

**Warm-Up**

Select **all** of the scales that are equivalent to the scale 1 cm to 5 km.

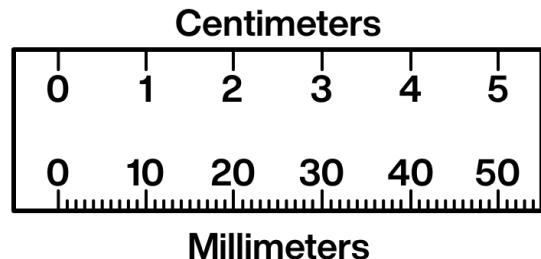
3 cm to 15 km       1 cm to 150 km       5 cm to 1 km

0.5 cm to 2.5 km       12 cm to 60 km

**Practice**

There is a proportional relationship between any length measured in centimeters (cm) and the same length measured in millimeters (mm).

Use the ruler to help you complete the tables.



1.1 Complete the table.

Length (cm)	Length (mm)
4	
12	
50	
88.49	

1.2 Complete the table.

Length (mm)	Length (cm)
25	
240	
4	
699.1	

What is the constant of proportionality?

What is the constant of proportionality?

1.3 How are these two constants of proportionality related to each other?

2. Amoli and Ella are converting measurements between inches and feet. Amoli says that the constant of proportionality is 12. Ella says it is  $\frac{1}{12}$ . Do you agree with either of them?

Explain your reasoning.

3. The area of the Mojave desert is 25 000 square miles. A scale drawing of the Mojave desert has an area of 10 square inches. What is the scale of the map?

## Explore

Here is a recipe for 12 cupcakes.

Four friends are deciding where to meet to make the cupcakes.

- Terrance has 1 cup of flour and 6 eggs.
- Duri has 12 cups of flour and 1 000 grams of butter.
- Habib has 3 cups of milk and 6 cups of sugar.
- Anika has 1 cup of sugar and 4 cups of milk.

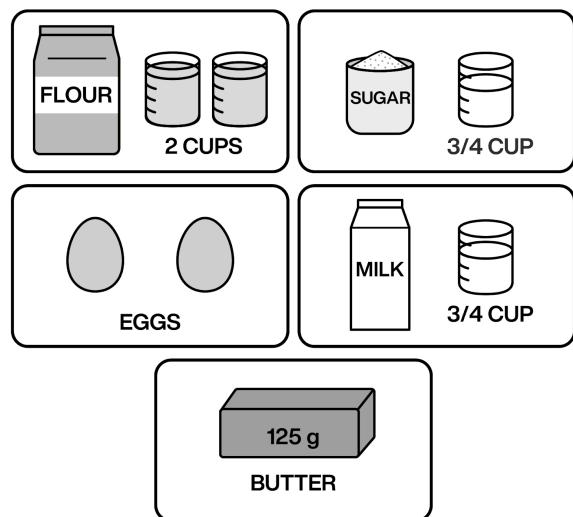
If each person has enough of all the other ingredients, how many cupcakes could they make on their own?

Terrance: \_\_\_\_\_ cupcakes

Duri: \_\_\_\_\_ cupcakes

Habib: \_\_\_\_\_ cupcakes

Anika: \_\_\_\_\_ cupcakes



They all decide to meet at school, and they each bring their two ingredients. How many cupcakes could they make together?

## Reflect

1. Put a star next to the question that you thought was the most important.
2. Use the space below to ask one question you have or to share something you are proud of.

## Warm-Up

- 3 cm to 15 km     1 cm to 150 km     5 cm to 1 km
- 0.5 cm to 2.5 km     12 cm to 60 km

## Practice

1.1 Complete the table.

Length (cm)	Length (mm)
4	40
12	120
50	500
88.49	884.9

1.2 Complete the table.

Length (mm)	Length (cm)
25	2.5
240	24
4	0.4
699.1	69.91

What is the constant of proportionality? 10

What is the constant of proportionality? 0.1

- 1.3 Responses vary. The constants of proportionality are reciprocals of each other.
2. They are both correct. Explanations vary. Amoli is saying that there are 12 inches for every 1 foot. Ella is saying that there is  $\frac{1}{12}$  of a foot for every 1 inch.
3. 1 inch to 50 miles

## Explore

**Terrance:** 6 cupcakes**Duri:** 72 cupcakes**Habib:** 48 cupcakes**Anika:** 16 cupcakes

They could make 36 cupcakes together since they will be limited by having only 6 eggs.

**Warm-Up**

Find each of the following percentages:

50% of 40

25% of 40

5% of 40

5% of 80

**Practice**

The relationship between a distance in yards,  $y$ , and the same distance in miles,  $m$ , is described by the equation  $y = 1760m$ .

- 1.1 Find some measurements in yards and miles by completing the table.

- 1.2 Is the relationship between a measurement in yards and a measurement in miles for the same distance proportional?

Explain why or why not.

Distance (mi.)	Distance (yd.)
1	
5	
	3 520
	17 600

2. Select **all** of the equations that represent a proportional relationship.

- The remaining length,  $L$ , of a 120 -inch rope after  $x$  inches have been cut off:  $120 - x = L$ .
- The total cost,  $t$ , after an 8% sales tax is added to an item's price,  $p$ :  $1.08p = t$ .
- The number of marbles each sister gets,  $x$ , when  $m$  marbles are shared equally among four sisters:  $x = \frac{m}{4}$ .
- The volume,  $V$ , of a rectangular prism whose height is 12 cm and base is a square with side lengths  $s$  cm:  $V = 12s^2$ .

3. Use the equation  $y = \frac{5}{2}x$  to complete the table.

Is  $y$  proportional to  $x$ ?

$x$	$y$
2	
3	
6	

4. Use the equation  $s = 3.2r + 5$  to complete the table.

Is  $s$  proportional to  $r$ ?

$r$	$s$
1	
2	
4	



## Unit 7.2, Lesson 7: Practice Problems

5. Quadrilateral  $A$  has side lengths 3 cm, 4 cm, 5 cm, and 6 cm.

Quadrilateral  $B$  is a scaled copy of quadrilateral  $A$  with a scale factor of 2.

Select **all** of the possible side lengths of quadrilateral  $B$ .

5 cm

6 cm

7 cm

8 cm

9 cm

## Explore

Liam and Sadia are running a 60-meter race.

Each of their distances can be represented by an equation, where  $y$  is distance in meters and  $x$  is time in seconds.

Use this information to complete the table:

- Liam's distance is represented with the equation  $y = