

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

The perimeter of the smaller polygon is 19 inches.
The ratio of the corresponding sides is 3:7.5 or 1:2.5.
Multiplying the perimeter of the smaller polygon by 2.5 results in the larger polygon having the perimeter of $2.5 \times 19 = 47.5$ inches.





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
120	15
200	**25**
280	35

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

$8, \frac{1}{8}$

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

$g = 8t$ and $t = \frac{g}{8}$

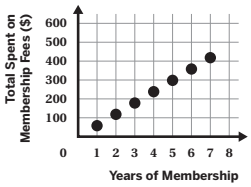
9. Use one of your equations from Problem 8 to determine how many tables will be needed to accommodate 300 guests.

$t = \frac{300}{8} \approx 38$ tables

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.
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2. Calculate a constant of proportionality for this relationship.
   $60 per year

3. Write an equation that relates years of membership, m, to the total amount of money spent on membership fees, C.
   $C = 60m$

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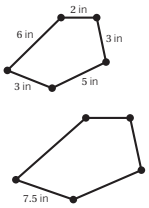
Name: Date: Period:

5. These polygons are scaled copies. Determine the perimeter of the larger polygon. Show or explain your thinking.
   The perimeter of the smaller polygon is 19 inches.
   The ratio of the corresponding sides is 3:7.5 or 1:2.5.
   Multiplying the perimeter of the smaller polygon by 2.5 results in the larger polygon having the perimeter of $2.5 \times 19 = 47.5$ inches.



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Practice Problem Analysis

Problem	DOK	Standard(s)
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2	2	7.RP.A.2.B
3	1	7.RP.A.2.C
4	1	7.RP.A
5	2	7.G.A.1
6	1	7.RP.A
7	2	7.RP.A.2.B
8	1	7.RP.A.2.C
9	1	7.RP.A

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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	12	38
Quarter	12	24	75
Cucumber Slice	19	38	121
Ring	8.5	17	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.

The circumference is 16 inches.

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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.

Not a reasonable approximation; Sample response: Because $\frac{45}{11} \approx 4.09$ and that is not slightly larger than 3.

b 20 in. and 47 in.

Not a reasonable approximation; Sample response: Because $\frac{47}{20} = 2.35$ and that is not slightly larger than 3.

c 16 in. and 50 in.

Reasonable approximation; Sample response: Because $\frac{50}{16} = 3.125$ and that is a little larger than 3.

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. **Sample response:**

Diameter	Circumference	$\frac{\text{Circumference}}{\text{Diameter}}$
9	**28.3**	**3.144**
48	**150.77**	**3.141**
37	116	**3.135**

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	12	38
Quarter	12	24	75
Cucumber Slice	19	38	121
Ring	8.5	17	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.
The circumference is 16 inches.

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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.
Not a reasonable approximation; Sample response: Because $\frac{45}{11} \approx 4.09$ and that is not slightly larger than 3.

b. 20 in. and 47 in.
Not a reasonable approximation; Sample response: Because $\frac{47}{20} = 2.35$ and that is not slightly larger than 3.

c. 16 in. and 50 in.
Reasonable approximation; Sample response: Because $\frac{50}{16} = 3.125$ and that is a little larger than 3.

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. Sample response:

Diameter	Circumference	$\frac{\text{Circumference}}{\text{Diameter}}$
9	28.3	3.144
48	150.77	3.141
37	116	3.135

Practice Problem Analysis

Problem	DOK	Standard(s)
1	1	7.G.B.4
2	1	7.G.B.4
3	2	7.G.B.4
4	2	7.G.B.4
5	2	7.G.B.4
6	1	7.G.B.4

Notes:

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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.	$\frac{42.5}{\pi}$ mm	$\frac{85}{\pi}$ mm	✔ 85 mm
The center to the edge of a circular pond measures 19 m.	✔ 19 m	38 m	38π m
The length across the top of a vinyl record measures 25.4 cm.	12.7 cm	✔ 25.4 cm	25.4π 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.	✔ 12 mm	24 mm	24π mm
The rubber around a bike tire measures 86 in.	$\frac{43}{\pi}$ in.	$\frac{86}{\pi}$ in.	✔ 86 in.
The length across a circular slice of cucumber measures 1.3 in.	0.65 in.	✔ 1.3 in.	1.3π in.

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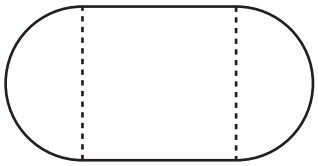
Name: ..... Date: ..... Period: .....

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.

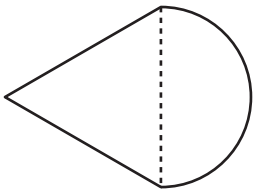


Noah's work:
2 semicircles + square
1 circle + square

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

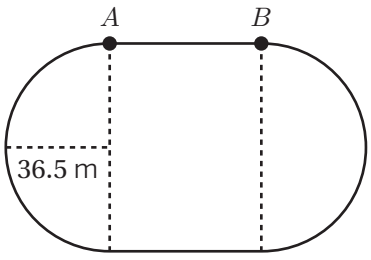
Sample response: Only two sides of the square are included in the perimeter, not four. He should have calculated $\pi(8) + 2(8) = 8\pi + 16$.

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.



$7\pi + 28$; Sample response: The perimeter is two sides of the triangle, $2 \cdot 14 = 28$, and half of the circumference of the circle with diameter of 14, $\frac{1}{2} \cdot \pi \cdot 14 = 7\pi$.

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.



$\frac{400 - 73\pi}{2}$ m; Sample response: The distance around the entire track, 400, is the circumference of a circle with radius 36.5 and two lengths from point A to B. The entire track is 400, so the unknown line segments are 400 – the circumference of the circle. The circumference of the circle is $2\pi \cdot 36.5 = 73\pi$. So the two unknown line segments are equal to $400 - 73\pi$. To determine the length of one line segment, I would divide that by 2, $\frac{400 - 73\pi}{2}$.

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.	$\frac{42.5}{\pi}$ mm	$\frac{85}{\pi}$ mm	✔ 85 mm
The center to the edge of a circular pond measures 19 m.	✔ 19 m	38 m	38π m
The length across the top of a vinyl record measures 25.4 cm.	12.7 cm	✔ 25.4 cm	25.4π 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.	✔ 12 mm	24 mm	24π mm
The rubber around a bike tire measures 86 in.	$\frac{43}{\pi}$ in.	$\frac{86}{\pi}$ in.	✔ 86 in.
The length across a circular slice of cucumber measures 1.3 in.	0.65 in.	✔ 1.3 in.	1.3π in.

Unit 3 Lesson 4 55

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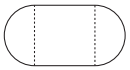
Name: Date: Period:

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.

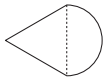


Noah's work:
2 semicircles + square
1 circle + square

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

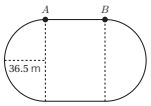
Sample response: Only two sides of the square are included in the perimeter, not four. He should have calculated $\pi(8) + 2(8) = 8\pi + 16$.

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.



$7\pi + 28$; Sample response: The perimeter is two sides of the triangle, $2 \cdot 14 = 28$, and half of the circumference of the circle with diameter of 14, $\frac{1}{2} \cdot \pi \cdot 14 = 7\pi$.

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.



$\frac{400 - 73\pi}{2}$ m; Sample response: The distance around the entire track, 400, is the circumference of a circle with radius 36.5 and two lengths from point A to B. The entire track is 400, so the unknown line segments are 400 – the circumference of the circle. The circumference of the circle is $2\pi \cdot 36.5 = 73\pi$. So the two unknown line segments are equal to $400 - 73\pi$. To determine the length of one line segment, I would divide that by 2, $\frac{400 - 73\pi}{2}$.

Unit 3 Lesson 4 56 Additional Practice

Practice Problem Analysis

Problem	DOK	Standard(s)
1	1	7.G.B.4
2	1	7.G.B.4
3	2	7.G.B.4
4	2	7.G.B.4
5	2	7.G.B.4
6	2	7.G.B.4
7	3	7.G.B.4

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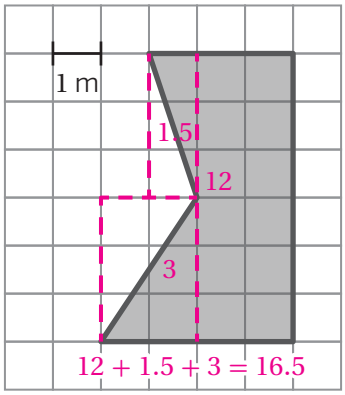
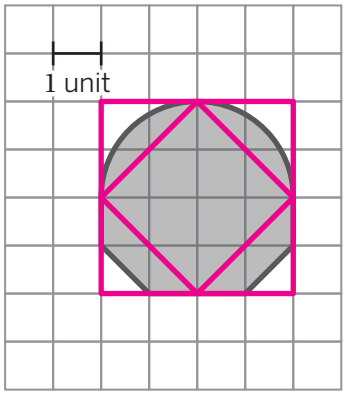
Name: ..... Date: ..... Period: .....

Additional Practice 3.05

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

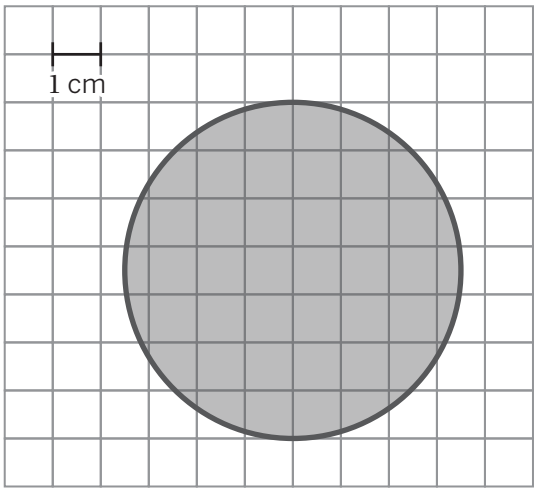


2. Here is a diagram of two squares and a shape. Explain why the area of the figure is more than 8 square units but less than 16 square units.



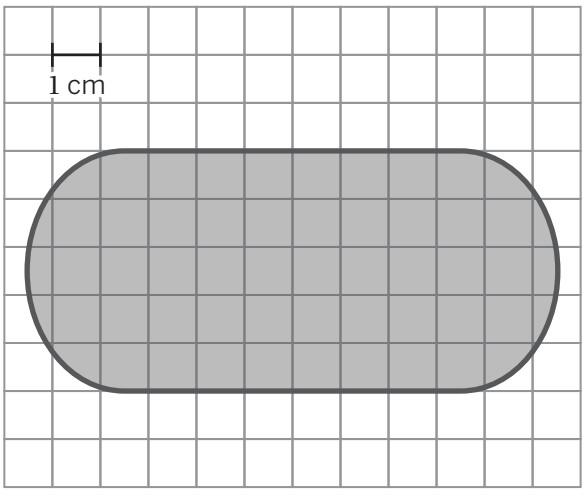
Problems 3–4: Estimate the area of each shape.

3.



Area ≈ 38 square cm

4.



Area= ≈ 40 square cm

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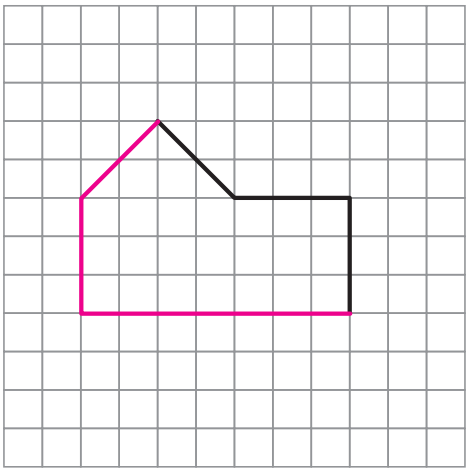
Name: ..... Date: ..... Period: .....

Problems 5–6: Priya started drawing a polygon.

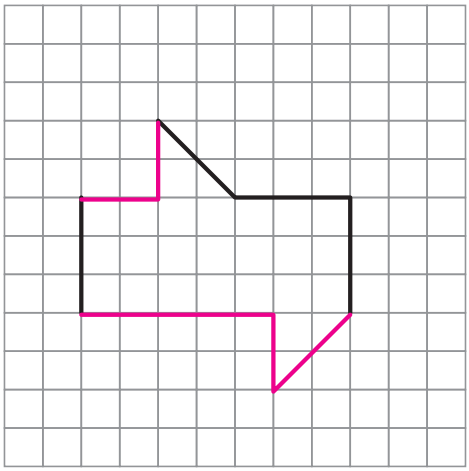
5. Complete Priya's drawing so that the polygon has an area of 25 square units.

Sample answer.



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

Sample answer.

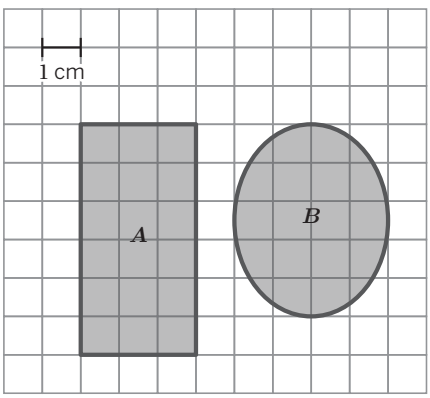


7. Which shape has a larger area? Circle one.

(Shape A) Shape B They are the same.

Show or explain how you know.

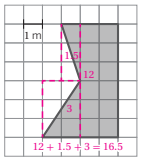
Explanations vary. The area of Shape A is 18 square cm. The area of Shape B will be smaller than a 4×5 rectangle, or 20 square cm. If I count up all of the whole squares and the partial squares, the area of Shape B will be about 16 square cm.



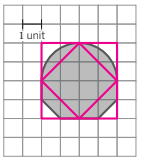
Name: Date: Period:

Additional Practice 3.05

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

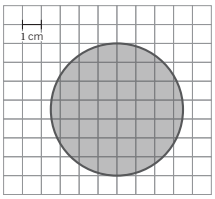


2. Here is a diagram of two squares and a shape. Explain why the area of the figure is more than 8 square units but less than 16 square units.



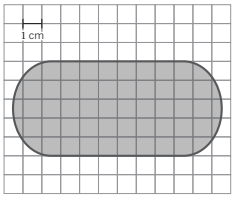
Problems 3–4: Estimate the area of each shape.

3.



Area ≈ 38 square cm

4.



Area= ≈ 40 square cm

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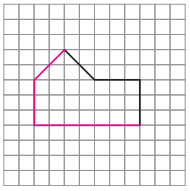
Name: Date: Period:

Problems 5–6: Priya started drawing a polygon.

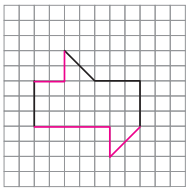
5. Complete Priya's drawing so that the polygon has an area of 25 square units.

Sample answer.



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

Sample answer.

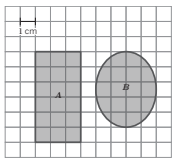


7. Which shape has a larger area? Circle one.

(Shape A) Shape B They are the same.

Show or explain how you know.

Explanations vary. The area of Shape A is 18 square cm. The area of Shape B will be smaller than a 4 x 5 rectangle, or 20 square cm. If I count up all of the whole squares and the partial squares, the area of Shape B will be about 16 square cm.



Practice Problem Analysis

Problem	DOK	Standard(s)
1	1	7.G.B.4
2	1	7.G.B.4
3	2	7.G.B.4
4	1	7.G.B.4
5	1	7.G.B.4
6	2	7.G.B.4
7	2	7.G.B.4

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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.

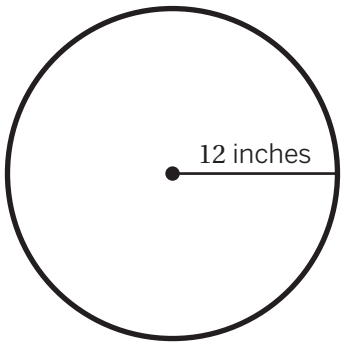
D. The circle's area is approximately 113.1 in^2.

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.

The area is exactly 2601π in^2; Sample response: $102 \div 2 = 51$; the radius is 51 in.
$A = \pi r^2$
$A = \pi \cdot 51^2$
$A = 2601\pi$

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

4.



144π square inches

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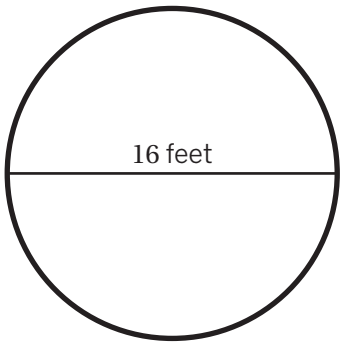
5.

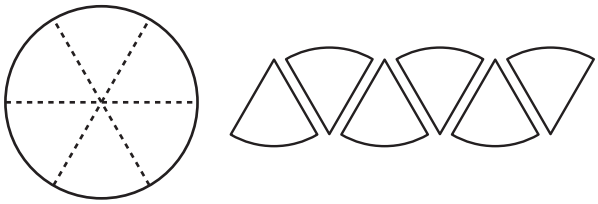


64π square feet

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?

The circumference is more useful for finding the length of the Martian dichotomy because the circumference represents the boundary around the planet.

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.

Sample response: The picture helps to explain why the area of a circle is represented by the expression πr^2 because I know how to find the area of a shape that looks similar to a rectangle. I can see that half of the circumference of the circle forms the length of the rectangle, $\frac{1}{2}(2\pi r)$, and that the radius r forms the width of the rectangle. To determine the area I would multiply $\frac{1}{2}(2\pi r) \cdot r$, which simplifies to πr^2.

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*?

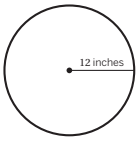
A. The circle's area is approximately 37.7 in^2.
B. The circle's area is approximately 452.4 in^2.
C. The circle's area is approximately 18.85 in^2.
D. The circle's area is approximately 113.1 in^2.

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.

The area is exactly 2601π in^2; Sample response: $102 \div 2 = 51$; the radius is 51 in.
$A = \pi r^2$
$A = \pi \cdot 51^2$
$A = 2601\pi$

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

4.



144π square inches

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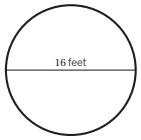
5.



64π square feet

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?

The circumference is more useful for finding the length of the Martian dichotomy because the circumference represents the boundary around the planet.

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.

Sample response: The picture helps to explain why the area of a circle is represented by the expression πr^2 because I know how to find the area of a shape that looks similar to a rectangle. I can see that half of the circumference of the circle forms the length of the rectangle, $\frac{1}{2}(2\pi r)$, and that the radius r forms the width of the rectangle. To determine the area I would multiply $\frac{1}{2}(2\pi r) \cdot r$, which simplifies to πr^2.

Practice Problem Analysis

Problem	DOK	Standard(s)
1	1	7.G.B.4
2	1	7.G.B.4
3	2	7.G.B.4
4	1	7.G.B.4, 7.G.B.6
5	1	7.G.B.4, 7.G.B.6
6	2	7.G.B.4, 7.G.B.6
7	3	7.G.B.4

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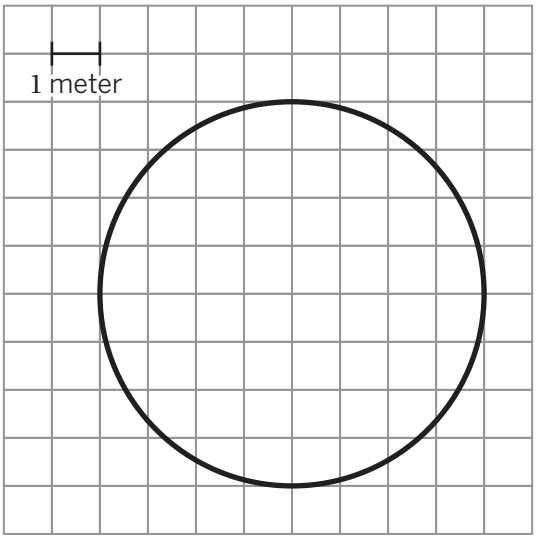
Name: ..... Date: ..... Period: .....

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.

I estimate the area of this shape to be approximately 48–50 square meters.

2. Estimate the length of the circular road.

I estimate the area of the circular road to be approximately 24 meters.

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.

If d = diameter and r = radius, an equation that relates them is $d = 2r$.

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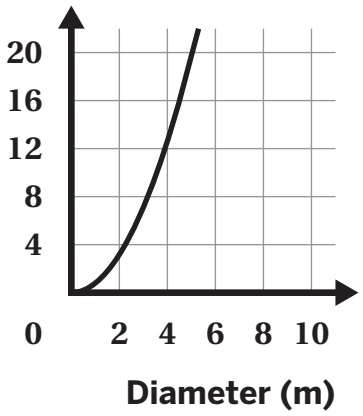
Name: ..... Date: ..... Period: .....

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



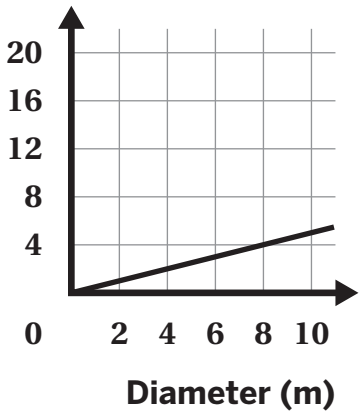
A. Radius vs. diameter

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

B. Area vs. diameter

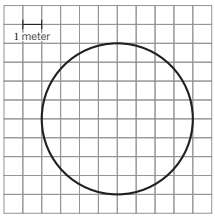
C. Circumference vs. diameter

D. Circumference vs. area

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.
I estimate the area of this shape to be approximately 48–50 square meters.

2. Estimate the length of the circular road.
I estimate the area of the circular road to be approximately 24 meters.

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.
If d = diameter and r = radius, an equation that relates them is $d = 2r$.

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Name: Date: Period:

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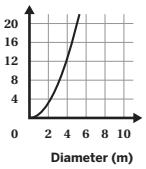
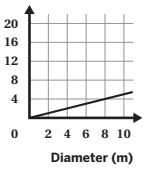


A. Radius vs. diameter
B. Circumference vs. diameter
(C.) Area vs. diameter
D. Circumference vs. area

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

Practice Problem Analysis

Problem	DOK	Standard(s)
1	2	7.G.B.4
2	2	7.G.B.4
3	1	7.G.B.4
4	1	7.G.B.4
5	2	7.G.B.4
6	2	7.G.B.4

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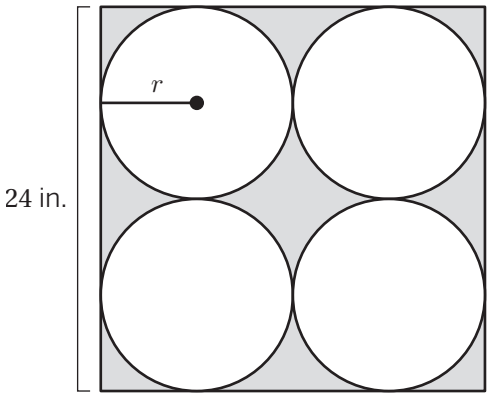
Name: ..... Date: ..... Period: .....

Additional Practice 3.09

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



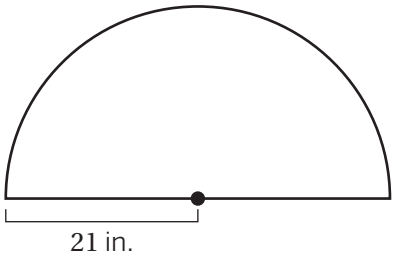
A. $r = 3$ in.

B. $r = 4$ in.

C. $r = 6$ in.

D. $r = 12$ in.

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

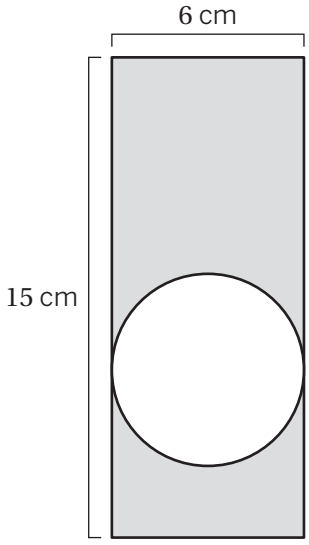


692.72 or 220.5π in².; Sample response: The area of the circle is

$A = \pi r^2$
$A = \pi \cdot 21^2$
$A = 441\pi$
$A \approx 1385.44$

The area of the semicircle is half of the area of the circle.
$1385.44 \div 2 = 692.72$ in²

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



The exact area of the shaded region is $90 - 9\pi$ cm²; Sample response:

Rectangle area:
$15 \cdot 6 = 90$
90 cm²

Circle area:
The diameter is equal to the length of the rectangle, which is 6 cm, so the radius is 3 cm.

$A = \pi r^2$
$A = \pi \cdot 3^2$
$A = 9\pi$

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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.

64π in^2; Sample response: The diameter is 32 in. so the radius is 16 in.

$A = \pi r^2$
$A = \pi \cdot 16^2$
$A = 256\pi$

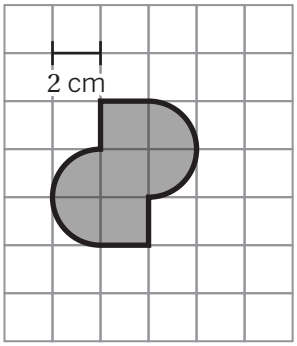
The area of the resulting shape is one-fourth of the original circle, $256\pi \div 4 = 64\pi$; the area is 64π in^2.

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.

The exact area of the shape is 9π. The circle starts with an area of 36π. When it is folded, it has an area of 18π. When it gets folded again, the area of the new shape is 9π.

6. Calculate the area of this shape.

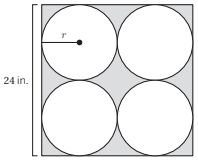
The area of this shape is $12 + 4\pi$ centimeters squared.



Name: Date: Period:

Additional Practice 3.09

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



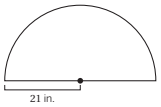
A. $r = 3$ in.

B. $r = 4$ in.

C. $r = 6$ in.

D. $r = 12$ in.

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



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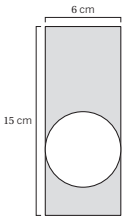
$A = 441\pi$
$A \approx 1385.44$

The area of the semicircle is half of the area of the circle.
$1385.44 \div 2 = 692.72$ in²

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



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Sample response:

Rectangle area:
$15 \cdot 6 = 90$
90 cm²

Circle area:
The diameter is equal to the length of the rectangle, which is 6 cm, so the radius is 3 cm.

$A = \pi r^2$
$A = \pi \cdot 3^2$
$A = 9\pi$

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Name: Date: Period:

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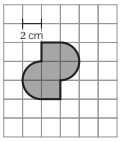

The area of this shape is $12 + 4\pi$ centimeters squared.

Practice Problem Analysis

Problem	DOK	Standard(s)
1	1	7.G.B.4
2	1	7.G.B.4
3	2	7.G.B.4
4	2	7.G.B.4
5	1	7.G.B.4
6	1	7.G.B.4

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Additional Practice 3.09

1. Use benchmark percentages to help you determine each percent of 400.

a. What is 50% of 400?
200

b. What is 10% of 400?
40

c. What is 1% of 400?
4

d. What is 5% of 400?
20

e. What is $\frac{1}{2}$% of 400?
2

f. What is 150% of 400?
600

2. Use benchmark percentages to help you determine each percent of 150.

a. What is 50% of 150?
75

b. What is 10% of 150?
15

c. What is 1% of 150?
1.5

d. What is 5% of 150?
7.5

e. What is $\frac{1}{2}$% of 150?
0.75

f. What is 150% of 150?
225

Han surveyed all 600 students in his school to determine how many siblings each student has. Here are the results of the survey. Use this information for Problems 3 and 4.

- 30 students have 0 siblings.
- 180 students have 1 sibling.
- 150 students have 2 siblings.
- 120 students have 3 siblings.
- 72 students have 4 siblings.
- 48 students have 5 or more siblings.

3. What percent of students have each number of siblings? Complete the table.

	0 siblings	1 sibling	2 siblings	3 siblings	4 siblings	5 or more siblings
Percent (%)	5	30	25	20	12	8

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

4. Assume the school's percentages are representative of all middle schoolers in the entire school district. If there are $1{,}500$ middle school students in the district, how many students are expected to have each number of siblings? Complete the table.

	0 siblings	1 sibling	2 siblings	3 siblings	4 siblings	5 or more siblings
Number of students	75	450	375	300	180	120

5. How could you determine 25% of any number? Select *all* that apply.

- ☑ **A.** Multiply the number by 0.25.
- ☐ **B.** Divide the number by $\frac{1}{4}$.
- ☐ **C.** Divide the number by 0.25.
- ☑ **D.** Divide the number by 4.
- ☑ **E.** Multiply the number by $\frac{1}{4}$.

6. Which of the following tells you how to determine 150% of any number?

A. Multiply the number by 150.

B. Multiply the number by 15.

C. Multiply the number by 1.5.

D. Multiply the number by 0.15.

7. Priya says that to determine 75% of a number, you divide the number by 4 and then multiply the number by 3. For example, she says that 75% of 40 is 30 because $(40 \div 4) \cdot 3 = 30$. Does Priya's method always work? Explain your thinking.

Yes; Sample response: Priya's method always works because dividing by 4 and then multiplying by 3 is the same as multiplying by 0.75.

8. Jada and Diego each answer this question: 8 is what percent of 10?

- Jada says, "8 is 80% of 10."
- Diego says, "8 is 20% of 10."

Who is correct? Explain your thinking.

Jada; Sample response: 8 is 80% of 10 because $\frac{8}{10}$ is equivalent to $\frac{80}{100}$, or 80%.

Name: Date: Period:

Additional Practice 3.09

1. Use benchmark percentages to help you determine each percent of 400.

a. What is 50% of 400?
200

b. What is 10% of 400?
40

c. What is 1% of 400?
4

d. What is 5% of 400?
20

e. What is $\frac{1}{2}$% of 400?
2

f. What is 150% of 400?
600

2. Use benchmark percentages to help you determine each percent of 150.

a. What is 50% of 150?
75

b. What is 10% of 150?
15

c. What is 1% of 150?
1.5

d. What is 5% of 150?
7.5

e. What is $\frac{1}{2}$% of 150?
0.75

f. What is 150% of 150?
225

Han surveyed all 600 students in his school to determine how many siblings each student has. Here are the results of the survey. Use this information for Problems 3 and 4.

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- 72 students have 4 siblings.
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3. What percent of students have each number of siblings? Complete the table.

	0 siblings	1 sibling	2 siblings	3 siblings	4 siblings	5 or more siblings
Percent (%)	5	30	25	20	12	8

Unit 3 Lesson 9 75

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	0 siblings	1 sibling	2 siblings	3 siblings	4 siblings	5 or more siblings
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5. How could you determine 25% of any number? Select *all* that apply.

- ☑ A. Multiply the number by 0.25.
- ☐ B. Divide the number by $\frac{1}{4}$.
- ☐ C. Divide the number by 0.25.
- ☑ D. Divide the number by 4.
- ☑ E. Multiply the number by $\frac{1}{4}$.

6. Which of the following tells you how to determine 150% of any number?

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B. Multiply the number by 15.

C. Multiply the number by 1.5.

D. Multiply the number by 0.15.

7. Priya says that to determine 75% of a number, you divide the number by 4 and then multiply the number by 3. For example, she says that 75% of 40 is 30 because $(40 \div 4) \cdot 3 = 30$. Does Priya's method always work? Explain your thinking.

Yes; Sample response: Priya's method always works because dividing by 4 and then multiplying by 3 is the same as multiplying by 0.75.

8. Jada and Diego each answer this question: 8 is what percent of 10?

- Jada says, "8 is 80% of 10."
- Diego says, "8 is 20% of 10."

Who is correct? Explain your thinking.

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Unit 3 Lesson 9 76 Additional Practice

Practice Problem Analysis

Problem	DOK	Standard(s)
1	2	6.RP.A.3.C
2	2	6.RP.A.3.C
3	2	6.RP.A.3.C
4	2	6.RP.A.3.C
5	1	6.RP.A.3.C
6	1	6.RP.A.3.C
7	3	6.RP.A.3.C
8	3	6.RP.A.3.C

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

Additional Practice 3.10

1. Select *all* of the expressions that could be used to determine 60% of x.

- ☑ **A.** $(0.6) \cdot x$
- ☐ **B.** $\frac{6}{100} \cdot x$
- ☐ **C.** $60 \cdot x$
- ☑ **D.** $\frac{60}{100} \cdot x$
- ☐ **E.** $\frac{2}{5} \cdot x$
- ☑ **F.** $\frac{3}{5} \cdot x$
- ☑ **G.** $\frac{6}{10} \cdot x$
- ☐ **H.** $(0.06) \cdot x$

2. Select *all* of the expressions that could be used to determine 35% of x.

- ☐ **A.** $35 \cdot x$
- ☐ **B.** $(0.65) \cdot x$
- ☑ **C.** $\frac{35}{100} \cdot x$
- ☑ **D.** $(0.35) \cdot x$
- ☐ **E.** $\frac{13}{20} \cdot x$
- ☑ **F.** $\frac{7}{20} \cdot x$

3. During batting practice, Bard hit 180 pitches and 25% of them were foul balls. How many foul balls did Bard hit? Explain your thinking.

45 foul balls; Students' explanations may vary.

4. 40% of the students in Clare's class earned an A on the last test. If there are 30 students in Clare's class, how many students earned an A? Explain your thinking.

12 students; Students' explanations may vary.

5. Kiran wants to purchase a backpack for $\$50$. If the tax rate is 9%, how much will Kiran pay in tax? Explain your thinking.

$4.50; Students' explanations may vary.

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6. Elena surveyed 250 students to find out about the favorite vegetables of students at her school. Complete the table to show either the number of students or the percent of students who said each vegetable was their favorite.

	Number of students	Percent of students (%)
Cucumbers	75	30
Carrots	55	22
Broccoli	45	18
Sweet potatoes	40	16
Bell peppers	20	8
Cauliflower	15	6
Total	250	100

7. The recommended daily allowance for vitamin C for adults is 80 mg, and a 16-oz smoothie says it contains 280% of the daily recommended allowance of vitamin C. How many milligrams of vitamin C are in the smoothie? Show or explain your thinking.

224 mg; Sample response:
$\frac{280}{100} \cdot 80 = 224$ mg

8. A large jug of milk contains 120 oz of milk. A smaller jug of milk contains 65% as much milk as the large bottle. Jada says that there is 42 oz of milk in the smaller bottle. Is Jada correct? Explain your thinking.

No; Sample response: $\frac{65}{100} \cdot 120 = 78$ oz

Name: Date: Period:

Additional Practice 3.10

1. Select *all* of the expressions that could be used to determine 60% of x.

- ☑ A. $(0.6) \cdot x$
- ☐ B. $\frac{6}{100} \cdot x$
- ☐ C. $60 \cdot x$
- ☑ D. $\frac{60}{100} \cdot x$
- ☐ E. $\frac{2}{5} \cdot x$
- ☑ F. $\frac{3}{5} \cdot x$
- ☑ G. $\frac{6}{10} \cdot x$
- ☐ H. $(0.06) \cdot x$

2. Select *all* of the expressions that could be used to determine 35% of x.

- ☐ A. $35 \cdot x$
- ☐ B. $(0.65) \cdot x$
- ☑ C. $\frac{35}{100} \cdot x$
- ☑ D. $(0.35) \cdot x$
- ☐ E. $\frac{13}{20} \cdot x$
- ☑ F. $\frac{7}{20} \cdot x$

3. During batting practice, Bard hit 180 pitches and 25% of them were foul balls. How many foul balls did Bard hit? Explain your thinking.

45 foul balls; Students' explanations may vary.

4. 40% of the students in Clare's class earned an A on the last test. If there are 30 students in Clare's class, how many students earned an A? Explain your thinking.

12 students; Students' explanations may vary.

5. Kiran wants to purchase a backpack for $50. If the tax rate is 9%, how much will Kiran pay in tax? Explain your thinking.

$4.50; Students' explanations may vary.

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Name: Date: Period:

6. Elena surveyed 250 students to find out about the favorite vegetables of students at her school. Complete the table to show either the number of students or the percent of students who said each vegetable was their favorite.

	Number of students	Percent of students (%)
Cucumbers	75	30
Carrots	55	22
Broccoli	45	18
Sweet potatoes	40	16
Bell peppers	20	8
Cauliflower	15	6
Total	250	100

7. The recommended daily allowance for vitamin C for adults is 80 mg, and a 16-oz smoothie says it contains 280% of the daily recommended allowance of vitamin C. How many milligrams of vitamin C are in the smoothie? Show or explain your thinking.

224 mg; Sample response:
$\frac{280}{100} \cdot 80 = 224$ mg

8. A large jug of milk contains 120 oz of milk. A smaller jug of milk contains 65% as much milk as the large bottle. Jada says that there is 42 oz of milk in the smaller bottle. Is Jada correct? Explain your thinking.

No; Sample response: $\frac{65}{100} \cdot 120 = 78$ oz

Practice Problem Analysis

Problem	DOK	Standard(s)
1	1	6.RP.A.3.C
2	1	6.RP.A.3.C
3	2	6.RP.A.3.C
4	2	6.RP.A.3.C
5	2	6.RP.A.3.C
6	2	6.RP.A.3.C
7	2	6.RP.A.3.C
8	3	6.RP.A.3.C

Notes:

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

Additional Practice 3.12

1. Which equations could be used to determine the missing number: 75 is 20% of what number? Select *all* that apply.

- ☐ **A.** $75 = \frac{2}{100} \cdot x$
- ☐ **B.** $20 = \frac{75}{100} \cdot x$
- ☑ **C.** $75 = \frac{20}{100} \cdot x$
- ☑ **D.** $75 = 0.2 \cdot x$
- ☐ **E.** $20 = 0.75 \cdot x$

2. Which equations could be used to determine the missing number: What number is 5% of 88? Select *all* that apply.

- ☑ **A.** $x = \frac{5}{100} \cdot 88$
- ☑ **B.** $\frac{x}{5} = \frac{88}{100}$
- ☐ **C.** $0.05x = 88$
- ☑ **D.** $0.05 \cdot 88 = x$
- ☑ **E.** $\frac{x}{88} = \frac{5}{100}$

3. Determine each missing value. Show your thinking.

a What number is 12% of 125?

15

b 18 is 90% of what number?

20

c 120% of what number is 48?

40

4. Tyler and Andre scored 42% of their team's points at yesterday's basketball game. If their team scored 50 points, how many points did Tyler and Andre score? Explain your thinking.

21 points; Students' explanations may vary.

5. A bakery sells 150 muffins on Tuesday. If 36% of the muffins were sold in the afternoon, how many muffins were sold in the afternoon? Explain your thinking.

54 muffins; Students' explanations may vary.

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Name: Date: Period:

6. An item is sold at two different stores. Which option is a better deal? Explain your thinking.

Store A	The item costs $54.95. There is a coupon for 20% off the price of the item.
Store B	The item costs $59.96. There is a coupon for 25% off the price of the item.

Store A; Sample response: The cost at Store A is $54.95 • 0.8 = $43.96, and the cost at Store B is $59.96 • 0.75 = $44.97. Store A is the better deal.

7. An item is on sale for 30% off and then it is reduced an additional 20% off. Another item is 50% off. The original price of the two items is the same. Lin said that the sale price of the two items is the same. Do you agree with Lin? Include an example to explain your thinking.

No; Sample response: 50% off is a better deal than a deal of 30% off and another 20% off. If the item costs $100 and is 30% off and another 20% off, the final cost is $56. If the item costs $100 and is 50% off, the final cost is $50.

8. An item is sold at two different stores. Mai says that the price of an item at Store A is a better deal. Do you agree with Mai? Explain your thinking.

Store A	The item costs $75. The sale sign says, "Buy 1, get 1 half off." Two items are purchased.
Store B	The item costs $85. The sale sign says,"Buy 2, get 30% off the total." Two items are purchased.

Yes; Sample response: Store A is a better deal. The price of two items at Store A is $112.50, and the price of two items at Store B is $119.

Name: Date: Period:

Additional Practice 3.12

1. Which equations could be used to determine the missing number: 75 is 20% of what number? Select *all* that apply.

   ☐ A. $75 = \frac{2}{100} \cdot x$ ☐ B. $20 = \frac{75}{100} \cdot x$ ☑ C. $75 = \frac{20}{100} \cdot x$

   ☑ D. $75 = 0.2 \cdot x$ ☐ E. $20 = 0.75 \cdot x$

2. Which equations could be used to determine the missing number: What number is 5% of 88? Select *all* that apply.

   ☑ A. $x = \frac{5}{100} \cdot 88$ ☑ B. $\frac{x}{5} = \frac{88}{100}$ ☐ C. $0.05x = 88$

   ☑ D. $0.05 \cdot 88 = x$ ☑ E. $\frac{x}{88} = \frac{5}{100}$

3. Determine each missing value. Show your thinking.

   a. What number is 12% of 125?

   15

   b. 18 is 90% of what number?

   20

   c. 120% of what number is 48?

   40

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   No; Sample response: 50% off is a better deal than a deal of 30% off and another 20% off. If the item costs $100 and is 30% off and another 20% off, the final cost is $56. If the item costs $100 and is 50% off, the final cost is $50.

8. An item is sold at two different stores. Mai says that the price of an item at Store A is a better deal. Do you agree with Mai? Explain your thinking.

Store A	The item costs $75. The sale sign says, "Buy 1, get 1 half off." Two items are purchased.
Store B	The item costs $85. The sale sign says,"Buy 2, get 30% off the total." Two items are purchased.

   Yes; Sample response: Store A is a better deal. The price of two items at Store A is $112.50, and the price of two items at Store B is $119.

Practice Problem Analysis

Problem	DOK	Standard(s)
1	1	6.RP.A.3.C
2	1	6.RP.A.3.C
3	2	6.RP.A.3.C
4	2	6.RP.A.3.C
5	2	6.RP.A.3.C
6	2	6.RP.A.3.C
7	3	6.RP.A.3.C
8	3	6.RP.A.3.C

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

Additional Practice 3.13

1. Complete each percentage statement.

a. 20% of 80 is 16.

b. 150% of 84 is 126.

c. 5% of 420 is 21.

2. Complete each percentage statement.

a. 75% of 20 is 15.

b. 40% of 170 is 68.

c. 125% of 20 is 25.

3. Complete each percentage statement.

a. 14% of 500 is 70.

b. 225% of 36 is 81.

c. 10% of 1,000 is 100.

4. On a sixth grade field trip, there are 5 chaperones for every 30 students. There are 175 people on the field trip.

a. How many chaperones are on the field trip?

25

b. How many sixth graders are on the field trip?

150

c. What percent are chaperones? **Hint:** Round to the nearest whole percent.

About 14%

d. What percent are sixth graders? **Hint:** Round to the nearest whole percent.

About 86%

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5. Andre conducts a survey of 1,450 people to find out about their favorite type of vacation. 56% of those surveyed prefer a beach vacation, 28% prefer a vacation in the mountains, and 16% prefer going to amusement parks for vacation.

a How many people prefer a beach vacation?

812 people

b How many people prefer a mountain vacation?

406 people

c How many people prefer going to an amusement park for vacation?

232 people

6. A bakery made 1,175 bagels. 48% are onion bagels, 36% are sesame bagels, and 16% are raisin bagels.

a How many onion bagels were made?

564 onion bagels

b How many sesame bagels were made?

423 sesame bagels

c How many raisin bagels were made?

188 raisin bagels

7. A bakery sells 12 corn muffins for every 4 lemon poppy seed muffins. On Saturday, the bakery sold 192 muffins.

a How many corn muffins were sold?

144 corn muffins

b How many lemon poppy seed muffins were sold?

48 lemon poppy seed muffins

c What percent of all the muffins sold were corn muffins?

75%

d What percent of all the muffins sold were lemon poppy seed muffins?

25%

8. Han says that 429 is 78% of 550. Is Han correct? Explain your thinking.

Yes; Sample response: Han is correct because $\frac{78}{100} \cdot 550 = 429$.

Name: Date: Period:

Additional Practice 3.13

1. Complete each percentage statement.

a. 20% of 80 is 16.

b. 150% of 84 is 126.

c. 5% of 420 is 21.

2. Complete each percentage statement.

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25

b. How many sixth graders are on the field trip?
150

c. What percent are chaperones? **Hint:** Round to the nearest whole percent.
About 14%

d. What percent are sixth graders? **Hint:** Round to the nearest whole percent.
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Name: Date: Period:

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48 lemon poppy seed muffins

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75%

d. What percent of all the muffins sold were lemon poppy seed muffins?
25%

8. Han says that 429 is 78% of 550. Is Han correct? Explain your thinking.
Yes; Sample response: Han is correct because $\frac{78}{100} \cdot 550 = 429$.

Practice Problem Analysis

Problem	DOK	Standard(s)
1	2	6.RP.A
2	2	6.RP.A
3	2	6.RP.A
4	2	6.RP.A
5	2	6.RP.A
6	2	6.RP.A
7	2	6.RP.A
8	3	6.RP.A

Notes:

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

Additional Practice 3.14

Students in two schools were asked whether they agreed with a rule that limits each student to at most one extra credit assignment per class, per semester. The results are shown in the table. Use this information for Problems 1–4. Round your answers to the nearest whole percent.

1. What percent of students from School A agreed with the rule? Show or explain your thinking.

About 49%; Sample response: There are 355 students from School A, and 175 students agreed. $\frac{175}{355} \cdot 100 \approx 49\%$

2. What percent of students from School B disagreed with the rule? Show or explain your thinking.

About 67%; Sample response: There are 375 students from School B, and 250 students disagreed. $\frac{250}{375} \cdot 100 \approx 67\%$

3. What percent of students from both schools agreed with the rule? Show or explain your thinking.

About 41%; Sample response: There are 730 students from both schools, and 300 students agreed. $\frac{300}{730} \cdot 100 \approx 41\%$

4. What percent of students from both schools disagreed with the rule? Show or explain your thinking.

About 59%; Sample response: There are 730 students from both schools, and 430 disagreed. $\frac{430}{730} \cdot 100 \approx 59\%$

5. Complete each percentage statement. Show your thinking.

a 85% of 360 is ..... **306** .....

b 17% of ..... **400** ..... is 68.

c ..... **175** ..... % of 36 is 63.

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6. Clare spent 50 minutes cooking dinner on Friday night.

a On Saturday night, it took Clare 130% as much time to cook dinner as it did on Friday night. How long did it take Clare to cook dinner on Saturday night? Show or explain your thinking.

65 minutes

b On Sunday night, it took Clare 80% as much time to cook dinner as it did on Friday night. How long did it take Clare to cook dinner on Sunday night? Show or explain your thinking.

40 minutes

7. An electronics store usually sells 550 video games each month. Determine each percentage. Show or explain your thinking.

a What percent of the video games sold are 99 games?

18%

b What percent of the video games sold are 462 games?

84%

c What percent of the video games sold are 660 games?

120%

8. A pair of shoes normally costs $80 and is on sale at 20% off. Tyler says, "The sale price of the pair of shoes is $68." Do you *agree* or *disagree* with this statement? Explain your thinking.

I disagree; Sample response: If the shoes are 20% off, they will cost $64. If the shoes cost $68, they are 15% off.

Name: Date: Period:

Additional Practice 3.14

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5. Complete each percentage statement. Show your thinking.

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   c. 175% of 36 is 63.

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      65 minutes

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      40 minutes

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Practice Problem Analysis

Problem	DOK	Standard(s)
1	2	6.RP.A.3.C
2	2	6.RP.A.3.C
3	2	6.RP.A.3.C
4	2	6.RP.A.3.C
5	2	6.RP.A.3
6	2	6.RP.A.3
7	2	6.RP.A.3.C
8	3	6.RP.A.3.C

Notes:

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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?

The customer will pay $7.56 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	**11.13**
3	42	**10.50**	1.89	**33.39**
4	**56**	14	**2.52**	**44.52**

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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?

The total price of the jacket is $42.50.

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?

The total price of the jacket is $41.45.

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

Explanations vary. Yes. Since Jackie is using the 15% off coupon first, the 15% discount is applied to the original price of the jacket, which is $57. On the other hand, when you hand the 15% off coupon to the cashier last, this coupon is taking a 15% discount off of $57 − $7 = $50. This results in different prices.

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?

$7.14

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

$30.00

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

$16.95

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?
   The customer will pay $7.56 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
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   The total price of the jacket is $41.45.

6. Does the order you use the coupons make a difference? Explain your thinking.
   Explanations vary. Yes. Since Jackie is using the 15% off coupon first, the 15% discount is applied to the original price of the jacket, which is $57. On the other hand, when you hand the 15% off coupon to the cashier last, this coupon is taking a 15% discount off of $57 − $7 = $50. This results in different prices.

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8. A paintbrush set costs $31.50 after tax. How much did it cost before tax?
   $30.00

9. A sketchbook costs $18.00 after tax. How much did it cost before tax?
   $16.95

Practice Problem Analysis

Problem	DOK	Standard(s)
1	1	7.RP.A.3
2	1	7.RP.A.3
3	1	7.RP.A.3
4	2	7.RP.A.3
5	2	7.RP.A.3
6	2	7.RP.A.3
7	1	7.RP.A.3
8	1	7.RP.A.3
9	1	7.RP.A.3

Notes:

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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?

36 cups of yellow paint should be mixed with 2 cups of orange paint to make the shade of paint 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.

Explanations vary. Basil is \$6.00 per ounce. Rosemary is \$5.60 per ounce. Oregano is \$6.60 per ounce. So, the least expensive spice per ounce is rosemary,

3. Which spice is the most expensive per ounce?

Explanations vary. Basil is \$6.00 per ounce. Oregano is \$5.60 per ounce. Oregano is \$6.60 per ounce. So, the most expensive spice per ounce is oregano.

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
20	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. $c = 2s$

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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?

It takes the tortoise $8\frac{1}{3}$ minutes to reach a distance of 5 feet from the beach.

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

The tortoise will be $13\frac{1}{3}$ feet 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 4.11

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?

   36 cups of yellow paint should be mixed with 2 cups of orange paint to make the shade of paint 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.

   Explanations vary. Basil is $6.00 per ounce. Rosemary is $5.60 per ounce. Oregano is $6.60 per ounce. So, the least expensive spice per ounce is rosemary.

3. Which spice is the most expensive per ounce?

   Explanations vary. Basil is $6.00 per ounce. Oregano is $5.60 per ounce. Oregano is $6.60 per ounce. So, the most expensive spice per ounce is oregano.

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
20	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. $c = 2s$

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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?

   It takes the tortoise $8\frac{1}{3}$ minutes to reach a distance of 5 feet from the beach.

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

   The tortoise will be $13\frac{1}{3}$ feet 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. $d = \frac{3}{5}t$

Practice Problem Analysis

Problem	DOK	Standard(s)
1	1	7.RP.A.2
2	2	7.RP.A.1, 7.RP.A.2
3	2	7.RP.A.1, 7.RP.A.2
4	1	7.RP.A.2
5	2	7.RP.A.1, 7.RP.A.2
6	1	7.RP.A.2
7	1	7.RP.A.2
8	2	7.RP.A.1, 7.RP.A.2

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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?

Cordelia's house would be 9 inches from the library on a map that has a scale of 1 inch to 60 miles.

3. What is 30% of 180?

54

4. What is 180% of 60?

108

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

x	y
12	**4**
19	$6\frac{1}{3}$
24	**8**

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?

$1\frac{2}{3}$ gallons of red paint are needed.

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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
2	8
$2\frac{5}{8}$	$10\frac{1}{2}$

Name: Date: Period:

Additional Practice 4.12

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

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

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?

Cordelia's house would be 9 inches from the library on a map that has a scale of 1 inch to 60 miles.

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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.

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$\frac{1}{4}$	1
$\frac{3}{4}$	3
$1\frac{1}{2}$	6
2	8
$2\frac{5}{8}$	$10\frac{1}{2}$

Practice Problem Analysis

Problem	DOK	Standard(s)
1	1	7.RP.A.2
2	2	7.RP.A.2
3	1	7.RP.A.2
4	1	7.RP.A.2
5	1	7.RP.A.2
6	1	7.RP.A.2
7	1	7.RP.A.1, 7.RP.A.2
8	2	7.RP.A.1, 7.RP.A.2

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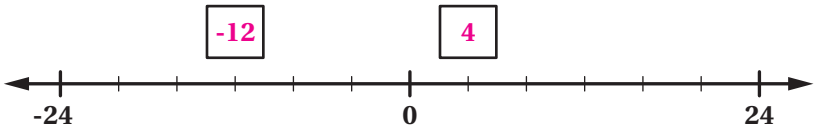
Name: ..... Date: ..... Period: .....

Additional Practice 7.01

Problems 1–4: Fill in the blanks on the number lines.

1.



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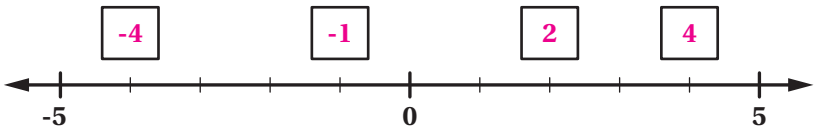

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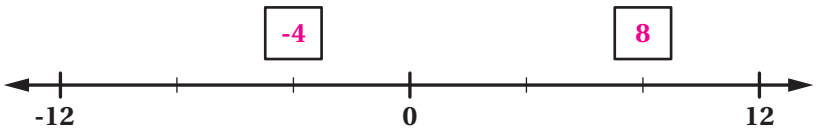

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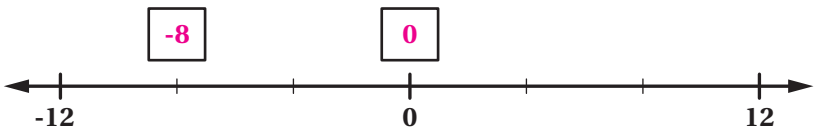

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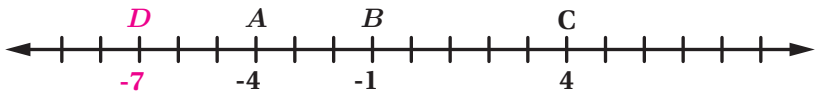
Name: ..... Date: ..... Period: .....

Problems 5–8: Here is a number line.



5. Describe where you would plot 50 on the number line.

Since 50 is a positive number, I would plot 50 on the right side of the number line.

6. Point D is 3 units to the left of point A. Plot point D.

See graph.

7. Point E is at 0. Where is Point E located?

A. To the left of Point A

B. Between Points A and B

C. Between Points B and C

D. To the right of Point C

8. What locations are 2 units away from point B?

A. -3 and 1

B. -4 and 2

C. -5 and -2

D. -6 and -5

Name: Date: Period:

Additional Practice 7.02

1. For each number, name its opposite.

a. 0
0

b. 11
−11

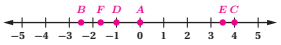
c. $-1\frac{1}{3}$
$1\frac{1}{3}$

d. −3.125
3.125

e. 9.15
−9.15

f. $\frac{3}{4}$
$-\frac{3}{4}$

2. Plot and label each point on the number line.



a. Point A is located at the opposite of 0.

b. Point B is located at the opposite of 2.5.

c. Point C is located at the opposite of −4.

d. Point D is located at −1.

e. Point E is located at 3.5.

f. Point F is located at $-\frac{5}{3}$.

3. Where would the temperature −3.2°F be located on a thermometer? Select *all* that apply.

- ☑ **A.** Between 0 and −5
- ☐ **B.** Between 2 and 4
- ☑ **C.** Between −3 and −4
- ☐ **D.** Between 3 and −3
- ☑ **E.** Between −10 and 0
- ☑ **F.** Between −3 and −3.5

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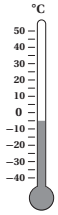
Name: Date: Period:

4. Where would the number $-\frac{17}{2}$ be located on a number line? Select *all* that apply.

- ☐ **A.** Between −16 and −18
- ☑ **B.** Between −7 and −10
- ☑ **C.** Between $-\frac{19}{2}$ and $-\frac{15}{2}$
- ☐ **D.** Between −6 and −8
- ☐ **E.** Between −15 and −17
- ☑ **F.** Between $-\frac{33}{4}$ and $-\frac{35}{4}$

5. Refer to the thermometer showing degrees Celsius.



a. What is the temperature shown?
−5°C

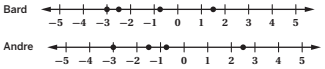
b. What is the opposite of the temperature shown?
5°C

c. What would the temperature be if it was 5° warmer?
0°C

d. What would the temperature be if it was 10° colder?
−15°C

e. What would the temperature be if it was 2.5° warmer?
−2.5°C

6. Bard and Andre each plotted the numbers $-\frac{3}{4}$, $1\frac{1}{2}$, −3, and 2.5 on the number lines shown. Who is correct? Explain your thinking.

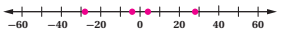


Neither is correct; Sample response:
Bard graphed 2.5 incorrectly, and Andre graphed $1\frac{1}{2}$ incorrectly.

7. The temperatures in Miami, FL, and Anchorage, AK, are rarely the same.

a. One evening, the temperature in Miami was 28°C. During that same evening in Anchorage, it was 32°C cooler than it was in Miami. What was the temperature in Anchorage?
−4°C

b. For both cities, plot the temperature and their opposite temperature.



c. Clare says the temperature for Miami is closer to 0 than the temperature for Anchorage. Do you agree? Explain your thinking.
I do not agree with Clare; Sample response: The temperature for Miami is 28°C and the temperature for Anchorage is −4°C; −4°C is closer to 0.

Practice Problem Analysis

Problem	DOK	Standard(s)
1	1	6.NS.C.6.A
2	1	6.NS.C.6.C
3	2	6.NS.C.6
4	2	6.NS.C.6
5	2	6.NS.C.6, 6.NS.C.6.A
6	3	6.NS.C.6.C
7	3	6.NS.C.6

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

Additional Practice 7.02

1. For each number, name its opposite.

a 0

0

b 11

−11

c $-1\frac{1}{3}$

$1\frac{1}{3}$

d -3.125

3.125

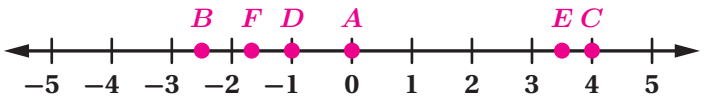
e 9.15

−9.15

f $\frac{3}{4}$

$-\frac{3}{4}$

2. Plot and label each point on the number line.



a Point A is located at the opposite of 0.

b Point B is located at the opposite of 2.5.

c Point C is located at the opposite of -4.

d Point D is located at -1.

e Point E is located at 3.5.

f Point F is located at $-\frac{5}{3}$.

3. Where would the temperature $-3.2°\text{F}$ be located on a thermometer? Select *all* that apply.

☑ **A.** Between 0 and -5

☐ **B.** Between 2 and 4

☑ **C.** Between -3 and -4

☐ **D.** Between 3 and -3

☑ **E.** Between -10 and 0

☑ **F.** Between -3 and -3.5

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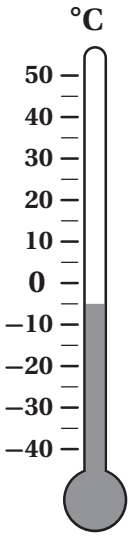
Name: ..... Date: ..... Period: .....

4. Where would the number $-\frac{17}{2}$ be located on a number line? Select *all* that apply.

- ☐ **A.** Between -16 and -18
- ☑ **B.** Between -7 and -10
- ☑ **C.** Between $-\frac{19}{2}$ and $-\frac{15}{2}$
- ☐ **D.** Between -6 and -8
- ☐ **E.** Between -15 and -17
- ☑ **F.** Between $-\frac{33}{4}$ and $-\frac{35}{4}$

5. Refer to the thermometer showing degrees Celsius.



a What is the temperature shown?

−5°C

b What is the opposite of the temperature shown?

5°C

c What would the temperature be if it was 5° warmer?

0°C

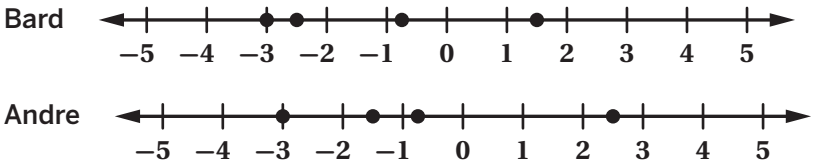
d What would the temperature be if it was 10° colder?

−15°C

e What would the temperature be if it was 2.5° warmer?

−2.5°C

6. Bard and Andre each plotted the numbers $-\frac{3}{4}$, $1\frac{1}{2}$, -3, and 2.5 on the number lines shown. Who is correct? Explain your thinking.



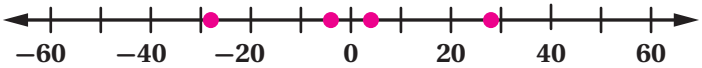
Neither is correct; Sample response:
Bard graphed 2.5 incorrectly, and Andre graphed $1\frac{1}{2}$ incorrectly.

7. The temperatures in Miami, FL, and Anchorage, AK, are rarely the same.

a One evening, the temperature in Miami was 28°C. During that same evening in Anchorage, it was 32°C cooler than it was in Miami. What was the temperature in Anchorage?

−4°C

b For both cities, plot the temperature and their opposite temperature.



c Clare says the temperature for Miami is closer to 0 than the temperature for Anchorage. Do you agree? Explain your thinking.

I do not agree with Clare; Sample response: The temperature for Miami is 28°C and the temperature for Anchorage is −4°C; −4°C is closer to 0.

Name: Date: Period:

Additional Practice 7.02

1. For each number, name its opposite.

a. 0
0

b. 11
−11

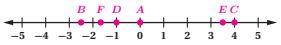
c. $-1\frac{1}{3}$
$1\frac{1}{3}$

d. −3.125
3.125

e. 9.15
−9.15

f. $\frac{3}{4}$
$-\frac{3}{4}$

2. Plot and label each point on the number line.



a. Point A is located at the opposite of 0.

b. Point B is located at the opposite of 2.5.

c. Point C is located at the opposite of −4.

d. Point D is located at −1.

e. Point E is located at 3.5.

f. Point F is located at $-\frac{5}{3}$.

3. Where would the temperature −3.2°F be located on a thermometer? Select *all* that apply.

- ☑ **A.** Between 0 and −5
- ☐ **B.** Between 2 and 4
- ☑ **C.** Between −3 and −4
- ☐ **D.** Between 3 and −3
- ☑ **E.** Between −10 and 0
- ☑ **F.** Between −3 and −3.5

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Name: Date: Period:

4. Where would the number $-\frac{17}{2}$ be located on a number line? Select *all* that apply.

- ☐ **A.** Between −16 and −18
- ☑ **B.** Between −7 and −10
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- ☐ **E.** Between −15 and −17
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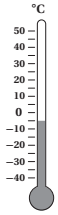
5. Refer to the thermometer showing degrees Celsius.



a. What is the temperature shown?
−5°C

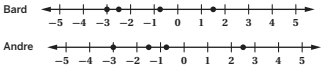
b. What is the opposite of the temperature shown?
5°C

c. What would the temperature be if it was 5° warmer?
0°C

d. What would the temperature be if it was 10° colder?
−15°C

e. What would the temperature be if it was 2.5° warmer?
−2.5°C

6. Bard and Andre each plotted the numbers $-\frac{3}{4}$, $1\frac{1}{2}$, −3, and 2.5 on the number lines shown. Who is correct? Explain your thinking.



Neither is correct; Sample response:
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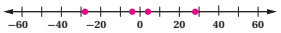

c. Clare says the temperature for Miami is closer to 0 than the temperature for Anchorage. Do you agree? Explain your thinking.
I do not agree with Clare; Sample response: The temperature for Miami is 28°C and the temperature for Anchorage is −4°C; −4°C is closer to 0.

Practice Problem Analysis

Problem	DOK	Standard(s)
1	1	6.NS.C.6.A
2	1	6.NS.C.6.C
3	2	6.NS.C.6
4	2	6.NS.C.6
5	2	6.NS.C.6, 6.NS.C.6.A
6	3	6.NS.C.6.C
7	3	6.NS.C.6

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Additional Practice 7.04

1. Here are five numbers: $-\frac{3}{4}, -2, 1, \frac{3}{2}, 2$

Suppose these numbers are plotted on a horizontal number line. Which statement about the locations of the numbers is true?

A. 2 is the farthest to the right, and $-\frac{3}{4}$ is farthest to the left.

B. 2 is the farthest to the right, and -2 is farthest to the left.

C. 1 is the farthest to the right, and $-\frac{3}{4}$ is farthest to the left.

D. $-\frac{3}{4}$ is the farthest to the right, and 2 is farthest to the left.

Problems 2–4: Circle whether each statement is *true* or *false*.

2. -2.7 is to the left of -1.9 on the number line. True False

3. -3.2 is greater than -2.1. True False

4. Choose one statement from the previous two problems and explain your thinking.

Explanations vary. I choose the statement: –3.2 is greater than –2.1. This is false because –3.2 is farther to the left on the number line than –2.1 Since –3.2 is farther to the left, it is less than –2.1

5. Use the symbols $>$, $<$, or $=$ to compare each pair of numbers.

a $\frac{3}{4} \boxed{<} \frac{7}{8}$

b $\frac{1}{4} \boxed{=} \frac{2}{8}$

c $\frac{6}{10} \boxed{>} 0.5$

d $0.5 \boxed{=} \frac{50}{100}$

e $\frac{9}{11} \boxed{<} \frac{9}{10}$

f $\frac{1}{2} \boxed{>} \frac{1}{4}$

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

6. Use the symbols >, <, or = to compare each pair of numbers.

a $9.12 \boxed{<} 9.21$

b $6.4 \boxed{>} 6.04$

c $17.9 \boxed{=} 17.90$

d $12.25 \boxed{<} 12.52$

e $4.0 \boxed{=} 4.00$

f $5.8 \boxed{<} 58$

7. Which expressions are solutions to the equation $\frac{5}{6}x = 10$? Select *all* that apply.

☑ **A.** $10 \div \frac{5}{6}$

☐ **B.** $10 \div \frac{6}{5}$

☑ **C.** $\frac{10}{\frac{5}{6}}$

☐ **D.** $\frac{5}{6} \div 10$

☐ **E.** $10 \cdot \frac{5}{6}$

☑ **F.** $\frac{6}{5} \cdot 10$

8. Diego is selling raffle tickets for $1.50 per ticket. Complete the table to show how much money he would earn if he sold each number of tickets.

Number of tickets sold	20	50	r
Amount earned ($)	**30**	**75**	**$1.50r$**

9. Movie tickets at a local theater sell for $8.25.

a Complete the table to show how much the theater will earn for selling each number of movie tickets.

Number of tickets sold	4	22	t
Amount earned ($)	**33**	**181.50**	**$8.25t$**

b Mai says that in order for the theater to earn $561, the theater must sell 60 tickets. Is Mai correct? Explain your reasoning.

No; Sample response: To earn $561, divide that value by 8.25. The movie theater needs to sell 68 tickets.

Name: Date: Period:

Additional Practice 7.04

1. Here are five numbers: $-\frac{3}{4}, -2, 1, \frac{3}{2}, 2$

Suppose these numbers are plotted on a horizontal number line. Which statement about the locations of the numbers is true?

A. 2 is the farthest to the right, and $-\frac{3}{4}$ is farthest to the left.

B. 2 is the farthest to the right, and -2 is farthest to the left.

C. 1 is the farthest to the right, and $-\frac{3}{4}$ is farthest to the left.

D. $-\frac{3}{4}$ is the farthest to the right, and 2 is farthest to the left.

Problems 2–4: Circle whether each statement is *true* or *false*.

2. -2.7 is to the left of -1.9 on the number line. True False

3. -3.2 is greater than -2.1. True False

4. Choose one statement from the previous two problems and explain your thinking.

Explanations vary. I choose the statement: –3.2 is greater than –2.1. This is false because –3.2 is farther to the left on the number line than –2.1 Since –3.2 is farther to the left, it is less than –2.1

5. Use the symbols >, <, or = to compare each pair of numbers.

a. $\frac{3}{4} < \frac{7}{8}$

b. $\frac{1}{4} = \frac{2}{8}$

c. $\frac{6}{10} > 0.5$

d. $0.5 = \frac{50}{100}$

e. $\frac{9}{11} < \frac{9}{10}$

f. $\frac{1}{2} > \frac{1}{4}$

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Name: Date: Period:

6. Use the symbols >, <, or = to compare each pair of numbers.

a. $9.12 < 9.21$

b. $6.4 > 6.04$

c. $17.9 = 17.90$

d. $12.25 < 12.52$

e. $4.0 = 4.00$

f. $5.8 < 58$

7. Which expressions are solutions to the equation $\frac{5}{6}x = 10$? Select *all* that apply.

☑ A. $10 \div \frac{5}{6}$

☐ B. $10 \div \frac{6}{5}$

☑ C. $\frac{10}{\frac{5}{6}}$

☐ D. $\frac{5}{6} \div 10$

☐ E. $10 \cdot \frac{5}{6}$

☑ F. $\frac{6}{5} \cdot 10$

8. Diego is selling raffle tickets for $1.50 per ticket. Complete the table to show how much money he would earn if he sold each number of tickets.

Number of tickets sold	20	50	r
Amount earned ($)	30	75	$1.50r$

9. Movie tickets at a local theater sell for $8.25.

a. Complete the table to show how much the theater will earn for selling each number of movie tickets.

Number of tickets sold	4	22	t
Amount earned ($)	33	181.50	$8.25t$

b. Mai says that in order for the theater to earn $561, the theater must sell 60 tickets. Is Mai correct? Explain your reasoning.

No; Sample response: To earn $561, divide that value by 8.25. The movie theater needs to sell 68 tickets.

Practice Problem Analysis

Problem	DOK	Standard(s)
1	1	6.NS.C.6.C, 6.NS.C.7.A
2	1	6.NS.C.6.C, 6.NS.C.7.A
3	1	6.NS.C.6.C, 6.NS.C.7.A
4	2	6.NS.C.6.C, 6.NS.C.7.A
5	1	5.NBT.A.3.B
6	1	5.NBT.A.3.B
7	2	6.EE.B.5, 6.EE.B.7
8	2	6.EE.A.2.A, 6.EE.B.6
9	3	6.EE.A.2.A, 6.EE.B.6

Notes:

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

Additional Practice 7.03

1. Write an integer that represents each elevation.

a The Dead Sea has an elevation of 430 m below sea level.

−430 m

b Santa Fe, New Mexico, has an elevation of 2,194 m above sea level.

2,194 m

c Indio, California, has an elevation of 6 m below sea level.

−6 m

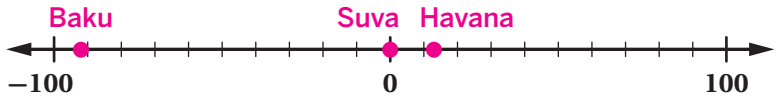
d Lake Eyre, Australia, has an elevation of 16 m below sea level.

−16 m

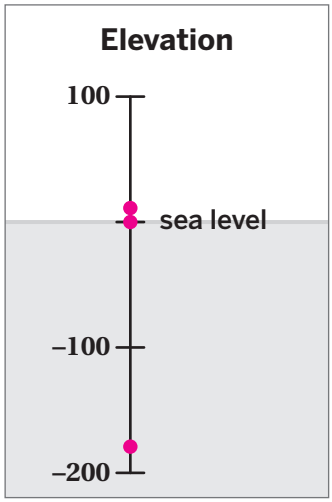
e Flagstaff, Arizona, has an elevation of 2,106 m above sea level.

2,106 m

2. Baku, Azerbaijan, has an elevation of 92 ft below sea level. Suva, Fiji, has an elevation at sea level. Havana, Cuba, has an elevation of 13 ft above sea level. Plot and label each location as a point on the number line.



3. The statements in parts a–d describe the movements of a humpback whale in the ocean. Each statement starts from the whale's elevation in the previous statement.



a A humpback whale is at the surface of the ocean to breathe. What is the whale's elevation?

0 ft

b The whale then dives down 180 ft to feed. What is the whale's elevation now?

−180 ft

c The whale breaches (leaps) 10 ft into the air. What is the whale's elevation now?

10 ft

d Plot and label the three elevations as points on the vertical number line.

4. Complete these problems about sea level and elevation.

a Which elevation is closer to sea level: −12 m or 15 m?

−12 m

b Which elevation is closer to sea level: 10 m or −20 m?

10 m

c A sea gull dives 12 ft below sea level. Then it swims 9 ft toward the surface. What is its elevation?

−3 ft

d Another sea gull dives 9 ft below sea level. Then it swims down another 16 ft. What is its elevation?

−25 ft

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

5. Complete the table for each elevation with the correct sign and its relation to sea level.

Elevation	Corresponding sign (+/–/no sign)	Relation to sea level (above/below/at)
–26 m	–	below
0 yd	no sign	at
15 ft	+	above

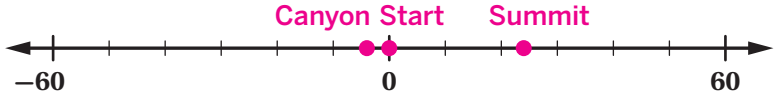
6. These statements describe the movements of a hiker on a trail. Each statement starts from the hiker's elevation in the previous statement.

a A hiker starts the trail at the base of the trail which is at sea level. What is the hiker's elevation?
0 m

b The hiker then walks up 24 m to a small summit. What is the hiker's elevation now?
24 m

c The hiker then walks down 28 m into Red Canyon. What is the hiker's elevation now?
–4 m

d Plot and label the three elevations as points on the horizontal number line.



7. Using what you know about positive and negative numbers, complete these problems.

a The temperature was 12°C at nightfall and then dropped 8° by midnight. What was the temperature at midnight?

4°C

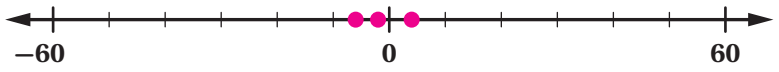
b The temperature was –8°C at dawn. By noon, the temperature rose 6°. What was the temperature at noon?

–2°C

c The temperature was 24°C at nightfall and then dropped 30° by sunrise. What was the temperature at sunrise?

–6°C

d Plot and label the three temperatures as points on the horizontal number line.



8. Clare claims that a city with an elevation of –15 ft is closer to sea level than a city with an elevation of 12 ft. Do you agree with her claim? Explain your thinking.

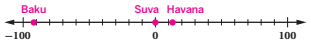
I disagree; Sample response: A city with an elevation of –15 ft is 15 ft away from sea level, and a city with an elevation of 12 ft is 12 ft away from sea level. A city with an elevation of 12 ft is closer to sea level.

Name: Date: Period:

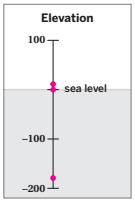
Additional Practice 7.03

1. Write an integer that represents each elevation.
   a. The Dead Sea has an elevation of 430 m below sea level.
   −430 m
   b. Santa Fe, New Mexico, has an elevation of 2,194 m above sea level.
   2,194 m
   c. Indio, California, has an elevation of 6 m below sea level.
   −6 m
   d. Lake Eyre, Australia, has an elevation of 16 m below sea level.
   −16 m
   e. Flagstaff, Arizona, has an elevation of 2,106 m above sea level.
   2,106 m

2. Baku, Azerbaijan, has an elevation of 92 ft below sea level. Suva, Fiji, has an elevation at sea level. Havana, Cuba, has an elevation of 13 ft above sea level. Plot and label each location as a point on the number line.



3. The statements in parts a–d describe the movements of a humpback whale in the ocean. Each statement starts from the whale's elevation in the previous statement.
   a. A humpback whale is at the surface of the ocean to breathe. What is the whale's elevation?
   0 ft
   b. The whale then dives down 180 ft to feed. What is the whale's elevation now?
   −180 ft
   c. The whale breaches (leaps) 10 ft into the air. What is the whale's elevation now?
   10 ft
   d. Plot and label the three elevations as points on the vertical number line.



4. Complete these problems about sea level and elevation.
   a. Which elevation is closer to sea level: −12 m or 15 m?
   −12 m
   b. Which elevation is closer to sea level: 10 m or −20 m?
   10 m
   c. A sea gull dives 12 ft below sea level. Then it swims 9 ft toward the surface. What is its elevation?
   −3 ft
   d. Another sea gull dives 9 ft below sea level. Then it swims down another 16 ft. What is its elevation?
   −25 ft

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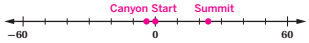
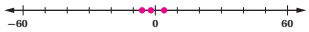
5. Complete the table for each elevation with the correct sign and its relation to sea level.

Elevation	Corresponding sign (+/−/no sign)	Relation to sea level (above/below/at)
−26 m	−	below
0 yd	no sign	at
15 ft	+	above

6. These statements describe the movements of a hiker on a trail. Each statement starts from the hiker's elevation in the previous statement.
   a. A hiker starts the trail at the base of the trail which is at sea level. What is the hiker's elevation?
   0 m
   b. The hiker then walks up 24 m to a small summit. What is the hiker's elevation now?
   24 m
   c. The hiker then walks down 28 m into Red Canyon. What is the hiker's elevation now?
   −4 m
   d. Plot and label the three elevations as points on the horizontal number line.



7. Using what you know about positive and negative numbers, complete these problems.
   a. The temperature was 12°C at nightfall and then dropped 8° by midnight. What was the temperature at midnight?
   4°C
   b. The temperature was −8°C at dawn. By noon, the temperature rose 6°. What was the temperature at noon?
   −2°C
   c. The temperature was 24°C at nightfall and then dropped 30° by sunrise. What was the temperature at sunrise?
   −6°C
   d. Plot and label the three temperatures as points on the horizontal number line.



8. Clare claims that a city with an elevation of −15 ft is closer to sea level than a city with an elevation of 12 ft. Do you agree with her claim? Explain your thinking.
   I disagree; Sample response: A city with an elevation of −15 ft is 15 ft away from sea level, and a city with an elevation of 12 ft is 12 ft away from sea level. A city with an elevation of 12 ft is closer to sea level.

Practice Problem Analysis

Problem	DOK	Standard(s)
1	1	6.NS.C.5
2	1	6.NS.C.5, 6.NS.C.6
3	2	6.NS.C.5
4	2	6.NS.C.5
5	2	6.NS.C.5
6	2	6.NS.C.5
7	2	6.NS.C.5
8	3	6.NS.C.5

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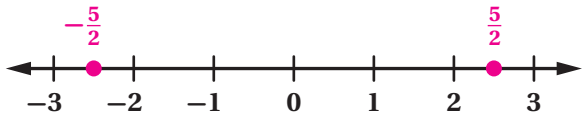
Name: ..... Date: ..... Period: .....

Additional Practice 7.05

1. Plot and label *all* the numbers that have an absolute value of $\frac{5}{2}$ on the number line.



2. Order these values from least to greatest.
$|3.4|, |-2|, 0, 2.6, -1$

−1, 0, |−2| , 2.6, |3.4|

3. The temperature at midnight was $4°C$ away from $0°C$. Select *all* the temperatures that could have been the temperature at midnight.

- ☐ **A.** $8°C$
- ☑ **B.** $4°C$
- ☐ **C.** $0°C$
- ☑ **D.** $-4°C$
- ☐ **E.** $-8°C$

4. The temperature at sunrise was $8°C$ away from $0°C$. List *all* the temperatures that could have been the temperature at sunrise.

8°C and −8°C

5. Coachella Valley, CA has an elevation of 21 m below sea level.

a Using absolute value, represent the distance of Coachella Valley from sea level.

|−21|

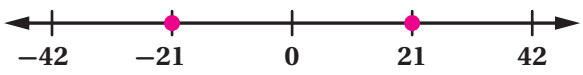
b Using an integer, represent the elevation of Coachella Valley.

−21

c Using an integer, represent the opposite elevation of Coachella Valley.

21 m

d Plot the elevation of Coachella Valley and its absolute value on the number line.



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

6. Determine the absolute value of each number.

a $\left|-\frac{11}{12}\right|$

$\frac{11}{12}$

b $|-8|$

8

c $\left|1\frac{3}{4}\right|$

$1\frac{3}{4}$

d $|3.9|$

3.9

7. Andre has three cats: Sparkles, Ember, and Ash. All three cats had the same weight at the beginning of the year. The table shows their change in weight by the end of the year.

	Change in weight (lb)
Sparkles	$2\frac{1}{2}$
Ember	$-\frac{1}{4}$
Ash	$-2\frac{1}{4}$

a Order the cats from least to greatest absolute value of change in weight.

Ember, Ash, Sparkles

b Who had the greatest change in weight during the year? Explain your thinking.

Sparkles; Sample response: Sparkles had the greatest change in weight during the year because $2\frac{1}{2}$ is the farthest from 0 on a number line.

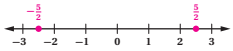
8. Shawn claims that the expressions 3.8 and $|-3.8|$ do not have the same value because $|-3.8|$ includes a negative symbol and an absolute value symbol. Do you agree with Shawn? Explain your thinking.

I disagree with Shawn; Sample response: The expressions have the same value. The absolute value of -3.8 is 3.8, so it has the same value as 3.8.

Name: Date: Period:

Additional Practice 7.05

1. Plot and label *all* the numbers that have an absolute value of $\frac{5}{2}$ on the number line.



2. Order these values from least to greatest.
$|3.4|, |-2|, 0, 2.6, -1$

$-1, 0, |-2|, 2.6, |3.4|$

3. The temperature at midnight was 4°C away from 0°C. Select *all* the temperatures that could have been the temperature at midnight.

- ☐ A. 8°C
- ☑ B. 4°C
- ☐ C. 0°C
- ☑ D. −4°C
- ☐ E. −8°C

4. The temperature at sunrise was 8°C away from 0°C. List *all* the temperatures that could have been the temperature at sunrise.

8°C and −8°C

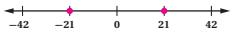
5. Coachella Valley, CA has an elevation of 21 m below sea level.

a. Using absolute value, represent the distance of Coachella Valley from sea level.
$|-21|$

b. Using an integer, represent the elevation of Coachella Valley.
-21

c. Using an integer, represent the opposite elevation of Coachella Valley.
21 m

d. Plot the elevation of Coachella Valley and its absolute value on the number line.



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Name: Date: Period:

6. Determine the absolute value of each number.

a. $\left|-\frac{11}{12}\right|$
$\frac{11}{12}$

b. $|-8|$
8

c. $\left|1\frac{3}{4}\right|$
$1\frac{3}{4}$

d. $|3.9|$
3.9

7. Andre has three cats: Sparkles, Ember, and Ash. All three cats had the same weight at the beginning of the year. The table shows their change in weight by the end of the year.

	Change in weight (lb)
Sparkles	$2\frac{1}{2}$
Ember	$-\frac{1}{4}$
Ash	$-2\frac{1}{4}$

a. Order the cats from least to greatest absolute value of change in weight.
Ember, Ash, Sparkles

b. Who had the greatest change in weight during the year? Explain your thinking.
Sparkles; Sample response: Sparkles had the greatest change in weight during the year because $2\frac{1}{2}$ is the farthest from 0 on a number line.

8. Shawn claims that the expressions 3.8 and $|-3.8|$ do not have the same value because $|-3.8|$ includes a negative symbol and an absolute value symbol. Do you agree with Shawn? Explain your thinking.
I disagree with Shawn; Sample response: The expressions have the same value. The absolute value of −3.8 is 3.8, so it has the same value as 3.8.

Practice Problem Analysis

Problem	DOK	Standard(s)
1	1	6.NS.C.7.C
2	1	6.NS.C.7.D
3	2	6.NS.C.7.C
4	2	6.NS.C.7.C
5	2	6.NS.C.7.C, 6.NS.C.7.D
6	1	6.NS.C.7.C
7	2	6.NS.C.7.D
8	3	6.NS.C.7

Notes:

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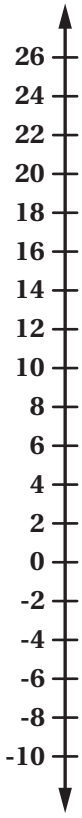
Name: ..... Date: ..... Period: .....

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?

Amsterdam

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?

Hamburg

3. How much higher is Miami than New Orleans?

9 feet

4. How much higher is Hamburg than Amsterdam?

31 feet

5. How much higher is Hamburg than New Orleans?

30 feet

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.

650 feet. $400 - (-250) = 400 + 250 + 650$ feet

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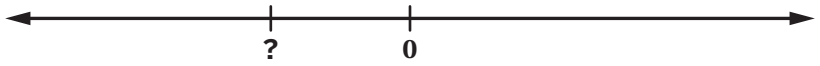
Name: ..... Date: ..... Period: .....

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.

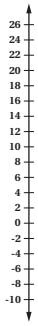
	Starting Position	Submarine Actions	Final Position
8.	-4	Add 3 floats Add 2 anchors	**-3**
9.	1	Add 6 anchors Add 1 float	**-4**
10.	-2	Remove 1 float Add 1 anchor	**-2**

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?

   Amsterdam

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?

   Hamburg

3. How much higher is Miami than New Orleans?

   9 feet

4. How much higher is Hamburg than Amsterdam?

   31 feet

5. How much higher is Hamburg than New Orleans?

   30 feet

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.

   650 feet. $400 - (-250) = 400 + 250 + 650$ feet

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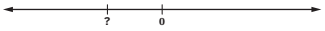
Name: Date: Period:

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	-3
9.	1	Add 6 anchors Add 1 float	-4
10.	-2	Remove 1 float Add 1 anchor	-2

Practice Problem Analysis

Problem	DOK	Standard(s)
1	1	7.NS.A.1B, 7.NS.A.1C
2	1	7.NS.A.1B, 7.NS.A.1C
3	1	7.NS.A.1B, 7.NS.A.1C
4	1	7.NS.A.1B, 7.NS.A.1C
5	1	7.NS.A.1B, 7.NS.A.1C
6	1	7.NS.A.1B, 7.NS.A.1C
7	1	7.NS.A.1B, 7.NS.A.1C
8	1	7.NS.A.1B, 7.NS.A.1C
9	1	7.NS.A.1B, 7.NS.A.1C
10	1	7.NS.A.1B, 7.NS.A.1A

Notes:

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

Additional Practice 5.02

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

1. $6 + -2 = 4$

2. $-6 + 2 = -4$

3. $-6 - 2 = -8$

4. $-6 - (-2) = -4$

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

-4

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

-28

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

-4

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.

Responses vary. 6 feet underwater can be represented by -6. Swimming 4 feet deeper can be represented by -4. Whether I start at -6 and subtract 4 or add -4, I will still move down 4 feet to a position of -10 feet.

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Name: Date: Period:

Problems 9–10: The table shows eight expressions.

9. Determine the value of each expression.

	Expression	Value
Expression 1	$2 + 4 - 6$	**0**
Expression 2	$2 + 4 - 6 + 8$	**8**
Expression 3	$2 + 4 - 6 + 8 - 10$	**−2**
Expression 4	$2 + 4 - 6 + 8 - 10 + 12$	**10**
Expression 5	$2 + 4 - 6 + 8 - 10 + 12 - 14$	**−4**
Expression 6	$2 + 4 - 6 + 8 - 10 + 12 - 14 + 16$	**12**
Expression 7	$2 + 4 - 6 + 8 - 10 + 12 - 14 + 16 - 18$	**−6**
Expression 8	$2 + 4 - 6 + 8 - 10 + 12 - 14 + 16 - 18 + 20$	**14**

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

9th expression: −8 ***Explanations vary:*** **Every odd expression decreases by 2 from the previous odd expression.**

10th expression: 16 ***Explanations vary:*** **Every even expression increases by 2 from the previous odd expression.**

20th expression: 26 ***Explanations vary:*** **The 20th expression will be 5 increases of 2 from the 10th expression. $16 + 2(5) = 26$**

Name: Date: Period:

Additional Practice 5.02

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

1. $6 + -2 = 4$
2. $-6 + 2 = -4$
3. $-6 - 2 = -8$
4. $-6 - (-2) = -4$

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

   -4

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

   -28

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

   -4

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.

   Responses vary. 6 feet underwater can be represented by -6. Swimming 4 feet deeper can be represented by -4. Whether I start at -6 and subtract 4 or add -4, I will still move down 4 feet to a position of -10 feet.

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Name: Date: Period:

Problems 9–10: The table shows eight expressions.

9. Determine the value of each expression.

	Expression	Value
Expression 1	$2 + 4 - 6$	0
Expression 2	$2 + 4 - 6 + 8$	8
Expression 3	$2 + 4 - 6 + 8 - 10$	-2
Expression 4	$2 + 4 - 6 + 8 - 10 + 12$	10
Expression 5	$2 + 4 - 6 + 8 - 10 + 12 - 14$	-4
Expression 6	$2 + 4 - 6 + 8 - 10 + 12 - 14 + 16$	12
Expression 7	$2 + 4 - 6 + 8 - 10 + 12 - 14 + 16 - 18$	-6
Expression 8	$2 + 4 - 6 + 8 - 10 + 12 - 14 + 16 - 18 + 20$	14

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

    9th expression: -8 *Explanations vary:* Every odd expression decreases by 2 from the previous odd expression.

    10th expression: 16 *Explanations vary:* Every even expression increases by 2 from the previous odd expression.

    20th expression: 26 *Explanations vary:* The 20th expression will be 5 increases of 2 from the 10th expression. $16 + 2(5) = 26$

Practice Problem Analysis

Problem	DOK	Standard(s)
1	1	7.NS.A.1.B
2	1	7.NS.A.1.B
3	1	7.NS.A.1.C
4	1	7.NS.A.1.C
5	1	7.NS.A.1.C
6	1	7.NS.A.1.C
7	1	7.NS.A.1.B
8	1	7.NS.A.1.C
9	1	7.NS.A.1.C, 7.NS.A.1.D
10	2	7.NS.A.1.C

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

Additional Practice 5.03

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

1. $12 + a = 5$

$a = -7$

2. $-4.5 + b = 6.5$

$b = 11$

3. $c + 5.1 = 2.8$

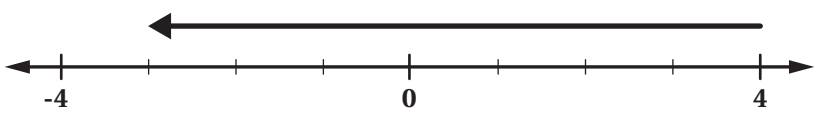
$c = -2.3$

Problems 4–5: Evaluate each expression.

4. $6 - 8 = -2$

5. $-6 - 8 = -14$

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



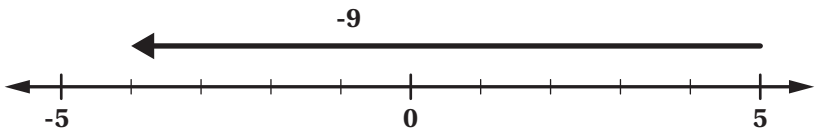
A. $x + (-3) = 4$

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. $5 + (-9) = x$

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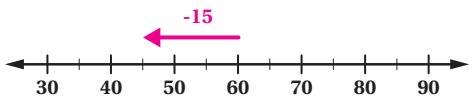
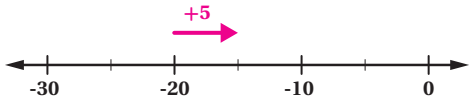
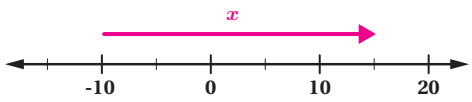
Name: ..... Date: ..... Period: .....

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.		$60 + (-15) = x$
9.	The temperature was −20°F and then rose 5°F.		$-20 + (-5) = x$
10.	At sunrise, the temperature was −10°F. At noon, the temperature is 15°F. By how much did the temperature rise?		$-10 + x = 15$

Name: Date: Period:

Additional Practice 5.03

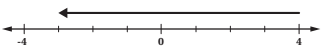
Problems 1–3: Determine the value of the variable that makes each equation true.

1. $12 + a = 5$
   $a = -7$
2. $-4.5 + b = 6.5$
   $b = 11$
3. $c + 5.1 = 2.8$
   $c = -2.3$

Problems 4–5: Evaluate each expression.

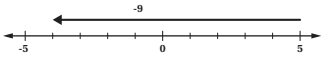
4. $6 - 8 = -2$
5. $-6 - 8 = -14$

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. $5 + (-9) = x$

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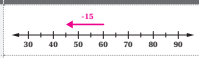
Problems 8–10: Draw an arrow diagram to represent each situation. Then write an addition equation that represents the change in temperature and the final temperature.

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

Practice Problem Analysis

Problem	DOK	Standard(s)
1	1	7.NS.A.1.B
2	1	7.NS.A.1.B
3	1	7.NS.A.1.B
4	1	7.NS.A.1.C
5	1	7.NS.A.1.C
6	1	7.NS.A.1.B
7	1	7.NS.A.1.B
8	2	7.NS.A.1.B
9	2	7.NS.A.1.B
10	2	7.NS.A.1.B

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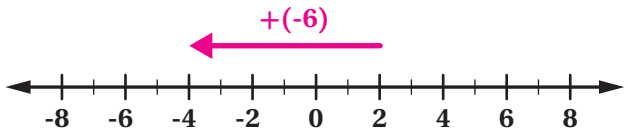
Name: ..... Date: ..... Period: .....

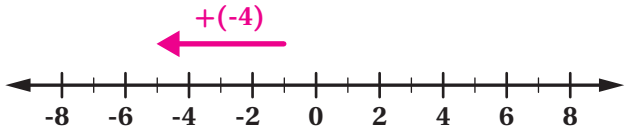
Additional Practice 5.04

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

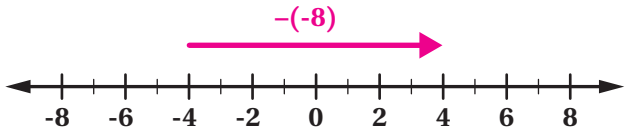
1. $2 - 6$ $= -4$



2. $(-1) + (-4)$ $= -5$



3. $-4 - (-8)$ $= 4$



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

4.

Expression	Value
$4 + (-5)$	**−1**
$-5 + 3$	**−2**
$-3 + (-10)$	**−13**
$-1.5 + (-3.7)$	**−5.2**

5.

Expression	Value
$-5 + 4$	**−1**
$3 + (-5)$	**−2**
$(-10) + (-3)$	**−13**
$-3.7 + (-1.5)$	**−5.2**

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

Responses vary. **The values of the sums are the same and order doesn't matter for addition.**

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Name: Date: Period:

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

7.

Expression	Value
$4 - 5$	**-1**
$-5 - 3$	**-8**
$-3 - (-10)$	**7**
$-1.5 - (-3.7)$	**-2.2**

8.

Expression	Value
$5 - 4$	**1**
$3 - (-5)$	**8**
$(-10) - (-3)$	**-7**
$-3.7 - (-1.5)$	**-2.2**

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

Responses vary. **If the order of the numbers being subtracted changes, the value changes to its opposite.**

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

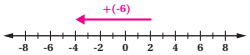
Any value of x greater than -8 will result in the need for y to be greater than 5. Since $-8 + 5 = -3$, if the value of the first number (x, or -8) decreases, then the value of the second number (y, or 5) will have to increase to get the same sum of -3.

Name: Date: Period:

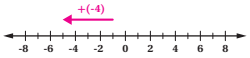
Additional Practice 5.04

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

1. $2 - 6 = -4$



2. $(-1) + (-4) = -5$



3. $-4 - (-8) = 4$

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

4.

Expression	Value
$4 + (-5)$	-1
$-5 + 3$	-2
$-3 + (-10)$	-13
$-1.5 + (-3.7)$	-5.2

5.

Expression	Value
$-5 + 4$	-1
$3 + (-5)$	-2
$(-10) + (-3)$	-13
$-3.7 + (-1.5)$	-5.2

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

Responses vary. The values of the sums are the same and order doesn't matter for addition.

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Name: Date: Period:

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

7.

Expression	Value
$4 - 5$	-1
$-5 - 3$	-8
$-3 - (-10)$	7
$-1.5 - (-3.7)$	-2.2

8.

Expression	Value
$5 - 4$	1
$3 - (-5)$	8
$(-10) - (-3)$	-7
$-3.7 - (-1.5)$	-2.2

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

Responses vary. If the order of the numbers being subtracted changes, the value changes to its opposite.

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

Any value of x greater than -8 will result in the need for y to be greater than 5. Since $-8 + 5 = -3$, if the value of the first number (x, or -8) decreases, then the value of the second number (y, or 5) will have to increase to get the same sum of -3.

Practice Problem Analysis

Problem	DOK	Standard(s)
1	1	7.NS.A.1, 7.NS.A.1.C
2	1	7.NS.A.1, 7.NS.A.1.B
3	1	7.NS.A.1, 7.NS.A.1.C
4	1	7.NS.A.1.B
5	1	7.NS.A.1.B
6	2	7.NS.A.1.B
7	1	7.NS.A.1.C
8	1	7.NS.A.1.C, 7
9	2	7.NS.A.1.C
10	2	7.NS.A.1.B, 7.NS.A.1.D

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

Additional Practice 5.05

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

1.

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

Least **Greatest**

2.

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

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.

Explanations vary. I know that when I subtract a larger number from a smaller number, I will get a negative value. I also know that subtracting a negative number is the same as adding a positive number.

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.** $-3.5 + (-15.2)$

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Name: Date: Period:

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

6. $24 + w = -24.6$

$w = -48.6$

7. $-12 - x = 10.6$

$x = -22.6$

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

$y = \frac{1}{8}$

9. $z + 8.9 = -16$

$z = -24.9$

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.

$56.7 - (-73.8)$ and $56.7 + 73.8$

b Calculate the difference in temperatures between these two locations.

130.5°C

Name: Date: Period:

Additional Practice 5.05

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

1.

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

Least **Greatest**

2.

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

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.

Explanations vary. I know that when I subtract a larger number from a smaller number, I will get a negative value. I also know that subtracting a negative number is the same as adding a positive number.

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. $-3.5+(-15.2)$

Unit 5 Lesson 5 103

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Name: Date: Period:

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

6. $24+w=-24.6$
$w=-48.6$

7. $-12-x=10.6$
$x=-22.6$

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

9. $z+8.9=-16$
$z=-24.9$

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.
$56.7-(-73.8)$ and $56.7+73.8$

b. Calculate the difference in temperatures between these two locations.
130.5°C

Unit 5 Lesson 5 104 Additional Practice

Practice Problem Analysis

Problem	DOK	Standard(s)
1	1	7.NS.A.1.B, 7.NS.A.1.C
2	1	7.NS.A.1.B, 7.NS.A.1.C
3	1	7.NS.A.1.B, 7.NS.A.1.C, 7.NS.A.1D
4	2	7.NS.A.1C
5	1	7.NS.A.1C
6	1	7.NS.A.1.B, 7.NS.A.1.C, 7.NS.A.1D
7	1	7.NS.A.1.B, 7.NS.A.1.C, 7.NS.A.1D
8	1	7.NS.A.1.B, 7.NS.A.1.C, 7.NS.A.1D
9	1	7.NS.A.1.B, 7.NS.A.1.C, 7.NS.A.1D
10	2	7.NS.A.1C, 7.NS.A.3

Notes:

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

Additional Practice 5.06

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

1. $6 \cdot a = -18$

$a = -3$

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

$b = -18$

3. $-6 \cdot c = 18$

$c = -3$

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?

$-20°\text{F}$

5. What was the temperature 2 hours ago?

$-6°\text{F}$

6. What was the temperature 4 hours ago?

$-2°\text{F}$

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.	$(-4) \cdot (-5) = -20$		X	$(-4) \cdot (-5) = 20$
8.	$8 \cdot (-3) = 24$		X	$8 \cdot (-3) = -24$
9.	$(-6) \cdot (-1) = 6$	X		

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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	$2 \cdot 4$	Up	8
Removing 3 groups of 2 floats	$-3 \cdot 2$	Down	-6
Adding 4 groups of 3 anchors	$4 \cdot (-3)$	Down	-12
Removing 3 groups of 1.5 anchors	$-3 \cdot (-1.5)$	Up	4.5

Name: Date: Period:

Additional Practice 5.06

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

1. $6 \cdot a = -18$
   $a = -3$
2. $-6 \cdot (3) = b$
   $b = -18$
3. $-6 \cdot c = 18$
   $c = -3$

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

4. What will the temperature be in 5 hours?
   $-20°F$

5. What was the temperature 2 hours ago?
   $-6°F$

6. What was the temperature 4 hours ago?
   $-2°F$

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.	$(-4) \cdot (-5) = -20$		X	$(-4) \cdot (-5) = 20$
8.	$8 \cdot (-3) = 24$		X	$8 \cdot (-3) = -24$
9.	$(-6) \cdot (-1) = 6$	X		

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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	$2 \cdot 4$	Up	8
Removing 3 groups of 2 floats	$-3 \cdot 2$	Down	-6
Adding 4 groups of 3 anchors	$4 \cdot (-3)$	Down	-12
Removing 3 groups of 1.5 anchors	$-3 \cdot (-1.5)$	Up	4.5

Practice Problem Analysis

Problem	DOK	Standard(s)
1	1	7.NS.A.2.A
2	1	7.NS.A.2.A
3	1	7.NS.A.2.A
4	2	7.NS.A.2.A
5	2	7.NS.A.2.A
6	2	7.NS.A.2.A
7	1	7.NS.A.2.A
8	1	7.NS.A.2.A
9	1	7.NS.A.2.A
10	2	7.NS.A.2.A

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

Additional Practice 5.07

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

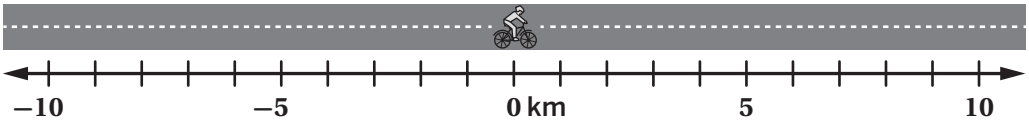
a.	$3 + 3 + 3 + 3$	d	$5 \cdot (-1)$
b.	$-2 + (-2)$	c	$4 \cdot (-3)$
c.	$-3 + (-3) + (-3) + (-3)$	e	$1 \cdot (-5)$
d.	$-1 + (-1) + (-1) + (-1) + (-1)$	a	$4 \cdot 3$
e.	-5	b	$2 \cdot (-2)$

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

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)	−12	−8	−4	0	4	8

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

a 5 minutes $2 \cdot 5 = 10$; 10 km

b −10 minutes $2 \cdot (-10) = -20$; −20 km

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

a $\boxed{12} \cdot (-2) = -24$

b $\boxed{3} \cdot (-8) = -24$

c $2 \cdot \boxed{-6} = -12$

d $4 \cdot \boxed{-6} = -24$

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

Expression as a product	Expression as a sum	Value of the expressions
$2 \cdot (-3)$	$(-3) + (-3)$	-6
$4 \cdot \left(-\frac{1}{4}\right)$	$-\frac{1}{4} + \left(-\frac{1}{4}\right) + \left(-\frac{1}{4}\right) + \left(-\frac{1}{4}\right)$	-1
$5 \cdot 0.4$	$0.4 + 0.4 + 0.4 + 0.4 + 0.4$	2
$3 \cdot \left(-2\frac{1}{3}\right)$	$\left(-2\frac{1}{3}\right) + \left(-2\frac{1}{3}\right) + \left(-2\frac{1}{3}\right)$	-7
$6 \cdot (-0.1)$	$(-0.1) + (-0.1) + (-0.1) + (-0.1) + (-0.1) (-0.1)$	-0.6

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.

Bard will be at 75 and Shawn will be at 50; Sample response: $15 \cdot 5 = 75$ and $10 \cdot 5 = 50$.

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

Tyler is 40 ft in front of Bard; Sample response: Tyler's location is $10 \cdot (-8) = -80$ and Bard's location is $15 \cdot (-8)$

$= -120$. $-80 - (-120)$

$= -80 + 120 = 40$.

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

I agree with Han; Sample response: I know that $-(a \cdot b) = -ab$ and that to find the product of $a \cdot (-b)$ I can determine the product of $a \cdot b$ then make it negative, which is also $-ab$.

Name: Date: Period:

Additional Practice 5.07

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

a. $3+3+3+3$ — d $5 \cdot (-1)$

b. $-2+(-2)$ — c $4 \cdot (-3)$

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

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

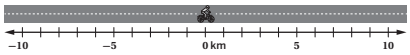
e. -5 — b $2 \cdot (-2)$

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

Use the diagram shown for problems 3 and 4.



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Time (minutes)	−6	−4	−2	0	2	4
Position (km)	−12	−8	−4	0	4	8

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

a. 5 minutes $2 \cdot 5 = 10$; 10 km

b. −10 minutes $2 \cdot (-10) = -20$; −20 km

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

a. $\boxed{12} \cdot (-2) = -24$

b. $\boxed{3} \cdot (-8) = -24$

c. $2 \cdot \boxed{-6} = -12$

d. $4 \cdot \boxed{-6} = -24$

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

Expression as a product	Expression as a sum	Value of the expressions
$2 \cdot (-3)$	$(-3)+(-3)$	-6
$4 \cdot \left(-\frac{1}{4}\right)$	$-\frac{1}{4}+\left(-\frac{1}{4}\right)+\left(-\frac{1}{4}\right)+\left(-\frac{1}{4}\right)$	-1
$5 \cdot 0.4$	$0.4+0.4+0.4+0.4+0.4$	2
$3 \cdot \left(-2\frac{1}{3}\right)$	$\left(-2\frac{1}{3}\right)+\left(-2\frac{1}{3}\right)+\left(-2\frac{1}{3}\right)$	-7
$6 \cdot (-0.1)$	$(-0.1)+(-0.1)+(-0.1)+(-0.1)+(-0.1)+(-0.1)$	-0.6

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.

Bard will be at 75 and Shawn will be at 50; Sample response: $15 \cdot 5 = 75$ and $10 \cdot 5 = 50$.

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

Tyler is 40 ft in front of Bard; Sample response: Tyler's location is $10 \cdot (-8) = -80$ and Bard's location is $15 \cdot (-8)$ $= -120$. $-80 - (-120)$ $= -80 + 120 = 40$.

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

I agree with Han; Sample response: I know that $-(a \cdot b) = -ab$ and that to find the product of $a \cdot (-b)$ I can determine the product of $a \cdot b$ then make it negative, which is also $-ab$.

Practice Problem Analysis

Problem	DOK	Standard(s)
1	1	7.NS.A.2.A, 7.NS.A.2.C
2	1	7.NS.A.2.A
3	2	7.NS.A.2.A
4	2	7.NS.A.2.A
5	2	7.NS.A.2.A
6	2	7.NS.A.2.A, 7.NS.A.2.C
7	3	7.NS.A.2.A
8	3	7.NS.A.2.A

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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. $-5x = -30$

$x = 6$

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

$x = 37.5$

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.

−$6.99 per month. *Explanations vary.* I divided −83.88 by 12 to get the cost per month.

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

−$34.95 *Explanations vary.* I multiplied −6.99 by 5 to get the cost for 5 months.

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. $\frac{15}{-8}$

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

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

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

Least **Greatest**

8. Determine the missing value in each equation.

a. $-45 \div$ 5 $= -9$

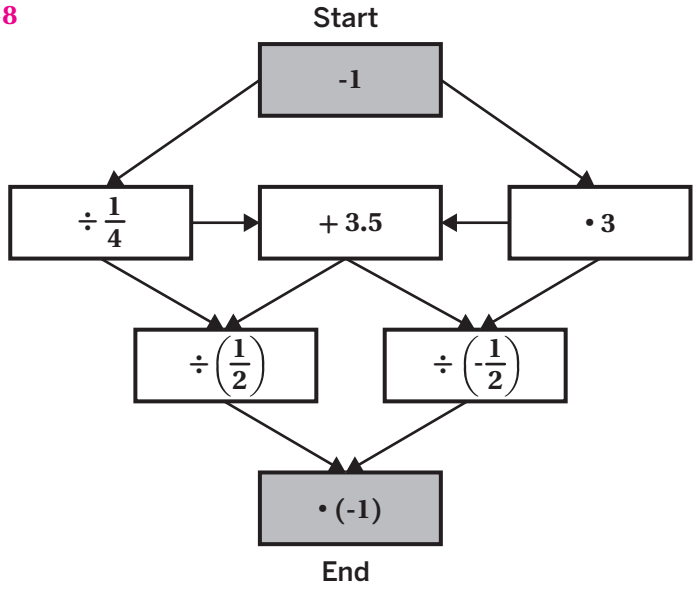
b. $-21 \div$ −7 $= 3$

c. −72 $\div 8 = -9$

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

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?

Responses vary. −8



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. $-5x = -30$

$x = 6$

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

$x = 37.5$

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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.

−$6.99 per month. *Explanations vary.* I divided −83.88 by 12 to get the cost per month.

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

−$34.95 *Explanations vary.* I multiplied −6.99 by 5 to get the cost for 5 months.

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. $\frac{15}{-8}$

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Name: Date: Period:

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

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

Least **Greatest**

8. Determine the missing value in each equation.

a. $-45 \div$ 5 $= -9$

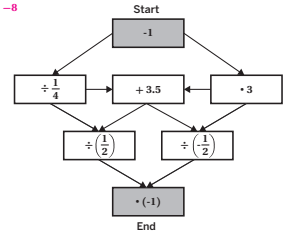
b. $-21 \div$ −7 $= 3$

c. −72 $\div 8 = -9$

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

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?

Responses vary. −8



Practice Problem Analysis

Problem	DOK	Standard(s)
1	1	7.NS.A.2.B
2	1	7.NS.A.2.B
3	1	7.NS.A.2.B
4	2	7.NS.A.2.B
5	2	7.NS.A.2.B, 7.NS.A.2.C
6	1	7.NS.A.2.B
7	1	7.NS.A.2.B
8	1	7.NS.A.2.B
9	2	7.NS.A.2.C

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

Additional Practice 5.10

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

1. $-12 + a = -16$

$a = -4$

2. $-12 - 16 = b$

$b = -28$

3. $-4c = -12$

$c = 3$

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

$d = -48$

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
xy	$x - 2y$	$x - z$	xyz

Least **Greatest**

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

Yes. *Explanations vary.* Because -3 is negative, the signs of the expressions xyz and $x \cdot y$ would be the opposite of what they were when $x = 3$, which would change the order of the values.

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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.

Responses vary. $a = 6, b = -2$

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

c	d	$c + d$	$c - d$	$-c + d$
$-\frac{2}{3}$	$2\frac{5}{6}$	$2\frac{1}{6}$	$-3\frac{1}{2}$	$3\frac{1}{2}$
$\frac{2}{3}$	$-2\frac{5}{6}$	$-2\frac{1}{6}$	$3\frac{1}{2}$	$-3\frac{1}{2}$

10. Describe any patterns you notice.

Responses vary. $c - d$ **and** $-c + d$ **are the opposite values in each row and reversed when the signs of** c **and** d **are reversed.**

Name: Date: Period:

Additional Practice 5.10

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

1. $-12 + a = -16$
   $a = -4$

2. $-12 - 16 = b$
   $b = -28$

3. $-4c = -12$
   $c = 3$

4. $\frac{d}{-4} = 12$
   $d = -48$

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
xy	$x - 2y$	$x - z$	xyz

Least Greatest

7. Would your order be different if the value of x was -3 instead? Explain your thinking.
   Yes. *Explanations vary.* Because -3 is negative, the signs of the expressions xyz and $x \cdot y$ would be the opposite of what they were when $x = 3$, which would change the order of the values.

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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.
   Responses vary. $a = 6, b = -2$

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

c	d	$c + d$	$c - d$	$-c + d$
$-\frac{2}{3}$	$2\frac{5}{6}$	$2\frac{1}{6}$	$-3\frac{1}{2}$	$3\frac{1}{2}$
$\frac{2}{3}$	$-2\frac{5}{6}$	$-2\frac{1}{6}$	$3\frac{1}{2}$	$-3\frac{1}{2}$

10. Describe any patterns you notice.
    Responses vary. $c - d$ and $-c + d$ are the opposite values in each row and reversed when the signs of c and d are reversed.

Practice Problem Analysis

Problem	DOK	Standard(s)
1	1	7.NS.A.1.D, 7.NS.A.2, 7.NS.A.2.C
2	1	7.NS.A.1.D
3	1	7.NS.A.2, 7.NS.A.2.C
4	1	7.NS.A.2, 7.NS.A.2.C
5	1	7.NS.A.1.D
6	2	7.NS.A.1.D, 7.NS.A.2, 7.NS.A.2.C
7	2	7.NS.A.1.D, 7.NS.A.2, 7.NS.A.2.C
8	2	7.NS.A.1.D
9	1	7.EE.B.3, 7.NS.A.1.D
10	2	7.NS.A.1.D

Notes:

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

Additional Practice 5.11

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

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

$a = 13.6$

2. $-10b = 40$

$b = -4$

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

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

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

$d = 32.8$

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 ÷ $2 = -9$

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

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

d. 11 + $(-15) = -4$

e. -12 − $(-15) = 3$

f. -12 • $(-10) = 120$

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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.

c — 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 — 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 — 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?

d — The temperature was −1.5°C and changed to −6°C. What was the change in temperature?

a. $1.5c = -6$

b. $-6 + 1.5 = c$

c. $-1.5c = -6$

d. $-1.5 + c = -6$

Name: Date: Period:

Additional Practice 5.11

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

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

$a = 13.6$

2. $-10b = 40$

$b = -4$

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

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

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

$d = 32.8$

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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. $-18 \div 2 = -9$

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

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

d. $11 + (-15) = -4$

e. $-12 - (-15) = 3$

f. $-12 \cdot (-10) = 120$

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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.

c. 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. 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. 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?

d. The temperature was −1.5°C and changed to −6°C. What was the change in temperature?

a. $1.5c = -6$

b. $-6 + 1.5 = c$

c. $-1.5c = -6$

d. $-1.5 + c = -6$

Practice Problem Analysis

Problem	DOK	Standard(s)
1	1	7.EE.B.3, 7.NS.A.3
2	1	7.EE.B.3, 7.NS.A.3
3	1	7.EE.B.3, 7.NS.A.3
4	1	7.EE.B.3, 7.NS.A.3
5	2	7.EE.B.3, 7.NS.A.3
6	1	7.EE.B.3, 7.NS.A.3
7	1	7.EE.B.3, 7.NS.A.3
8	2	7.EE.B.3, 7.NS.A.3

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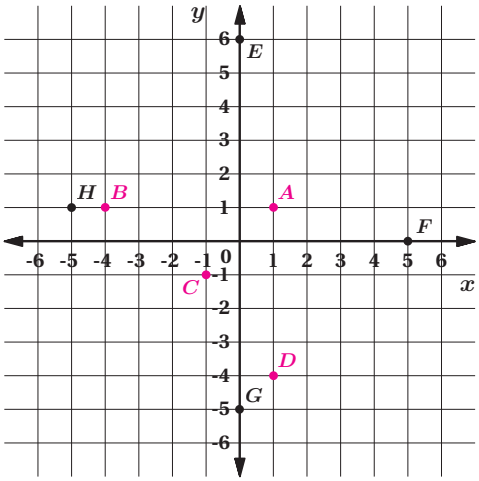
Name: ..... Date: ..... Period: .....

Additional Practice 7.10

Refer to the coordinate plane for Problems 1 and 2.

1. Plot and label the following four points:
$A(1, 1), B(-4, 1), C(-1, -1), D(1, -4)$.



2. Write the coordinates for each point.

a Point E
(0, 6)

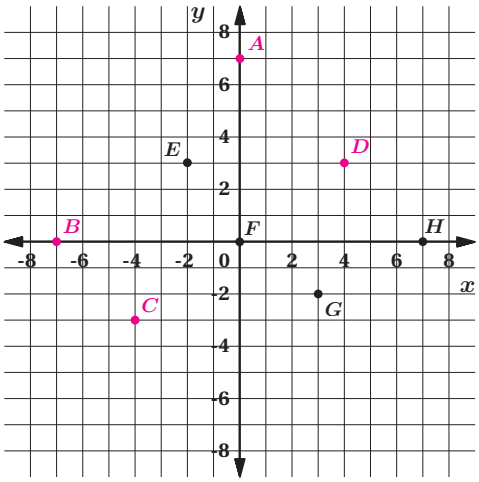
b Point F
(5, 0)

c Point G
(0, −5)

d Point H
(−5, 1)

Refer to the coordinate plane for Problems 3 and 4.

3. Plot and label the following four points:
$A(0, 7), B(-7, 0), C(-4, -3), D(4, 3)$.



4. Write the coordinates for each point.

a Point E
(−2, 3)

b Point F
(0, 0)

c Point G
(3, −2)

d Point H
(7, 0)

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

5. When these three ordered pairs are plotted, the points fall on the same line: $(-3, -3)$, $(-3, 0)$, $(-3, 1)$.

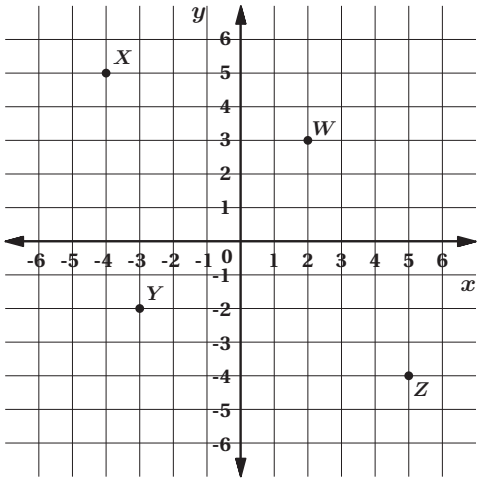
a Is the line vertical or horizontal? Explain your thinking.

Vertical; Sample response: They all have the same x-coordinate.

b Write the ordered pairs for two other points that also lie on this same line.

Sample response: $(-3, -6)$ and $(-3, 4)$

6. Refer to the coordinate plane.



a Complete the table to show the coordinates and quadrant for each point.

Point	Coordinates	Quadrant
W	$(2, 3)$	I
X	$(-4, 5)$	II
Y	$(-3, -2)$	III
Z	$(5, -4)$	IV

b Point V is located at $(0, 5)$. On what axis does point V lie on?

y-axis

c For all of the points in quadrant III, are both coordinates *positive* or *negative*?

Negative

7. Priya says that if both coordinates of a point are positive, the point can be located in either quadrant I or quadrant II. Is Priya correct? Explain your thinking.

No; Sample response: Both coordinates are positive only in quadrant I.

8. Priya says that if both coordinates of a point are negative, the point can be located in either quadrant III or quadrant IV. Is Priya correct? Explain your thinking.

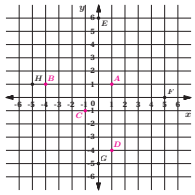
No; Sample response: Both coordinates are negative only in quadrant III.

Name: Date: Period:

Additional Practice 7.10

Refer to the coordinate plane for Problems 1 and 2.

1. Plot and label the following four points:
$A(1, 1)$, $B(-4, 1)$, $C(-1, -1)$, $D(1, -4)$.



2. Write the coordinates for each point.

a. Point E
(0, 6)

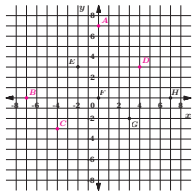
b. Point F
(5, 0)

c. Point G
(0, −5)

d. Point H
(−5, 1)

Refer to the coordinate plane for Problems 3 and 4.

3. Plot and label the following four points:
$A(0, 7)$, $B(-7, 0)$, $C(-4, -3)$, $D(4, 3)$.



4. Write the coordinates for each point.

a. Point E
(−2, 3)

b. Point F
(0, 0)

c. Point G
(3, −2)

d. Point H
(7, 0)

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5. When these three ordered pairs are plotted, the points fall on the same line:
$(-3, -3)$, $(-3, 0)$, $(-3, 1)$.

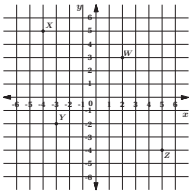
a. Is the line vertical or horizontal? Explain your thinking.
Vertical; Sample response: They all have the same x-coordinate.

b. Write the ordered pairs for two other points that also lie on this same line.
Sample response: (−3, −6) and (−3, 4)

6. Refer to the coordinate plane.

a. Complete the table to show the coordinates and quadrant for each point.

Point	Coordinates	Quadrant
W	(2, 3)	I
X	(−4, 5)	II
Y	(−3, −2)	III
Z	(5, −4)	IV



b. Point V is located at $(0, 5)$. On what axis does point V lie on?
y-axis

c. For all of the points in quadrant III, are both coordinates *positive* or *negative*?
Negative

7. Priya says that if both coordinates of a point are positive, the point can be located in either quadrant I or quadrant II. Is Priya correct? Explain your thinking.
No; Sample response: Both coordinates are positive only in quadrant I.

8. Priya says that if both coordinates of a point are negative, the point can be located in either quadrant III or quadrant IV. Is Priya correct? Explain your thinking.
No; Sample response: Both coordinates are negative only in quadrant III.

Practice Problem Analysis

Problem	DOK	Standard(s)
1	2	6.NS.C.6.C
2	1	6.NS.C.6.C
3	2	6.NS.C.6.C
4	1	6.NS.C.6.C
5	2	6.NS.C.6.C, 6.NS.C.6.B
6	2	6.NS.C.6.C
7	3	6.NS.C.6.B
8	3	6.NS.C.6.B

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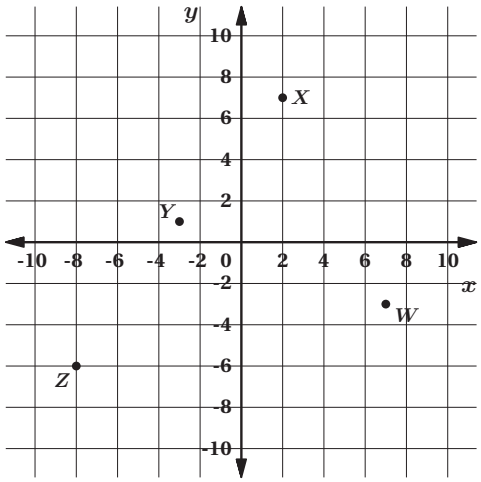
Additional Practice 7.11

1. Refer to the coordinate plane.



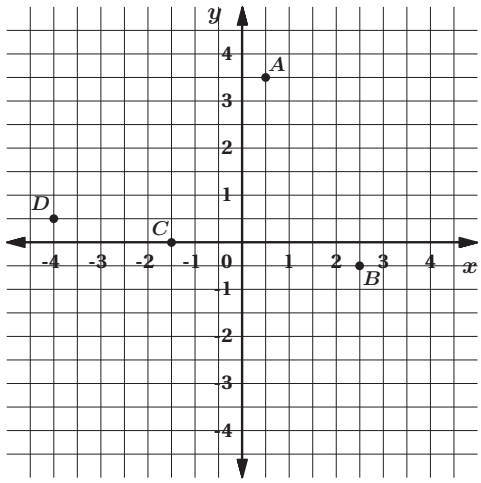
a What is the scale for this coordinate plane?

2

b Write the coordinates of each point.

Point	Coordinates
W	(7, −3)
X	(2, 7)
Y	(−3, 1)
Z	(−8, −6)

2. Refer to the coordinate plane.



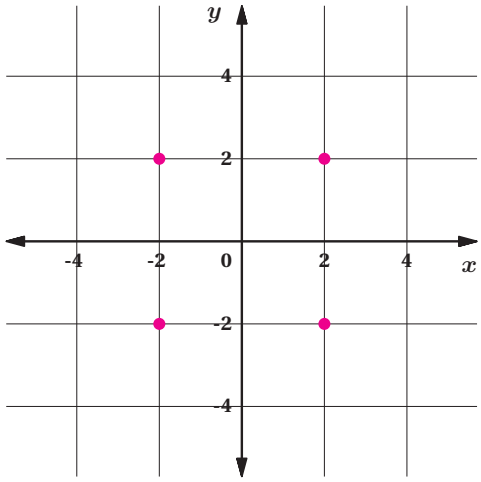
a What is the scale for this coordinate plane?

0.5 (or equivalent)

b Write the coordinates of each point.

Point	Coordinates
A	(0.5, 3.5)
B	(2.5, −0.5)
C	(−1.5, 0)
D	(−4, 0.5)

3. Refer to the coordinate plane.



a Name four points with integer coordinates that would form a square with the origin at its center.

Sample response: (−2, 2), (−2, −2), (2, −2), (2, 2)

b Plot these points on the coordinate plane to verify that they form a square.

Sample response:

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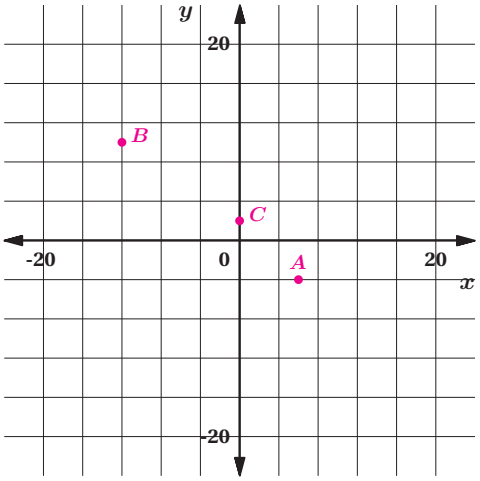
4. Refer to the coordinate plane.



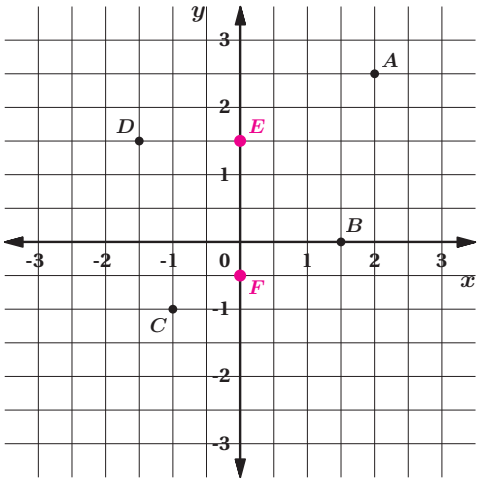
a What is the scale for this coordinate plane?

4

b Plot and label points $A(6, -4)$, $B(-12, 10)$ and $C(0, 2)$ on the coordinate plane.

Refer to the coordinate plane for Problems 5 and 6.

5. Shawn plotted four points and recorded the coordinates as: $A(2.5, 2.5)$, $B(0, 1.5)$, $C(-1, -1)$, $D(-2, -2)$.



Some of the coordinates Shawn wrote are incorrect. For each point, state whether Shawn's ordered pairs are *correct* or *incorrect*. For any incorrect pair, explain what Shawn's mistake might have been.

a Point A

Incorrect; Sample response: $A(2, 2.5)$; Shawn may not have understood the scale factor.

b Point B

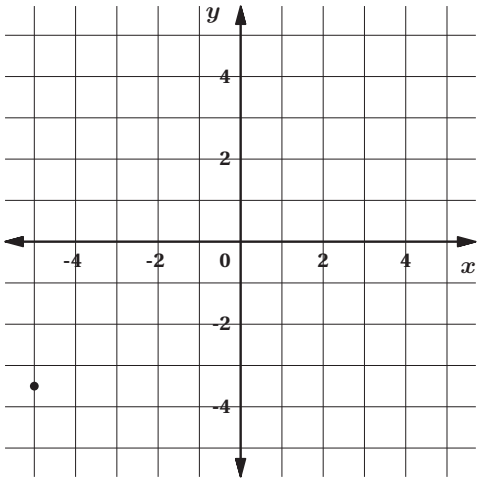
Incorrect; Sample response: $B(1.5, 0)$; Shawn may have confused the order of the coordinates for (x, y).

c Point C

Correct

d Point D

Incorrect; Sample response: $D(-2, -2)$; Shawn may not have understood the scale factor.



6. Plot and label the points $E(0, 1.5)$ and $F(0, -0.5)$ on the coordinate plane.

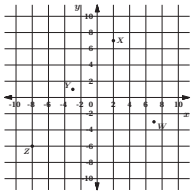
7. Refer to the point plotted on the coordinate plane. Bard says the point is located at $(-5, -4.5)$. Is Bard correct? Explain your thinking.

No; Sample response: Bard plotted the point at $(-5, -3.5)$.

Name: Date: Period:

Additional Practice 7.11

1. Refer to the coordinate plane.



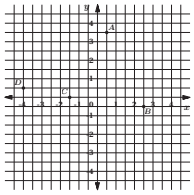
a. What is the scale for this coordinate plane?

2

b. Write the coordinates of each point.

Point	Coordinates
W	(7, −3)
X	(2, 7)
Y	(−3, 1)
Z	(−8, −6)

2. Refer to the coordinate plane.



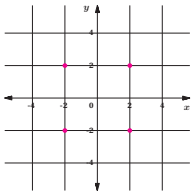
a. What is the scale for this coordinate plane?

0.5 (or equivalent)

b. Write the coordinates of each point.

Point	Coordinates
A	(0.5, 3.5)
B	(2.5, −0.5)
C	(−1.5, 0)
D	(−4, 0.5)

3. Refer to the coordinate plane.



a. Name four points with integer coordinates that would form a square with the origin at its center.

Sample response: (−2, 2), (−2, −2), (2, −2), (2, 2)

b. Plot these points on the coordinate plane to verify that they form a square.

Sample response:

Unit 7 Lesson 11 201

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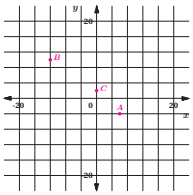
4. Refer to the coordinate plane.



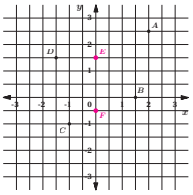
a. What is the scale for this coordinate plane?

4

b. Plot and label points $A(6, -4)$, $B(-12, 10)$ and $C(0, 2)$ on the coordinate plane.

Refer to the coordinate plane for Problems 5 and 6.

5. Shawn plotted four points and recorded the coordinates as: $A(2.5, 2.5)$, $B(0, 1.5)$, $C(-1, -1)$, $D(-2, -2)$.



Some of the coordinates Shawn wrote are incorrect. For each point, state whether Shawn's ordered pairs are *correct* or *incorrect*. For any incorrect pair, explain what Shawn's mistake might have been.

a. Point A

Incorrect; Sample response: $A(2, 2.5)$; Shawn may not have understood the scale factor.

b. Point B

Incorrect; Sample response: $B(1.5, 0)$; Shawn may have confused the order of the coordinates for (x, y).

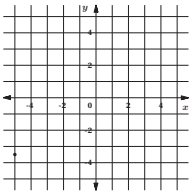
c. Point C

Correct

d. Point D

Incorrect; Sample response: $D(-2, -2)$; Shawn may not have understood the scale factor.

6. Plot and label the points $E(0, 1.5)$ and $F(0, -0.5)$ on the coordinate plane.



7. Refer to the point plotted on the coordinate plane. Bard says the point is located at $(-5, -4.5)$. Is Bard correct? Explain your thinking.

No; Sample response: Bard plotted the point at $(-5, -3.5)$.

Unit 7 Lesson 11 202 Additional Practice

Practice Problem Analysis

Problem	DOK	Standard(s)
1	2	6.NS.C.6.C
2	2	6.NS.C.6.C
3	2	6.NS.C.6.C
4	2	6.NS.C.6.C
5	3	6.NS.C.6.C
6	2	6.NS.C.6.C
7	3	6.NS.C.6.C

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

Additional Practice 7.12

1. The vertices of a rectangle are located at $(-2, 2)$, $(-2, -4)$, $(2, -4)$, and $(2, 2)$.

a What is the length and width of the rectangle?

Length: 6 units, Width: 4 units or Length: 4 units, Width: 6 units

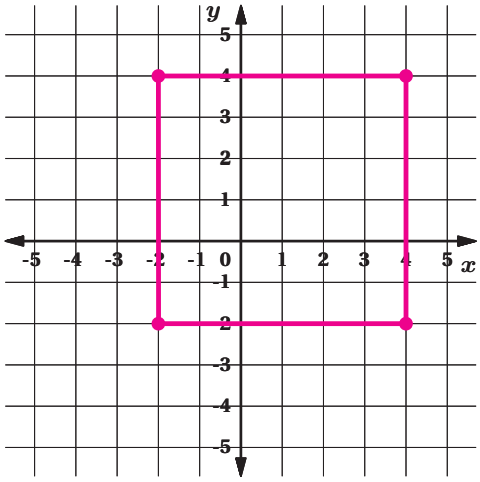
b What is the perimeter of the rectangle?

20 units

c What is the area of the rectangle?

24 square units

2. Refer to the coordinate plane.



a Draw a square with a perimeter of 24 units and one vertex located at the point $(4, 4)$.

b Write the coordinates of the other vertices.

$(4, -2)$, $(-2, 2)$, $(-2, 4)$

c What is the area of the square?

36 square units

3. The vertices of a rectangle are located at $(-3, 2)$, $(3, 2)$, $(-3, -5)$, and $(3, -5)$.

a What is the length and width of the rectangle?

Length: 7 units, Width: 6 units or Length: 6 units, Width: 7 units

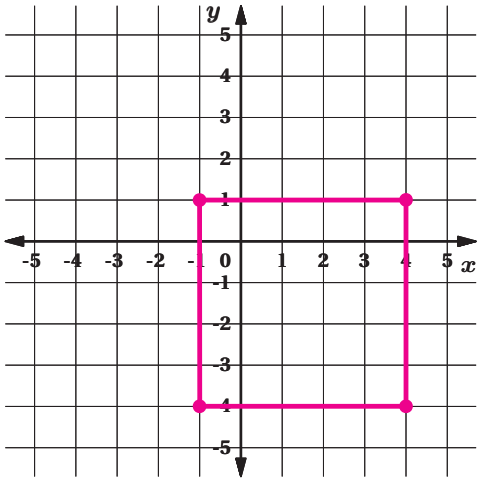
b What is the perimeter of the rectangle?

26 units

c What is the area of the rectangle?

42 square units

4. Refer to the coordinate plane.



a Draw a square with a perimeter of 20 units and one vertex located at the point $(-1, 1)$.

b Write the coordinates of the other vertices.

$(-1, -4)$, $(4, -4)$, $(4, 1)$

c What is the area of the square?

25 square units

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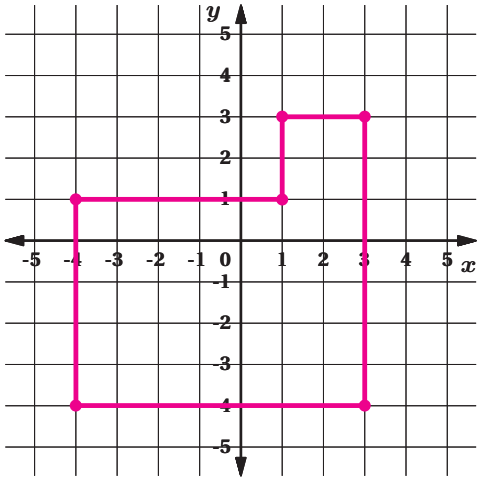
Name: ..... Date: ..... Period: .....

Use this coordinate plane for Problems 5 and 6.

5. Plot and connect the following points in the order they are listed to form a polygon: $(3, 3)$, $(3, -4)$, $(-4, -4)$, $(-4, 1)$, $(1, 1)$, $(1, 3)$.



6. The line segments formed a polygon.

a What is the perimeter of the polygon?

28 units

b What is the area of the polygon?

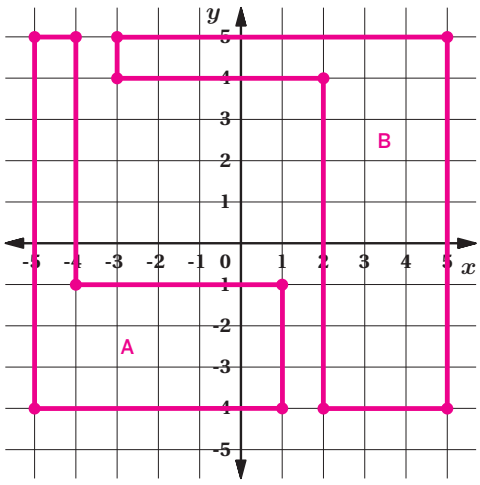
39 square units

Use this coordinate plane for Problems 7 and 8.

7. Plot and connect these points in the order they are listed to form the two polygons described. Label the polygons A and B.

Polygon A: $(-5, 5)$, $(-4, 5)$, $(-4, -1)$, $(1, -1)$, $(1, -4)$, $(-5, -4)$

Polygon B: $(-3, 5)$, $(-3, 4)$, $(2, 4)$, $(2, -4)$, $(5, -4)$, $(5, 5)$



8. Jada claims that Polygon A and Polygon B has the same perimeter. Is she correct? Explain your thinking.

No; Sample response: The perimeter of polygon A is 30 units. The perimeter of polygon B is 34 units. Therefore, the polygons do not have the same perimeter because polygon B has the greater perimeter.

Name: Date: Period:

Additional Practice 7.12

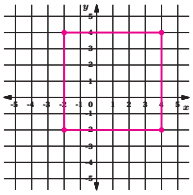
1. The vertices of a rectangle are located at (−2, 2), (−2, −4), (2, −4), and (2, 2).

a. What is the length and width of the rectangle?
Length: 6 units, Width: 4 units or Length: 4 units, Width: 6 units

b. What is the perimeter of the rectangle?
20 units

c. What is the area of the rectangle?
24 square units

2. Refer to the coordinate plane.



a. Draw a square with a perimeter of 24 units and one vertex located at the point (4, 4).

b. Write the coordinates of the other vertices.
(4, −2), (−2, 2), (−2, 4)

c. What is the area of the square?
36 square units

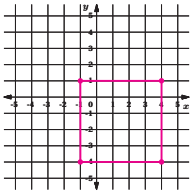
3. The vertices of a rectangle are located at (−3, 2), (3, 2), (−3, −5), and (3, −5).

a. What is the length and width of the rectangle?
Length: 7 units, Width: 6 units or Length: 6 units, Width: 7 units

b. What is the perimeter of the rectangle?
26 units

c. What is the area of the rectangle?
42 square units

4. Refer to the coordinate plane.



a. Draw a square with a perimeter of 20 units and one vertex located at the point (−1, 1).

b. Write the coordinates of the other vertices.
(−1, −4), (4, −4), (4, 1)

c. What is the area of the square?
25 square units

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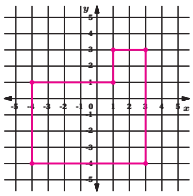
Use this coordinate plane for Problems 5 and 6.

5. Plot and connect the following points in the order they are listed to form a polygon: (3, 3), (3, −4), (−4, −4), (−4, 1), (1, 1), (1, 3).

6. The line segments formed a polygon.

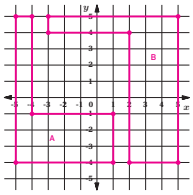


a. What is the perimeter of the polygon?
28 units

b. What is the area of the polygon?
39 square units

Use this coordinate plane for Problems 7 and 8.

7. Plot and connect these points in the order they are listed to form the two polygons described. Label the polygons A and B.



Polygon A: (−5, 5), (−4, 5), (−4, −1), (1, −1), (1, −4), (−5, −4)

Polygon B: (−3, 5), (−3, 4), (2, 4), (2, −4), (5, −4), (5, 5)

8. Jada claims that Polygon A and Polygon B has the same perimeter. Is she correct? Explain your thinking.
No; Sample response: The perimeter of polygon A is 30 units. The perimeter of polygon B is 34 units. Therefore, the polygons do not have the same perimeter because polygon B has the greater perimeter.

Practice Problem Analysis

Problem	DOK	Standard(s)
1	1	6.G.A.3, 6.NS.C.6.C
2	2	6.G.A.3, 6.NS.C.6.C
3	1	6.G.A.3, 6.NS.C.6.C
4	2	6.G.A.3, 6.NS.C.6.C
5	2	6.G.A.3, 6.NS.C.6.C
6	2	6.G.A.3, 6.NS.C.6.C
7	2	6.G.A.3, 6.NS.C.6.C
8	3	6.G.A.3, 6.NS.C.6.C

Notes:

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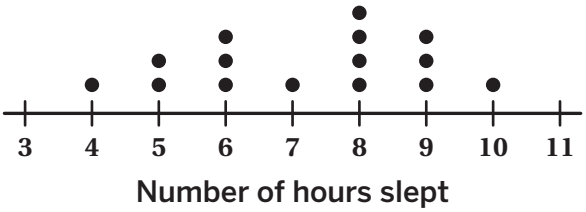
Name: ..... Date: ..... Period: .....

Additional Practice 8.02

Use this dot plot for Problems 1–2.



Number of hours slept

1. Shawn surveyed several students to determine the number of hours students slept the previous night.

a How many students did Shawn survey?

15 students

b What was the typical number of hours students slept?

8 hours

c What percent of the students slept less than 6 hours?

20%

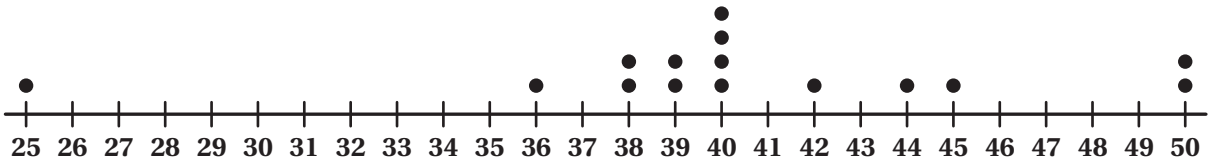
d What percent of the students slept 7 or more hours?

60%

2. Shawn slept for 10 hours last night. Shawn claims to have slept about the typical amount as all the other students surveyed. Do you agree with Shawn? Explain your thinking.

No; Sample response: Shawn slept about 2 hours more than the typical students surveyed.

3. A group of students was asked, "How many songs are on your favorite playlist?" The results are shown on this dot plot. Select *all* the statements that are true.



Number of songs in playlist

- ☐ **A.** 9 students were asked about the number of songs on their playlist.
- ☑ **B.** The most occurring number of songs on the playlist is 40.
- ☐ **C.** Typically, there are between 42 and 50 songs on a playlist.
- ☑ **D.** One-third of students had more than 40 songs on their playlist.
- ☑ **E.** More than half of the students had between 38 and 40 songs on their playlist.

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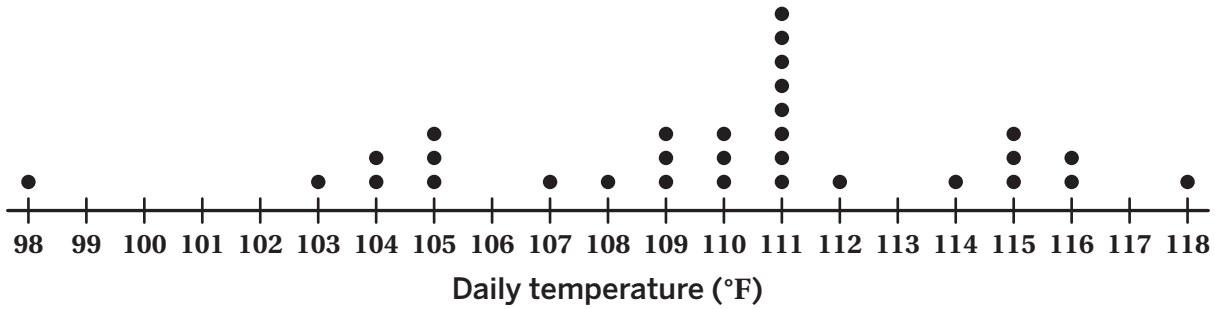
Name: ..... Date: ..... Period: .....

This dot plot shows the daily high temperatures in Phoenix, AZ, in July.
Use this dot plot for Problems 4–5.



4. Refer to the dot plot.

a What was the lowest daily temperature?
98°

b Which temperature occurred most often?
111°

c How many days had a temperature less than 110°?
12 days

d What fraction of days had temperatures of 114° or higher?
$\frac{7}{31}$

e What was a typical temperature in July?
111°

5. The temperature on June 30, was 100°F. How does the temperature on June 30 compare to the temperatures in July? Select *all* that apply.

- ☐ **A.** The temperature on June 30 was much higher than the typical temperature in July.
- ☑ **B.** The temperature on June 30 was within the range of temperatures in July.
- ☑ **C.** The typical temperature in July was much higher than the temperature on June 30.
- ☐ **D.** The minimum temperature in July was higher than the temperature on June 30.
- ☐ **E.** There are thirteen days in July that had a higher temperature than June 30.

6. Here are descriptions of data sets. Select *all* the descriptions that could be displayed as dot plots.

- ☑ **A.** Shoe size of each student in a sixth grade class.
- ☐ **B.** Eye color of a group of students in the cafeteria.
- ☐ **C.** How students get to school each day.
- ☑ **D.** Number of soccer goals a team scored at each game during their season.
- ☑ **E.** A month of overnight low temperatures for a city in Florida.

7. Clare said the results to the question, "What is the height of all the students in third grade?" cannot be displayed on a dot plot because most of the students in the class are the same height. Do you agree with Clare? Explain your thinking.
No; Sample response: The results to the question can be graphed on a dot plot because even if the students are all close to the same height, there will still be some variation in the data.

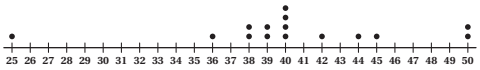
Name: Date: Period:

Additional Practice 8.02

Use this dot plot for Problems 1–2.

Number of hours slept

1. Shawn surveyed several students to determine the number of hours students slept the previous night.
   a. How many students did Shawn survey?
      15 students
   b. What was the typical number of hours students slept?
      8 hours
   c. What percent of the students slept less than 6 hours?
      20%
   d. What percent of the students slept 7 or more hours?
      60%
2. Shawn slept for 10 hours last night. Shawn claims to have slept about the typical amount as all the other students surveyed. Do you agree with Shawn? Explain your thinking.
   No; Sample response: Shawn slept about 2 hours more than the typical students surveyed.
3. A group of students was asked, "How many songs are on your favorite playlist?" The results are shown on this dot plot. Select *all* the statements that are true.



Number of songs in playlist

- ☐ A. 9 students were asked about the number of songs on their playlist.
- ☑ B. The most occurring number of songs on the playlist is 40.
- ☐ C. Typically, there are between 42 and 50 songs on a playlist.
- ☑ D. One-third of students had more than 40 songs on their playlist.
- ☑ E. More than half of the students had between 38 and 40 songs on their playlist.

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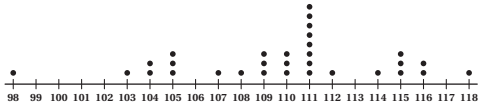
Name: Date: Period:

This dot plot shows the daily high temperatures in Phoenix, AZ, in July.
Use this dot plot for Problems 4–5.



Daily temperature (°F)

4. Refer to the dot plot.
   a. What was the lowest daily temperature?
      98°
   b. Which temperature occurred most often?
      111°
   c. How many days had a temperature less than 110°?
      12 days
   d. What fraction of days had temperatures of 114° or higher?
      $\frac{7}{31}$
   e. What was a typical temperature in July?
      111°
5. The temperature on June 30, was 100°F. How does the temperature on June 30 compare to the temperatures in July? Select *all* that apply.
   - ☐ A. The temperature on June 30 was much higher than the typical temperature in July.
   - ☑ B. The temperature on June 30 was within the range of temperatures in July.
   - ☑ C. The typical temperature in July was much higher than the temperature on June 30.
   - ☐ D. The minimum temperature in July was higher than the temperature on June 30.
   - ☐ E. There are thirteen days in July that had a higher temperature than June 30.
6. Here are descriptions of data sets. Select *all* the descriptions that could be displayed as dot plots.
   - ☑ A. Shoe size of each student in a sixth grade class.
   - ☐ B. Eye color of a group of students in the cafeteria.
   - ☐ C. How students get to school each day.
   - ☑ D. Number of soccer goals a team scored at each game during their season.
   - ☑ E. A month of overnight low temperatures for a city in Florida.
7. Clare said the results to the question, "What is the height of all the students in third grade?" cannot be displayed on a dot plot because most of the students in the class are the same height. Do you agree with Clare? Explain your thinking.
   No; Sample response: The results to the question can be graphed on a dot plot because even if the students are all close to the same height, there will still be some variation in the data.

Practice Problem Analysis

Problem	DOK	Standard(s)
1	2	6.SP.A.2, 6.SP.B
2	2	6.SP.A.2, 6.SP.B
3	3	6.SP.A.2, 6.SP.B
4	2	6.SP.A.2, 6.SP.B
5	2	6.SP.A.2, 6.SP.B
6	1	6.SP.A.2, 6.SP.B.4
7	3	6.SP.A.2, 6.SP.B

Notes:

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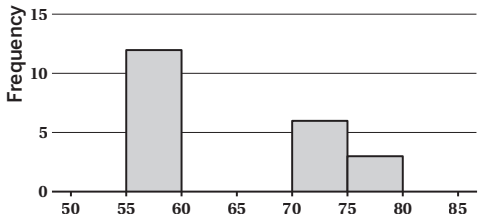
Name: ..... Date: ..... Period: .....

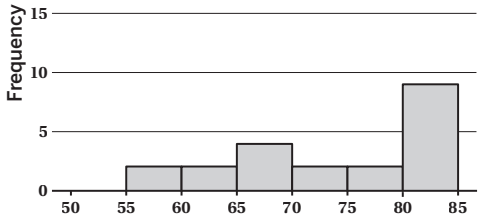
Additional Practice 8.05

1. Match each histogram with a dot plot that represents the same data set.

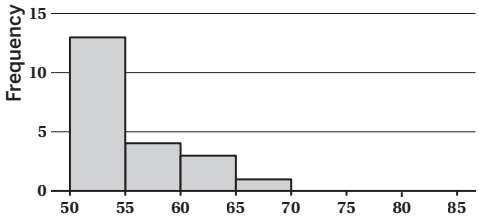
a



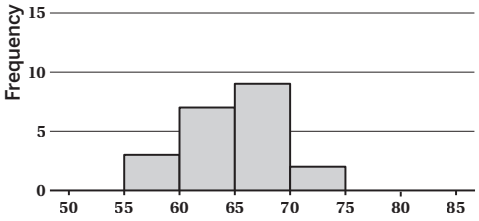
b



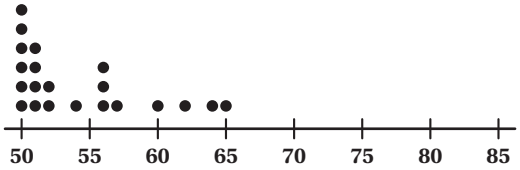
c



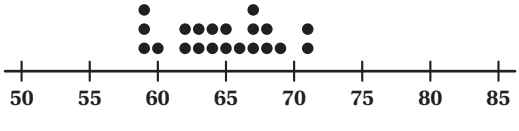
d



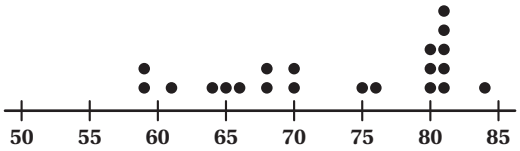
c



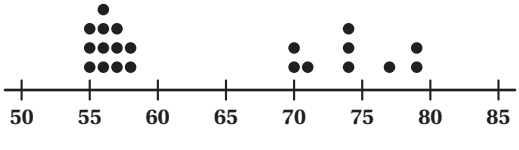
d



b

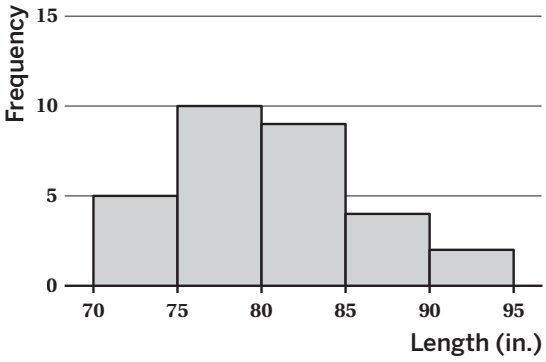


a



2. The histogram summarizes the lengths, in inches, of a group of West Atlantic bluefin tuna. Select *all* the statements that are true about the histogram.

- ☑ **A.** The majority of tuna were between 75 and 85 in. long.
- ☐ **B.** The longest tuna was over 8 ft long.
- ☐ **C.** 10 tuna were 75 in. long.
- ☑ **D.** A total of 30 tuna were measured.
- ☐ **E.** A total of 5 tuna were measured.
- ☑ **F.** Five tuna were less than 75 in. long.



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

This table shows the age of players, in years, on a professional basketball team. Use this information for Problems 3–4.

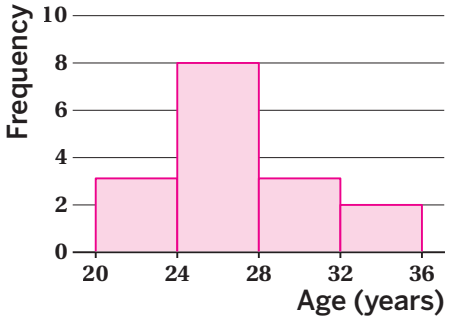
22	22	24	24	25	30	30	29
25	27	32	27	35	26	26	21

3. Complete the frequency table and use it to make a histogram of the ages of the players.

a

Age (years)	Frequency
20 to less than 24	3
24 to less than 28	8
28 to less than 32	3
32 to less than 36	2

b

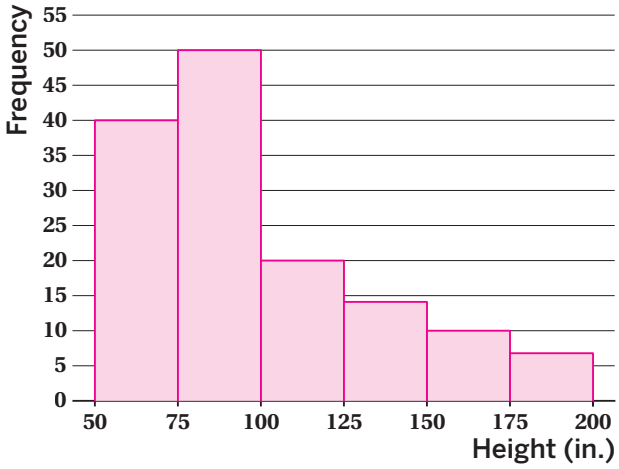


4. What is a typical age of a player on the team? Explain your thinking.

26; Accept reasonable answers between 24 and 28 years old.

5. The frequency table shows the heights of peach trees, in inches, on an acre of land. Use the frequency table to make a histogram of the heights of the peach trees.

Height (in.)	Frequency
50 to less than 75	40
75 to less than 100	50
100 to less than 125	20
125 to less than 150	14
150 to less than 175	10
155 to less than 200	7



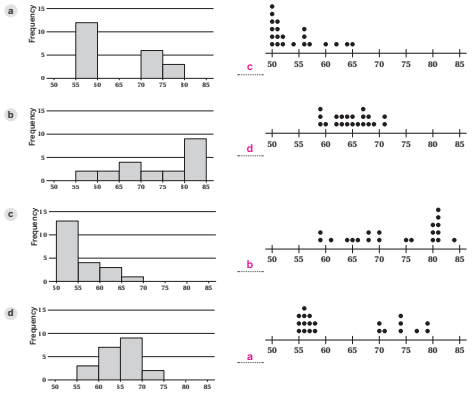
6. Refer to the histogram from Problem 5. An average peach tree is between 144 and 180 in. tall. Bard says that there are 24 peach trees between these heights. Is Bard correct? Explain your thinking.

No; Sample response: A histogram only gives ranges of data, not actual heights.

Name: Date: Period:

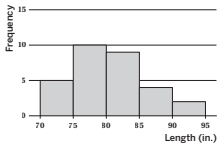
Additional Practice 8.05

1. Match each histogram with a dot plot that represents the same data set.



2. The histogram summarizes the lengths, in inches, of a group of West Atlantic bluefin tuna. Select *all* the statements that are true about the histogram.

- [x] **A.** The majority of tuna were between 75 and 85 in. long.
- [ ] **B.** The longest tuna was over 8 ft long.
- [ ] **C.** 10 tuna were 75 in. long.
- [x] **D.** A total of 30 tuna were measured.
- [ ] **E.** A total of 5 tuna were measured.
- [x] **F.** Five tuna were less than 75 in. long.



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Name: Date: Period:

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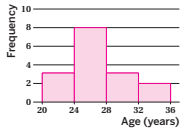
22	22	24	24	25	30	30	29
25	27	32	27	35	26	26	21

3. Complete the frequency table and use it to make a histogram of the ages of the players.

a

Age (years)	Frequency
20 to less than 24	3
24 to less than 28	8
28 to less than 32	3
32 to less than 36	2

b

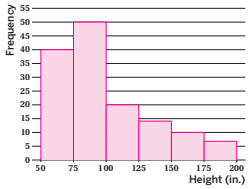


4. What is a typical age of a player on the team? Explain your thinking.

26; Accept reasonable answers between 24 and 28 years old.

5. The frequency table shows the heights of peach trees, in inches, on an acre of land. Use the frequency table to make a histogram of the heights of the peach trees.

Height (in.)	Frequency
50 to less than 75	40
75 to less than 100	50
100 to less than 125	20
125 to less than 150	14
150 to less than 175	10
155 to less than 200	7



6. Refer to the histogram from Problem 5. An average peach tree is between 144 and 180 in. tall. Bard says that there are 24 peach trees between these heights. Is Bard correct? Explain your thinking.

No; Sample response: A histogram only gives ranges of data, not actual heights.

Practice Problem Analysis

Problem	DOK	Standard(s)
1	1	6.SP.B.4, 6.SP.B.5.B
2	1	6.SP.B.4, 6.SP.B.5.B
3	2	6.SP.B.4, 6.SP.B.5.B
4	2	6.SP.B.4, 6.SP.B.5.B
5	2	6.SP.B.4, 6.SP.B.5.B
6	3	6.SP.B.4, 6.SP.B.5.B

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

Additional Practice 8.07

1. Which expressions could you use to calculate the mean of this data set? Select *all* that apply.

12, 9, 15, 16, 12, 13

- ☐ **A.** $(12 + 9 + 15 + 16 + 12 + 13) \cdot 6$
- ☑ **B.** $(12 + 9 + 15 + 16 + 12 + 13) \div 6$
- ☑ **C.** $\frac{12 + 9 + 15 + 16 + 12 + 13}{6}$
- ☐ **D.** $77 \cdot 6$
- ☑ **E.** $77 \div 6$

2. This data set represents the daily high temperatures for Minneapolis, Minnesota, in degrees Celsius.

6	9	8	10	8	6	9

What was the average high temperature? Show your thinking.

8 degrees Celsius

3. The mean of four numbers is 12. Three of the numbers are 8, 12, and 12. What is the fourth number? Show or explain your thinking.

16; Sample response: Since 8 is 4 less than 12, the fourth number must be 12 + 4, or 16.

4. This data set represents the number of goals a soccer team scored at each game during their season.

3	5	8	2	4	3	1
0	1	1	5	3	2	4

What was the average number of goals scored at each game? Show your thinking.

3 goals

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5. An art teacher is rearranging four bags of popsicle sticks so that each bag contains an equal number of sticks. Currently Bag A has 45 sticks, Bag B has 25 sticks, Bag C has 16 sticks, and Bag D has 34 sticks. Select *all* the ways the art teacher could make each bag have the same number of popsicle sticks.

- ☑ **A.** Remove 5 popsicle sticks from Bag D and 15 popsicle sticks from Bag A. Redistribute the 20 sticks that were removed into Bags B and D so there are 30 sticks in each bag.
- ☐ **B.** Remove 5 popsicle sticks from Bag D and place them in Bag B.
- ☐ **C.** Remove 15 popsicle sticks from Bag A and place them in Bag B. Remove 5 popsicle sticks from Bag D and place them in Bag C.
- ☐ **D.** Remove 15 popsicle sticks from Bag A and place them in Bag C. Remove 5 popsicle sticks from Bag D and place them in Bag B.
- ☑ **E.** Remove all the popsicle sticks and make four equal piles, which will contain 30 sticks. Then put each pile in one of the bags.

6. Noah babysat 6 times. He earned \$24, \$25, \$31, \$32, and \$28 for the first 5 babysitting jobs. How much did Noah earn at the sixth babysitting job if the average amount he earned was \$27? Show your thinking.

\$22

7. In her math class, Priya's teacher gives 5 quizzes, each worth 10 points. After 4 of her quizzes, Priya has scores of 7, 10, 8, and 6. How many points does Priya have to score on the last quiz to have an average score of 8? Show or explain your thinking.

9 points

8. While playing a card game, Shawn kept score for the first 5 hands, as shown in the table. Shawn claims that the mean score per hand is 15.

14	10	15	20	16

Is Shawn correct? If yes, explain how Shawn is correct. If not, explain how to calculate the correct mean.

Yes; Sample response: Shawn can redistribute the numbers by calculating the sum and dividing the sum by 5.

$$\frac{14 + 10 + 15 + 20 + 16}{5} = \frac{75}{5} = 15$$

Name: Date: Period:

Additional Practice 8.07

1. Which expressions could you use to calculate the mean of this data set? Select *all* that apply.

12, 9, 15, 16, 12, 13

- ☐ **A.** $(12 + 9 + 15 + 16 + 12 + 13) \cdot 6$
- ☑ **B.** $(12 + 9 + 15 + 16 + 12 + 13) \div 6$
- ☑ **C.** $\frac{12 + 9 + 15 + 16 + 12 + 13}{6}$
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8 degrees Celsius

3. The mean of four numbers is 12. Three of the numbers are 8, 12, and 12. What is the fourth number? Show or explain your thinking.

16; Sample response: Since 8 is 4 less than 12, the fourth number must be 12 + 4, or 16.

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0	1	1	5	3	2	4

What was the average number of goals scored at each game? Show your thinking.

3 goals

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Name: Date: Period:

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- ☐ **B.** Remove 5 popsicle sticks from Bag D and place them in Bag B.
- ☐ **C.** Remove 15 popsicle sticks from Bag A and place them in Bag B. Remove 5 popsicle sticks from Bag D and place them in Bag C.
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$22

7. In her math class, Priya's teacher gives 5 quizzes, each worth 10 points. After 4 of her quizzes, Priya has scores of 7, 10, 8, and 6. How many points does Priya have to score on the last quiz to have an average score of 8? Show or explain your thinking.

9 points

8. While playing a card game, Shawn kept score for the first 5 hands, as shown in the table. Shawn claims that the mean score per hand is 15.

14	10	15	20	16

Is Shawn correct? If yes, explain how Shawn is correct. If not, explain how to calculate the correct mean.

Yes; Sample response: Shawn can redistribute the numbers by calculating the sum and dividing the sum by 5.

$\frac{14 + 10 + 15 + 20 + 16}{5} = \frac{75}{5} = 15$

Practice Problem Analysis

Problem	DOK	Standard(s)
1	1	6.SP.A.3, 6.SP.B.5.C
2	2	6.SP.A.3, 6.SP.B.5.C
3	2	6.SP.A.3, 6.SP.B.5.C
4	2	6.SP.A.3, 6.SP.B.5.C
5	2	6.SP.A.3, 6.SP.B.5.C
6	2	6.SP.A.3, 6.SP.B.5.C
7	2	6.SP.A.3, 6.SP.B.5.C
8	3	6.SP.A.3, 6.SP.B.5.C

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

Additional Practice 8.09

Problems 1–4. This table shows the amount of time it takes **5** laptops to charge to **100**%. The mean charge time is **30** minutes.

Charge Time (min)	30	31	29	29	31

1. Fill in the absolute deviation of each value from the mean.

Charge Time (min)	30	31	29	29	31
Absolute Deviation	0	1	1	1	1

2. What is the sum of the absolute deviations?

A. 0

B. 3

C. 4

D. 5

3. Calculate the mean absolute deviation (MAD) of this data set. Show your work.

The MAD is 0.8. The sum of the absolute deviations is 4. Since there are 5 data points, the mean absolute deviation will be 4 divided by 5, or 0.8.

4. Based on the calculated MAD, how are the data points spread around the mean?

A. The MAD is a smaller value, so the data points are *less* spread out around the mean.

B. The MAD is a smaller value, so the data points are *more* spread out around the mean.

C. The MAD is a larger value, so the data points are *less* spread out around the mean.

D. The MAD is a larger value, so the data points are *more* spread out around the mean.

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

Problems 5–7. Mia would like to know how long her classmates studied for an upcoming French exam. This table shows the amount of time **5** students studied for the exam. Their mean study time was **90** minutes.

Study Time (min)	80	92	111	140	27

5. Fill in the absolute deviation of each value from the mean.

Study Time (min)	80	92	111	140	27
Absolute Deviation	10	2	21	50	63

6. What is the sum of the absolute deviations?

A. 28.7

B. 29.2

C. 30.4

D. 31.6

7. Describe how the calculated MAD measures the spread of the data around the mean study time.

Explanations vary. The MAD is rather large. This means that the data points are more spread out around the mean. The amount of time the 5 students studied for the exam is very spread out and not consistent.

Name: Date: Period:

Additional Practice 8.09

Problems 1–4. This table shows the amount of time it takes **5** laptops to charge to **100**%. The mean charge time is **30** minutes.

Charge Time (min)	30	31	29	29	31

1. Fill in the absolute deviation of each value from the mean.

Charge Time (min)	30	31	29	29	31
Absolute Deviation	0	1	1	1	1

2. What is the sum of the absolute deviations?

A. 0
B. 3
C. 4
D. 5

3. Calculate the mean absolute deviation (MAD) of this data set. Show your work.

The MAD is 0.8. The sum of the absolute deviations is 4. Since there are 5 data points, the mean absolute deviation will be 4 divided by 5, or 0.8.

4. Based on the calculated MAD, how are the data points spread around the mean?

A. The MAD is a smaller value, so the data points are *less* spread out around the mean.
B. The MAD is a smaller value, so the data points are *more* spread out around the mean.
C. The MAD is a larger value, so the data points are *less* spread out around the mean.
D. The MAD is a larger value, so the data points are *more* spread out around the mean.

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Name: Date: Period:

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Explanations vary. The MAD is rather large. This means that the data points are more spread out around the mean. The amount of time the 5 students studied for the exam is very spread out and not consistent.

Practice Problem Analysis

Problem	DOK	Standard(s)
1	1	6.SP.B.5.C
2	1	6.SP.B.5.C
3	1	6.SP.A.3, 6.SP.B.5.C
4	2	6.SP.A.3, 6.SP.B.5.C
5	1	6.SP.B.5.C
6	1	6.SP.A.3, 6.SP.B.5.C
7	2	6.SP.A.3, 6.SP.B.5.C

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

Additional Practice 8.11

1. Select *all* the true statements about the median.

- ☑ **A.** The median is the middle number.
- ☐ **B.** If there are 9 data points, calculate the average of the two in the middle.
- ☑ **C.** The data set needs to be in numerical order before determining the median.
- ☑ **D.** The median represents both a measure of center and a typical number.
- ☐ **E.** The mean and median are always the same.

2. This data set shows the number of tornadoes in Texas over the last several years.

89	184	58	186	106	258	47	84	121

a Order the data from least to greatest.

47, 58, 84, 89, 106, 121, 184, 186, 258

b Calculate the median of the data set.

106

3. Diego's score for each hole in mini golf is shown.

3	4	1	6	4	6	3	3	2
5	4	3	5	7	2	4	4	1

What was his median score?

- ☐ **A.** 3
- ☑ **B.** 4
- ☐ **C.** 6
- ☐ **D.** 9

4. Shawn and Lin are reading a trilogy of books. The tables list the number of minutes each of them read on several days over the past few weeks.

Shawn	30	30	25	15	40	35	20	20	30	25	35	40
Lin	15	15	25	20	15	40	30	40	40	30	25	20

a Determine the median of each data set.

Shawn: 30 minutes; Lin: 25 minutes

b Who typically read more? Explain your thinking.

Shawn; Sample response: Shawn typically read 5 minutes longer than Lin.

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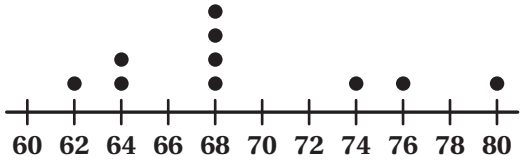
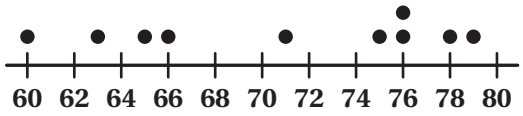
Name: Date: Period:

5. Match each dot plot with its median.

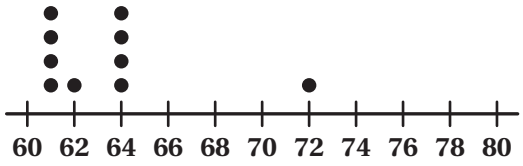
a



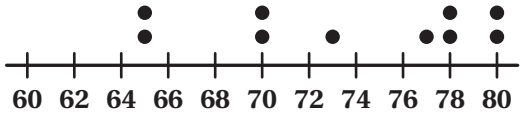
b 68



c 73

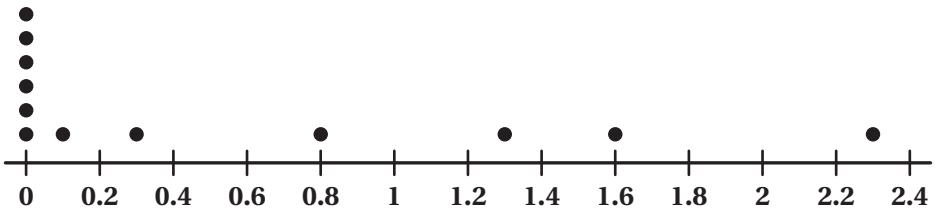


d 63



75

6. This dot plot shows the average snowfall days each month for Portland, Oregon. Determine the median for the data set.



0.05

7. Elena is researching which backpack would be the best one to buy. She sorted the price of several backpacks and noticed that 6 backpacks were more expensive than the one she purchased, and 8 backpacks were less expensive than the one she purchased. Does this mean that the price of Elena's backpack is the median? Explain your thinking.

No; Sample response: If 6 backpacks were more expensive than Elena's backpack, and 8 backpacks were more expensive than Elena's backpack, that means Elena's backpack is not in the middle, so it is not the median.

Name: Date: Period:

Additional Practice 8.11

1. Select *all* the true statements about the median.

- [x] **A.** The median is the middle number.
- [ ] **B.** If there are 9 data points, calculate the average of the two in the middle.
- [x] **C.** The data set needs to be in numerical order before determining the median.
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a. Order the data from least to greatest.
47, 58, 84, 89, 106, 121, 184, 186, 258

b. Calculate the median of the data set.
106

3. Diego's score for each hole in mini golf is shown.

3	4	1	6	4	6	3	3	2
5	4	3	5	7	2	4	4	1

What was his median score?

- [ ] **A.** 3
- [x] **B.** 4
- [ ] **C.** 6
- [ ] **D.** 9

4. Shawn and Lin are reading a trilogy of books. The tables list the number of minutes each of them read on several days over the past few weeks.

Shawn	30	30	25	15	40	35	20	20	30	25	35	40
Lin	15	15	25	20	15	40	30	40	40	30	25	20

a. Determine the median of each data set.
Shawn: 30 minutes; Lin: 25 minutes

b. Who typically read more? Explain your thinking.
Shawn; Sample response: Shawn typically read 5 minutes longer than Lin.

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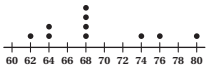
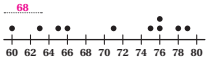
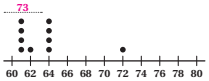
Name: Date: Period:

5. Match each dot plot with its median.

a.


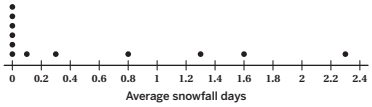
b. 68


c. 73


d. 63

75

6. This dot plot shows the average snowfall days each month for Portland, Oregon. Determine the median for the data set.



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Practice Problem Analysis

Problem	DOK	Standard(s)
1	1	6.SP.A.3, 6.SP.B.5.C
2	2	6.SP.A.3, 6.SP.B.5.C
3	2	6.SP.A.3, 6.SP.B.5.C
4	2	6.SP.A.3, 6.SP.B.5.C
5	2	6.SP.A.3, 6.SP.B.5.C
6	2	6.SP.A.3, 6.SP.B.5.C
7	3	6.SP.A.3, 6.SP.B.5.C

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

Additional Practice 8.13

1. This data set represents the scores of several students in a class on a 10-point quiz.

5	5	6	7	7	7	8	9	9	9	9	10	10	10	10

a. What is the median score?
9

b. What is the first quartile (Q1)?
7

c. What is the third quartile (Q3)?
10

d. What is the interquartile range (IQR)?
3

2. This data set represents the number of goals a soccer team scored at each game during their season.

3	5	8	2	4	3	1	0	1	1	5	3	2	4

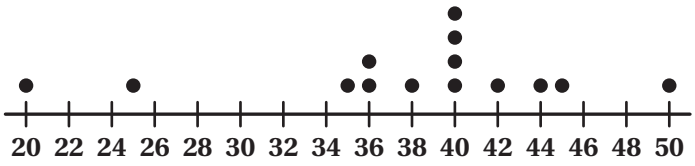
a. What is the median score?
3

b. What is the first quartile (Q1)?
1

c. What is the third quartile (Q3)?
4

d. What is the interquartile range (IQR)?
3

3. A group of students was asked, "How many songs are on your favorite playlist?" The results are shown on this dot plot.



Number of songs on playlist

a. What is the median score?
40

b. What is the first quartile (Q1)?
36

c. What is the third quartile (Q3)?
42

d. What is the interquartile range (IQR)?
6

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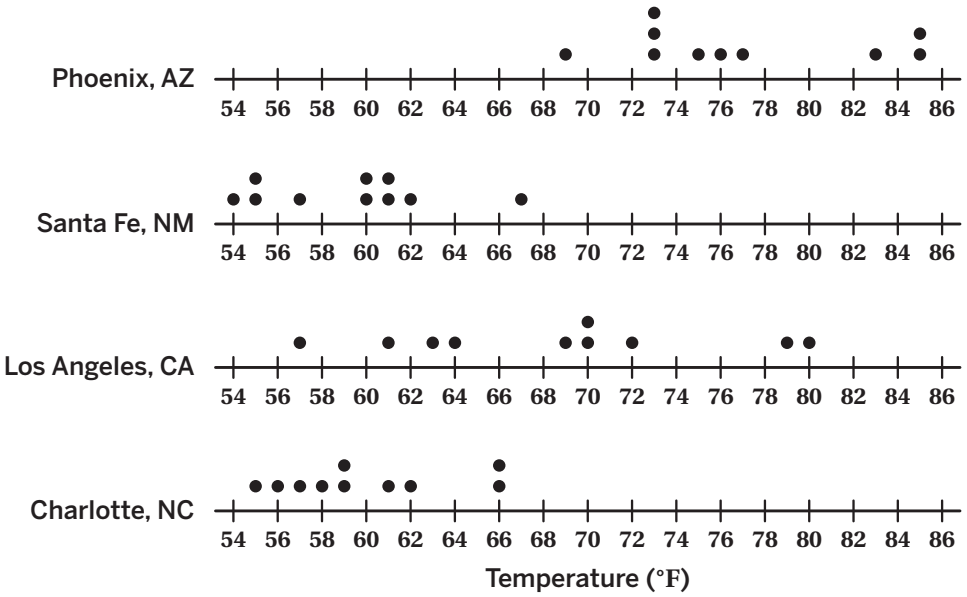
Name: ..... Date: ..... Period: .....

4. These dot plots represent the daily high temperatures in degrees Fahrenheit for four different cities in March. Match each dot plot with the correct median and IQR by writing the city's name next to each set of statistics.



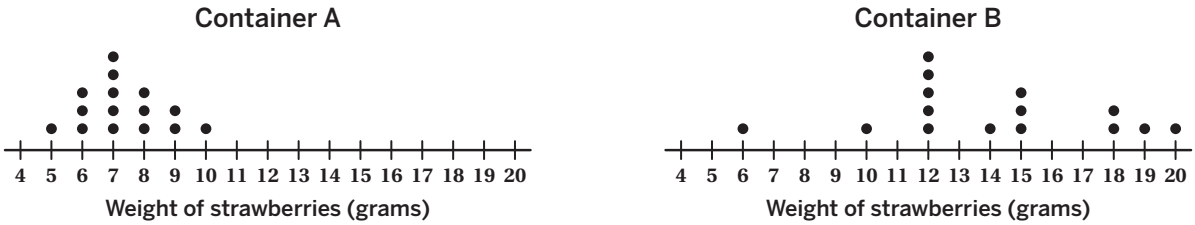
a Median: 59; IQR: 5
Charlotte, NC

b Median: 60; IQR: 6
Sante Fe, NM

c Median: 69.5; IQR: 9
Los Angeles, CA

d Median: 75.5; IQR: 10
Phoenix, AZ

5. Tyler weighs strawberries from two different containers and records the weights on the dot plots. Which statement is true about the data sets?



A. Container A has a greater range.

B. Container A has a greater IQR.

C. Container A has a greater median.

D. Container A has less variability.

6. Kiran and Clare exercised daily for the last 10 days and recorded how long they exercised each day. Kiran's median time was 50 minutes, with an IQR of 15. Clare's median time was 50 minutes, with an IQR of 25. Clare said her exercise time had less variability. Do you agree with Clare? Explain your thinking.

No; Sample response: Kiran's IQR was 15 and Clare's IQR was 25. Kiran's IQR was smaller, which means his time that he exercised had less variability than Clare's.

Name: Date: Period:

Additional Practice 8.13

1. This data set represents the scores of several students in a class on a 10-point quiz.

5	5	6	7	7	7	8	9	9	9	9	10	10	10	10

a. What is the median score?
9

b. What is the first quartile (Q1)?
7

c. What is the third quartile (Q3)?
10

d. What is the interquartile range (IQR)?
3

2. This data set represents the number of goals a soccer team scored at each game during their season.

3	5	8	2	4	3	1	0	1	1	5	3	2	4

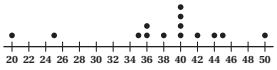
a. What is the median score?
3

b. What is the first quartile (Q1)?
1

c. What is the third quartile (Q3)?
4

d. What is the interquartile range (IQR)?
3

3. A group of students was asked, "How many songs are on your favorite playlist?" The results are shown on this dot plot.



Number of songs on playlist

a. What is the median score?
40

b. What is the first quartile (Q1)?
36

c. What is the third quartile (Q3)?
42

d. What is the interquartile range (IQR)?
6

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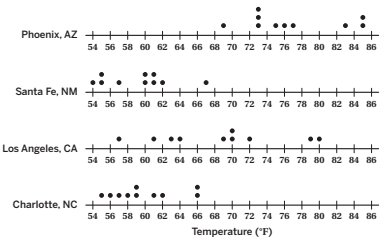
Name: Date: Period:

4. These dot plots represent the daily high temperatures in degrees Fahrenheit for four different cities in March. Match each dot plot with the correct median and IQR by writing the city's name next to each set of statistics.



a. Median: 59; IQR: 5
Charlotte, NC

b. Median: 60; IQR: 6
Sante Fe, NM

c. Median: 69.5; IQR: 9
Los Angeles, CA

d. Median: 75.5; IQR: 10
Phoenix, AZ

5. Tyler weighs strawberries from two different containers and records the weights on the dot plots. Which statement is true about the data sets?

A. Container A has a greater range.

B. Container A has a greater IQR.

C. Container A has a greater median.

D. Container A has less variability.

6. Kiran and Clare exercised daily for the last 10 days and recorded how long they exercised each day. Kiran's median time was 50 minutes, with an IQR of 15. Clare's median time was 50 minutes, with an IQR of 25. Clare said her exercise time had less variability. Do you agree with Clare? Explain your thinking.

No; Sample response: Kiran's IQR was 15 and Clare's IQR was 25. Kiran's IQR was smaller, which means his time that he exercised had less variability than Clare's.

Practice Problem Analysis

Problem	DOK	Standard(s)
1	1	6.SP.B.5.C
2	1	6.SP.B.5.C
3	1	6.SP.B.5.C
4	2	6.SP.B.5.C, 6.SP.B.5.D
5	2	6.SP.B.5.C, 6.SP.B.5.D
6	3	6.SP.B.5.C, 6.SP.B.5.D

Notes:

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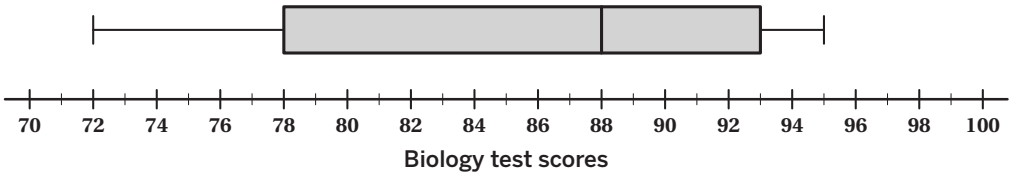
Name: ..... Date: ..... Period: .....

Additional Practice 8.14

1. This box plot summarizes the scores for a class on a recent biology test.



a. What is the greatest score in this class?

95

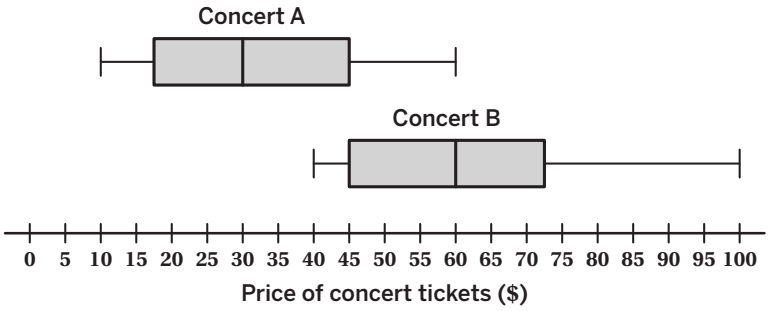
b. What is the median score in this class?

88

c. What is the interquartile range (IQR) for this class?

15

2. The box plots summarize the price of 250 tickets sold for two different concerts



a. How many tickets were sold for Concert A between $30 and $60?

125 tickets

b. What percent of tickets were sold for Concert B under $60?

50%

c. How many tickets were sold for Concert B between $45 and $100?

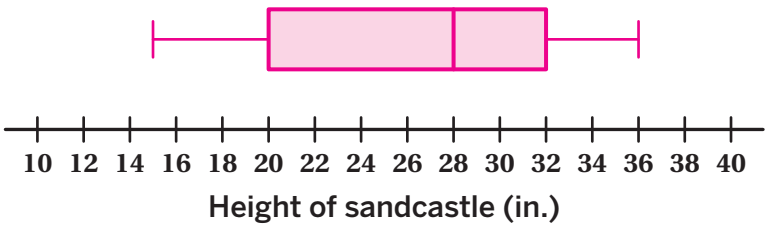
188 tickets (Also accept: 187.5 tickets)

d. What percent of tickets were sold for Concert A over $45?

25%

3. The data shows the height, in inches, of several sandcastles built on the beach. Create a box plot to represent this data.

18	34	30
28	15	30
36	24	22



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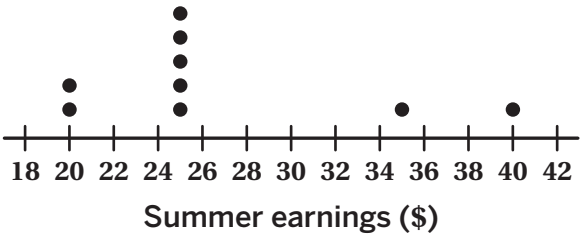
Name: ..... Date: ..... Period: .....

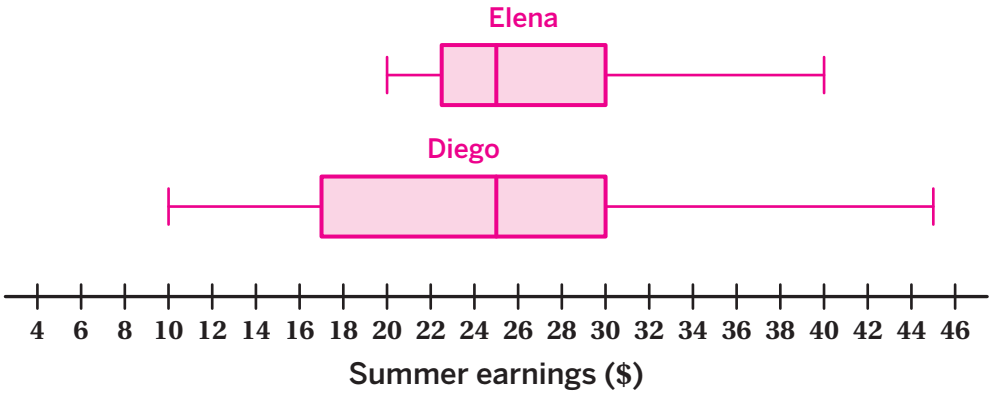
The data shows the amount of money Diego and Elena earned for doing odd jobs over the course of the summer. Use this information for Problems 4–6.

Diego:
Minimum: 10 **Q1:** 17 **Median:** 25 **Q3:** 30 **Maximum:** 45

Elena:



4. Create two box plots above the same number line to represent both sets of data. Make sure to label the box plot with *Diego* and *Elena*.



5. Which of the following statements are true about the box plots? Select *all* that apply.

- ☐ **A.** The IQR is the same for both data sets.
- ☑ **B.** The median is the same for both data sets.
- ☑ **C.** Diego earned a greater range of money over the summer.
- ☐ **D.** About 50% of the money Elena earned was more than $23.
- ☐ **E.** About 25% of the money Diego earned was less than $30.

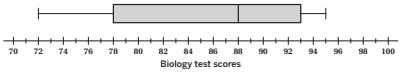
6. Diego says that 25% of the money that he and Elena earned is between $25 and $40. Do you agree with this statement? Explain your thinking.

I disagree; Sample response: About 25% of the money that both Elena and Diego earned is between $25 and $30.

Name: Date: Period:

Additional Practice 8.14

1. This box plot summarizes the scores for a class on a recent biology test.

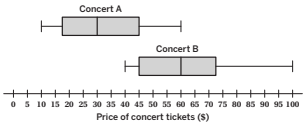


a. What is the greatest score in this class?
95

b. What is the median score in this class?
88

c. What is the interquartile range (IQR) for this class?
15

2. The box plots summarize the price of 250 tickets sold for two different concerts



a. How many tickets were sold for Concert A between $30 and $60?
125 tickets

b. What percent of tickets were sold for Concert B under $60?
50%

c. How many tickets were sold for Concert B between $45 and $100?
188 tickets (Also accept: 187.5 tickets)

d. What percent of tickets were sold for Concert A over $45?
25%

3. The data shows the height, in inches, of several sandcastles built on the beach. Create a box plot to represent this data.

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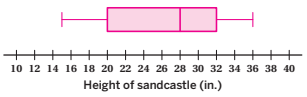
28	15	30
36	24	22



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Name: Date: Period:

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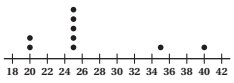
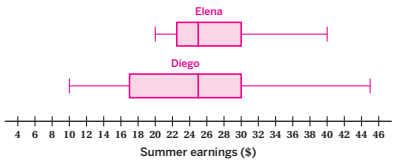
Diego:
Minimum: 10 **Q1:** 17 **Median:** 25 **Q3:** 30 **Maximum:** 45

Elena:



4. Create two box plots above the same number line to represent both sets of data. Make sure to label the box plot with *Diego* and *Elena*.



5. Which of the following statements are true about the box plots? Select *all* that apply.

- ☐ A. The IQR is the same for both data sets.
- ☑ B. The median is the same for both data sets.
- ☑ C. Diego earned a greater range of money over the summer.
- ☐ D. About 50% of the money Elena earned was more than $23.
- ☐ E. About 25% of the money Diego earned was less than $30.

6. Diego says that 25% of the money that he and Elena earned is between $25 and $40. Do you agree with this statement? Explain your thinking.
I disagree; Sample response: About 25% of the money that both Elena and Diego earned is between $25 and $30.

Practice Problem Analysis

Problem	DOK	Standard(s)
1	2	6.SP.B.5.C
2	2	6.SP.B.5.C
3	2	6.SP.B.4
4	2	6.SP.B.4
5	2	6.SP.B.5.C
6	3	6.SP.B.5.C

Notes:

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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.

False; Sample response: The entire group is the population; the sample is part of the group.

b Samples from the same population will vary from sample to sample.

True; Sample response: Each element from the sample has the same chance of being selected, but you cannot tell which elements will be selected.

c Different random samples of the same size and from the same population will be the same.

False; Sample response: By chance, the sample will have different elements, so it's likely that the samples will vary.

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.

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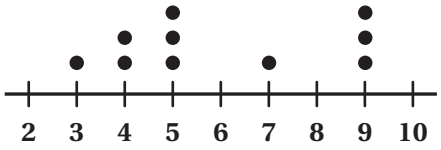
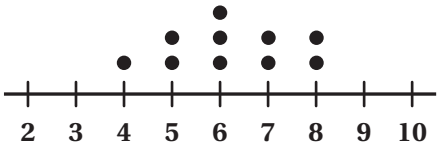
Name: ..... Date: ..... Period: .....

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	6	2
Letters in last name	6.2	1.04

Last name, by 0.2; Sample response: The mean number of letters of the last name is greater. The difference of the means is $6.2 - 6.0 = 0.2$. The difference is close to 0, which tells me there is not much difference in the lengths of first and last names.

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	59.5	1.67
Eighth graders	63.8	1.8

Eighth graders, by 4.3; Sample response: The mean height of eighth graders is greater. The difference of the means is $63.8 - 59.5 = 4.3$. This shows that on average, eighth graders are 4 inches taller than seventh graders.

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.
False; Sample response: The entire group is the population; the sample is part of the group.

b. Samples from the same population will vary from sample to sample.
True; Sample response: Each element from the sample has the same chance of being selected, but you cannot tell which elements will be selected.

c. Different random samples of the same size and from the same population will be the same.
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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.

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C. The sample represents all of the customers that come into the bakery on one day.

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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.

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	Mean	MAD
Letters in first name	6	2
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Last name, by 0.2; Sample response: The mean number of letters of the last name is greater. The difference of the means is $6.2 - 6.0 = 0.2$. The difference is close to 0, which tells me there is not much difference in the lengths of first and last names.

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
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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	59.5	1.67
Eighth graders	63.8	1.8

Eighth graders, by 4.3; Sample response: The mean height of eighth graders is greater. The difference of the means is $63.8 - 59.5 = 4.3$. This shows that on average, eighth graders are 4 inches taller than seventh graders.

Practice Problem Analysis

Problem	DOK	Standard(s)
1	2	7.SP.A.1
2	2	7.SP.A.1
3	2	7.SP.A.1
4	2	7.SP.A.1
5	2	7.SP.B.3
6	3	7.SP.B.3
7	2	7.SP.B.3
8	3	7.SP.B.3

Notes:

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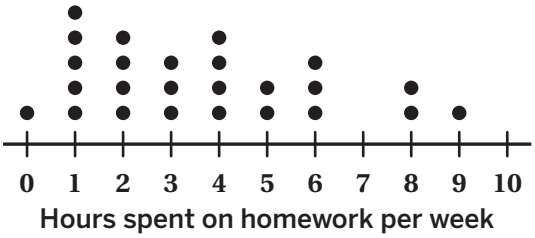
Name: ..... Date: ..... Period: .....

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.

No; Sample response: Because it is a representative sample, Lin should expect close to 60% of students to pay $1, and her sample showed a much higher percentage of students that participated in the fundraiser.

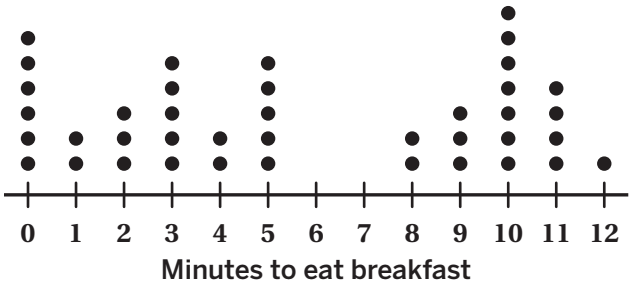
2. Tyler was asked how many hours students at his school spend on homework each week. The sample shown consists of 25 students and is representative of the population.



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 0 to 12.

b The center will be around 5.6. (Round to the nearest tenth.)

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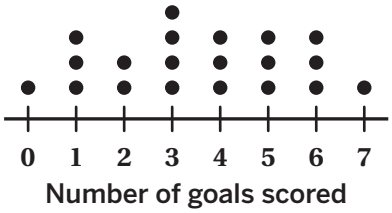
Name: ..... Date: ..... Period: .....

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.

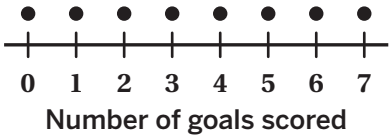


4. Calculate the mean and MAD for this data set.

a Mean 3.55

b MAD 1.65

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.



Yes; Sample response: This sample matches the spread of the population, matches the center very closely, and though the shape differs slightly, it is still a good representative of the population.

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.

No; Sample response: The mean of this sample is 99, which is much higher than the class mean.

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.

Yes; Sample response: The mean of this sample is also 91, so this is a good representation of the 24 students.

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.

Yes; Sample response: The mean of this sample is 90, which is close to the class average of 91.

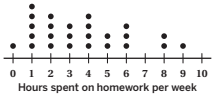
Name: Date: Period:

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.

   No; Sample response: Because it is a representative sample, Lin should expect close to 60% of students to pay $1, and her sample showed a much higher percentage of students that participated in the fundraiser.

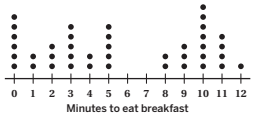
2. Tyler was asked how many hours students at his school spend on homework each week. The sample shown consists of 25 students and is representative of the population.

   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 0 to 12.

   b. The center will be around 5.6. (Round to the nearest tenth.)

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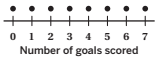
Priya surveyed soccer players to see how many goals they scored during their most recent soccer season. The results of the survey are shown in the dot plot. Refer to the dot plot for Problems 4–5.

4. Calculate the mean and MAD for this data set.

   a. Mean 3.55

   b. MAD 1.65

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.

   Yes; Sample response: This sample matches the spread of the population, matches the center very closely, and though the shape differs slightly, it is still a good representative of the population.

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.

   No; Sample response: The mean of this sample is 99, which is much higher than the class mean.

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.

   Yes; Sample response: The mean of this sample is also 91, so this is a good representation of the 24 students.

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.

   Yes; Sample response: The mean of this sample is 90, which is close to the class average of 91.

Practice Problem Analysis

Problem	DOK	Standard(s)
1	2	7.SP.A.2
2	2	7.SP.A.1
3	2	7.SP.A.1
4	2	7.SP.A.1
5	3	7.SP.A.1, 7.SP.A.2
6	2	7.SP.A.1, 7.SP.A.2
7	2	7.SP.A.1, 7.SP.A.2
8	2	7.SP.A.1, 7.SP.A.2

Notes:

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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. **0.6**

b Based on Clare's sample, estimate what fraction of the students preferred math. **0.525**

c Whose estimate is more likely to be accurate? Explain your thinking.
Clare; Sample response: The results are close, but Clare's estimate is more accurate because she used a larger sample.

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: $\frac{7}{24}$

b Elena's sample: $\frac{9}{24}$ or $\frac{3}{8}$

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. **175**

b 4 people in their household. **306**

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. **163**

b 4 people in their household. **366**

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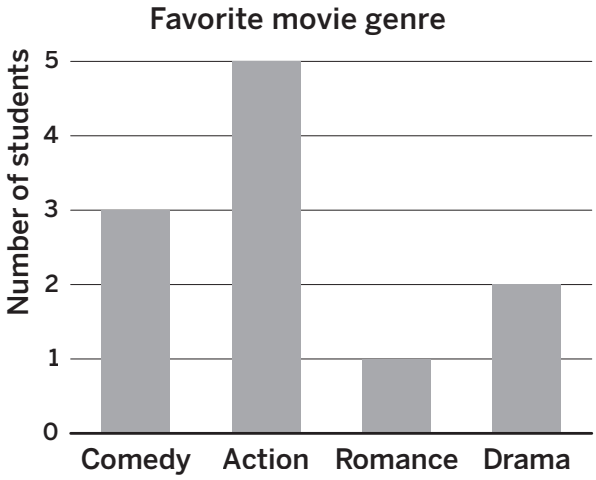
Name: ..... Date: ..... Period: .....

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.



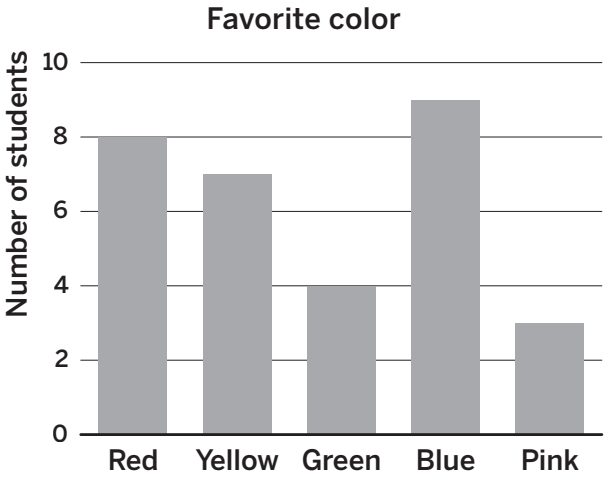
5. Estimate the total number of students in the school who would choose action as their favorite movie genre.

445

6. Estimate the total number of students in the school who would choose romance or drama as their favorite movie genre.

267

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.

Yes; Sample response: Shawn correctly estimated that 196 students chose yellow as their favorite color because $\frac{7}{31} \cdot 868 = 196$.

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.

No; Sample response: There are 17 students who chose red or blue as their favorite color because $\frac{17}{31} \cdot 868 = 476$.

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. 0.6
   b. Based on Clare's sample, estimate what fraction of the students preferred math. 0.525
   c. Whose estimate is more likely to be accurate? Explain your thinking.
   Clare; Sample response: The results are close, but Clare's estimate is more accurate because she used a larger sample.

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: $\frac{7}{24}$
   b. Elena's sample: $\frac{9}{24}$ or $\frac{3}{8}$

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. 175
   b. 4 people in their household. 306

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. 163
   b. 4 people in their household. 366

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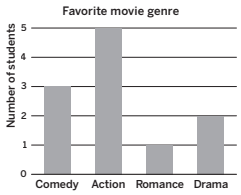
Name: Date: Period:

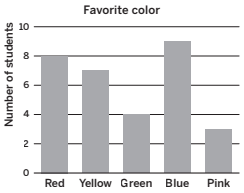
There are 978 students at Han's school. Han surveyed a random sample of students about their favorite movie genre. The bar graph shows the results. Refer to the bar graph for Problems 5–6.



5. Estimate the total number of students in the school who would choose action as their favorite movie genre.
   445

6. Estimate the total number of students in the school who would choose romance or drama as their favorite movie genre.
   267

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.
   Yes; Sample response: Shawn correctly estimated that 196 students chose yellow as their favorite color because $\frac{2}{31} \cdot 868 = 196$.

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.
   No; Sample response: There are 17 students who chose red or blue as their favorite color because $\frac{17}{31} \cdot 868 = 476$.

Practice Problem Analysis

Problem	DOK	Standard(s)
1	2	7.SP.A.2, 7.SP.B.4, 7.RP.A.2
2	1	7.SP.A.2, 7.SP.B.4, 7.RP.A.2
3	1	7.SP.A.2, 7.SP.B.4, 7.RP.A.2
4	1	7.SP.A.2, 7.SP.B.4, 7.RP.A.2
5	1	7.SP.A.2, 7.RP.A.2
6	1	7.SP.A.2, 7.RP.A.2
7	3	7.SP.A.2, 7.RP.A.2
8	3	7.SP.A.2, 7.RP.A.2

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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.

The mean number of pages that Clare read during winter break was 237 pages. The mean number of pages that Clare read during spring break was 234 pages.

2. Calculate how many MADs apart the means are. Use the larger MAD in your calculation.

The difference between the means is 3. Using the larger MAD, 33.6, the means are 3/33.6 or about 0.09 MADs apart.

3. Based on this data, did Clare read more pages during her winter break or her summer break? Explain your thinking.

No. Explanations vary. The difference of 3 is not a big difference when looking at the spread of the data. The difference between the means is less than 1 MAD. So, Clare read about the same number of pages during her winter break and during her summer break.

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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.

Explanations vary. Since the difference is more than 1 times the larger MAD, the data sets are very different. This suggests that teachers do spend more time driving to school.

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				
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MAD 33.6				

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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.

   The mean number of pages that Clare read during winter break was 237 pages. The mean number of pages that Clare read during spring break was 234 pages.

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   The difference between the means is 3. Using the larger MAD, 33.6, the means are 3/33.6 or about 0.09 MADs apart.

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   No. Explanations vary. The difference of 3 is not a big difference when looking at the spread of the data. The difference between the means is less than 1 MAD. So, Clare read about the same number of pages during her winter break and during her summer break.

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Students	22.7	8.3
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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.

   Explanations vary. Since the difference is more than 1 times the larger MAD, the data sets are very different. This suggests that teachers do spend more time driving to school.

Practice Problem Analysis

Problem	DOK	Standard(s)
1	1	7.SP.B.3, 7.SP.B.4
2	1	7.SP.B.3, 7.SP.B.4
3	2	7.SP.B.3, 7.SP.B.4
4	2	7.SP.B.3, 7.SP.B.4
5	2	7.SP.B.3, 7.SP.B.4

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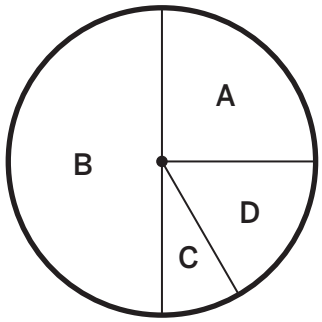
Name: ..... Date: ..... Period: .....

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* — **Possible**

b. Landing on *B* — **Possible**

c. Landing on *C* — **Possible**

d. Landing on *D* — **Possible**

e. Landing on a number — **Impossible**

f. Landing on a letter — **Certain**

2. Order these events from *least likely* to *most likely*.

Landing on *A*, Landing on *B*, Landing on *C*, Landing on *D*

Landing on *C*	**Least likely**
Landing on *D*	
Landing on *A*	
Landing on *B*	**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.

No; Sample response: While it is possible to land on *C* on her next spin, it is more likely the spinner will land on *A*, *B*, or *D* because these segments are larger.

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.

Andre; Sample response: Andre is more likely to select *C* because 2 out of 5 letters in the word *COUCH* is a *C*. Shawn is less likely to select *C* because 1 out of the 5 letters of the word *CHAIR* is a *C*.

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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.
Impossible

b Selecting a vowel from the word *WORK* or from the word *MATH*.
Equally likely as not

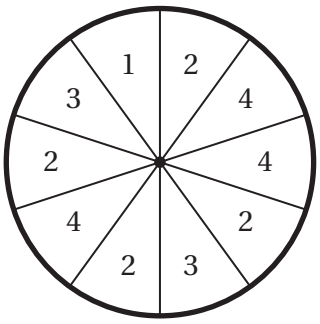
c Rolling a 6 on a 10-sided die.
Unlikely

d A spinner has 6 equal-sized sections labeled 1 through 6. You spin the spinner and it lands on an even number.
Equally likely as not

e Selecting a black marble from a bag containing only black marbles.
Certain

f Selecting a consonant from the word *STUDY*.
Likely

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

Landing on 1	**Least likely**
Landing on 3	
Landing on 4	
Landing on 2	**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.

Possible; Sample response: It is possible that a letter *A* will be selected because 2 of the 7 letters in the word *ALGEBRA* is an *A*.

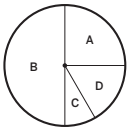
8. There are 12 girls and 13 boys in Priya's homeroom class. If a student is selected at random, Priya says it will be unlikely that a girl will be selected because there are more boys in the class. Is Priya correct? Explain your thinking.

No; Sample response: It is almost equally likely that a boy or girl will be selected because there are almost the same number of boys and girls in Priya's homeroom class.

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* — Possible

b. Landing on *B* — Possible

c. Landing on *C* — Possible

d. Landing on *D* — Possible

e. Landing on a number — Impossible

f. Landing on a letter — Certain

2. Order these events from *least likely* to *most likely*.

Landing on *A*, Landing on *B*, Landing on *C*, Landing on *D*

Landing on *C*	Least likely
Landing on *D*	
Landing on *A*	
Landing on *B*	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.

No; Sample response: While it is possible to land on *C* on her next spin, it is more likely the spinner will land on *A*, *B*, or *D* because these segments are larger.

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.

Andre; Sample response: Andre is more likely to select *C* because 2 out of 5 letters in the word *COUCH* is a *C*. Shawn is less likely to select *C* because 1 out of the 5 letters of the word *CHAIR* is a *C*.

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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.
Impossible

b. Selecting a vowel from the word *WORK* or from the word *MATH*.
Equally likely as not

c. Rolling a 6 on a 10-sided die.
Unlikely

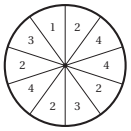
d. A spinner has 6 equal-sized sections labeled 1 through 6. You spin the spinner and it lands on an even number.
Equally likely as not

e. Selecting a black marble from a bag containing only black marbles.
Certain

f. Selecting a consonant from the word *STUDY*.
Likely

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



Landing on 1	Least likely
Landing on 3	
Landing on 4	
Landing on 2	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.

Possible; Sample response: It is possible that a letter *A* will be selected because 2 of the 7 letters in the word *ALGEBRA* is an *A*.

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.

No; Sample response: It is almost equally likely that a boy or girl will be selected because there are almost the same number of boys and girls in Priya's homeroom class.

Practice Problem Analysis

Problem	DOK	Standard(s)
1	2	7.SP.C.5
2	2	7.SP.C.5
3	2	7.SP.C.5
4	2	7.SP.C.5
5	2	7.SP.C.5
6	2	7.SP.C.5
7	2	7.SP.C.5
8	3	7.SP.C.5

Notes:

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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.

$\frac{13}{95}$; Sample response: I combined the number of students from each school because I am randomly selecting a student from the district. The chance that a student would be playing video games is $\frac{13}{95}$, or about 14%.

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.

$\frac{8}{95}$; Sample response: I combined the number of students from each school because I am randomly selecting a student from the district. The chance that a student would be watching a younger sibling is $\frac{8}{95}$, or about 8%.

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.

School 2; Sample response: The probability that a student from School 1 is hanging out with friends is $\frac{16}{65,}$ or about 25%. The probability that a student from School 2 is hanging out with friends is $\frac{10}{30}$, or about 33%. School 2 has a greater probability.

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.

School 1; Sample response: The probability that a student from School 1 is practicing a sport is $\frac{21}{65}$, or about 32%. The probability that a student from School 2 is practicing a sport is $\frac{6}{30}$, or 20%. School 1 has a greater probability.

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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*?

4 times

b Suppose you spin the spinner 72 times. About how many times do you expect it will land on something other than *T*?

60 times

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*?

3 times

b Suppose you spin the spinner 96 times. About how many times do you expect it will land on something other than an *E*?

72 times

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.

Higher: Sample response: The expected probability of landing on an *E* out of 32 spins is 8.

7. A number cube labeled 1 through 6 is rolled once.

a What is the probability of rolling a 3?

$\frac{1}{6}$

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.

Less than; Sample response: The expected probability of rolling a 3 is eight times. Han's outcome is less than the expected outcome.

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.

Elena; Sample response: The expected probability of landing on tails is $\frac{1}{2}$, but it is likely that the observed outcome will not be $\frac{1}{2}$, so I agree with Elena.

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.
   $\frac{13}{95}$; Sample response: I combined the number of students from each school because I am randomly selecting a student from the district. The chance that a student would be playing video games is $\frac{13}{95}$, or about 14%.
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.
   $\frac{8}{95}$; Sample response: I combined the number of students from each school because I am randomly selecting a student from the district. The chance that a student would be watching a younger sibling is $\frac{8}{95}$, or about 8%.
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.
   School 2; Sample response: The probability that a student from School 1 is hanging out with friends is $\frac{16}{65}$, or about 25%. The probability that a student from School 2 is hanging out with friends is $\frac{10}{30}$, or about 33%. School 2 has a greater probability.
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.
   School 1; Sample response: The probability that a student from School 1 is practicing a sport is $\frac{21}{65}$, or about 32%. The probability that a student from School 2 is practicing a sport is $\frac{6}{30}$, or 20%. School 1 has a greater probability.

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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*?
      4 times
   b. Suppose you spin the spinner 72 times. About how many times do you expect it will land on something other than *T*?
      60 times
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*?
      3 times
   b. Suppose you spin the spinner 96 times. About how many times do you expect it will land on something other than an *E*?
      72 times
   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.
      Higher: Sample response: The expected probability of landing on an *E* out of 32 spins is 8.
7. A number cube labeled 1 through 6 is rolled once.
   a. What is the probability of rolling a 3?
      $\frac{1}{6}$
   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.
      Less than; Sample response: The expected probability of rolling a 3 is eight times. Han's outcome is less than the expected outcome.
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.
   Elena; Sample response: The expected probability of landing on tails is $\frac{1}{2}$, but it is likely that the observed outcome will not be $\frac{1}{2}$, so I agree with Elena.

Practice Problem Analysis

Problem	DOK	Standard(s)
1	2	7.SP.C.6
2	2	7.SP.C.6
3	2	7.SP.C.6
4	2	7.SP.C.6
5	2	7.SP.C.6
6	2	7.SP.C.6, 7.SP.C.7
7	2	7.SP.C.6, 7.SP.C.7
8	3	7.SP.C.6

Notes:

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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	**0.4**
Country	15	**0.2**
Rap	21	**0.28**
Other	9	**0.12**
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.
20%

b The relative frequency of students who ride the bus.
30%

c The relative frequency of students who ride in a car.
10%

d The relative frequency of students who ride a bike.
40%

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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.
$\frac{1}{5}$

b Determine the relative frequency of the letter *T* occuring. Write the relative frequency as a fraction in simplest form.
$\frac{1}{9}$

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	5	$\frac{5}{61}$
C	4	$\frac{4}{61}$
U	7	$\frac{7}{61}$
O	11	$\frac{11}{61}$

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.

***A* and *N*; Sample response: The letters *A* and *N* have the same relative frequency because they each occur five times in the quote.**

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	0.4
Country	15	0.2
Rap	21	0.28
Other	9	0.12
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.
20%

b. The relative frequency of students who ride the bus.
30%

c. The relative frequency of students who ride in a car.
10%

d. The relative frequency of students who ride a bike.
40%

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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.
$\frac{1}{5}$

b. Determine the relative frequency of the letter *T* occuring. Write the relative frequency as a fraction in simplest form.
$\frac{1}{9}$

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	5	$\frac{5}{61}$
C	4	$\frac{4}{61}$
U	7	$\frac{7}{61}$
O	11	$\frac{11}{61}$

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.
A and *N*; Sample response: The letters *A* and *N* have the same relative frequency because they each occur five times in the quote.

Practice Problem Analysis

Problem	DOK	Standard(s)
1	2	7.SP.C.6
2	2	7.SP.C.6
3	2	7.SP.C.6
4	2	7.SP.C.6
5	2	7.SP.C.6
6	2	7.SP.C.6
7	3	7.SP.C.6

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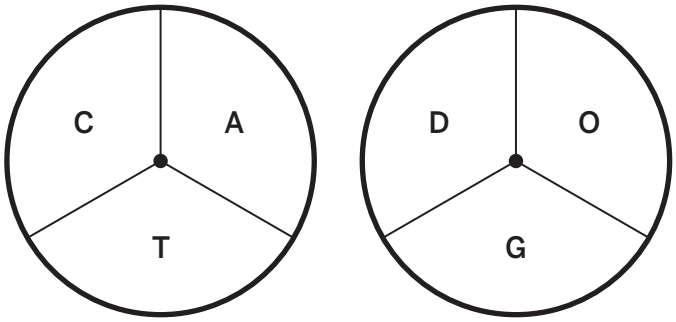
Name: ..... Date: ..... Period: .....

Additional Practice 8.06

1. Shawn spins the two fair spinners shown.



a List *all* of the possible outcomes.

CD, CO, CG, AD, AO, AG, TD, TO, TG

b How many different possible outcomes are in the sample space?

9

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.

H1H	H2H	H3H	H4H	H5H	H6H
H1T	H2T	H3T	H4T	H5T	H6T
T1H	T2H	T3H	T4H	T5H	T6H
T1T	T2T	T3T	T4T	T5T	T6T

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.

Dairy and granola, dairy and oatmeal, dairy and rice squares, soy and granola, soy and oatmeal, soy and rice squares; 6 outcomes

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.

Rice, chicken, tomatoes; rice, chicken, corn; lettuce, chicken, tomatoes; lettuce, chicken, corn; rice, beans, tomatoes; rice, beans, corn; lettuce, beans, tomatoes; lettuce, beans, corn; 8 outcomes

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.

No; Sample response: There are 24 possible outcomes: 1G, 2G, 3G, 4G, 5G, 6G, 1O, 2O, 3O, 4O, 5O, 6O, 1E, 2E, 3E, 4E, 5E, 6E, 1S, 2S, 3S, 4S, 5S, 6S. $6 \cdot 4 = 24$

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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.

72

6. How many different omelettes include whole eggs, sausage or bacon, and onions? Show or explain your thinking.

6; Sample response: There is 1 option for eggs, 2 options for proteins, 3 options for cheese, and 1 option for a vegetable. There are $1 \cdot 2 \cdot 3 \cdot 1 = 6$ different options.

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.

9; Sample response: Tyler has 1 option for eggs, 3 options for protein, 3 options for cheese, and 1 option for a vegetable. There are $1 \cdot 3 \cdot 3 \cdot 1 = 9$ different omelettes.

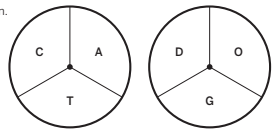
8. Suppose an omelette is made by randomly choosing each of the options. What is the ratio of the number of omelettes that Tyler could choose to the total number of possible omelettes? Show or explain your thinking.

$\frac{9}{72}$ or 0.125 or 12.5%

Name: Date: Period:

Additional Practice 8.06

1. Shawn spins the two fair spinners shown.



a. List *all* of the possible outcomes.
CD, CO, CG, AD, AO, AG, TD, TO, TG

b. How many different possible outcomes are in the sample space?
9

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.

H1H	H2H	H3H	H4H	H5H	H6H
H1T	H2T	H3T	H4T	H5T	H6T
T1H	T2H	T3H	T4H	T5H	T6H
T1T	T2T	T3T	T4T	T5T	T6T

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.
Dairy and granola, dairy and oatmeal, dairy and rice squares, soy and granola, soy and oatmeal, soy and rice squares; 6 outcomes

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.
Rice, chicken, tomatoes; rice, chicken, corn; lettuce, chicken, tomatoes; lettuce, chicken, corn; rice, beans, tomatoes; rice, beans, corn; lettuce, beans, tomatoes; lettuce, beans, corn; 8 outcomes

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.
No; Sample response: There are 24 possible outcomes: 1G, 2G, 3G, 4G, 5G, 6G, 1O, 2O, 3O, 4O, 5O, 6O, 1E, 2E, 3E, 4E, 5E, 6E, 1S, 2S, 3S, 4S, 5S, 6S. $6 \cdot 4 = 24$

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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.
72

6. How many different omelettes include whole eggs, sausage or bacon, and onions? Show or explain your thinking.
6; Sample response: There is 1 option for eggs, 2 options for proteins, 3 options for cheese, and 1 option for a vegetable. There are $1 \cdot 2 \cdot 3 \cdot 1 = 6$ different options.

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.
9; Sample response: Tyler has 1 option for eggs, 3 options for protein, 3 options for cheese, and 1 option for a vegetable. There are $1 \cdot 3 \cdot 3 \cdot 1 = 9$ different omelettes.

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.
$\frac{9}{72}$ or 0.125 or 12.5%

Practice Problem Analysis

Problem	DOK	Standard(s)
1	1	7.SP.C.8.B
2	1	7.SP.C.8.B
3	1	7.SP.C.8.B
4	3	7.SP.C.8.B
5	1	7.SP.C.8.B
6	2	7.SP.C.8.B
7	2	7.SP.C.8.B
8	2	7.SP.C.8.B

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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?
$\frac{1}{3}$

b. Based on this simulation, what is the probability that at least 4 out of 6 randomly selected students ride the bus to school?
$\frac{4}{20}$ or $\frac{1}{5}$ or 20%

c. Based on this simulation, what is the probability that fewer than 3 out of 6 randomly selected students ride the bus?
$\frac{3}{20}$ or 15%

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.

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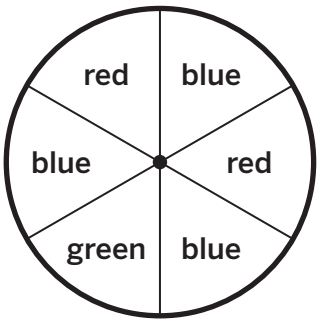
Name: ..... Date: ..... Period: .....

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.
$\frac{8}{50}$ or 0.16 or 16%

b. Rolling an even number and an odd number (in any order).
$\frac{28}{50}$ or 0.56 or 56%

c. Rolling two even numbers.
$\frac{12}{50}$ or 0.24 or 24%

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.

Less than; Sample response: The experimental probability is $\frac{10}{50}$ or 20%, which is slightly less than the theoretical probability of 25%.

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.

Greater than; Sample response: The experimental probability is $\frac{12}{50}$ or 24%, which is greater than the theoretical probability of about 17%.

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?
$\frac{1}{3}$

b. Based on this simulation, what is the probability that at least 4 out of 6 randomly selected students ride the bus to school?
$\frac{4}{20}$ or $\frac{1}{5}$ or 20%

c. Based on this simulation, what is the probability that fewer than 3 out of 6 randomly selected students ride the bus?
$\frac{3}{20}$ or 15%

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.

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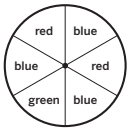
Name: Date: Period:

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.
$\frac{8}{50}$ or 0.16 or 16%

b. Rolling an even number and an odd number (in any order).
$\frac{28}{50}$ or 0.56 or 56%

c. Rolling two even numbers.
$\frac{12}{50}$ or 0.24 or 24%

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.
Less than; Sample response: The experimental probability is $\frac{10}{50}$ or 20%, which is slightly less than the theoretical probability of 25%.

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.
Greater than; Sample response: The experimental probability is $\frac{12}{50}$ or 24%, which is greater than the theoretical probability of about 17%.

Practice Problem Analysis

Problem	DOK	Standard(s)
1	2	7.SP.C.8.C
2	2	7.SP.C.8.C
3	2	7.SP.C.8.C
4	2	7.SP.C.8.C
5	2	7.SP.C.8.C
6	3	7.SP.C.8.C
7	3	7.SP.C.8.C

Notes:

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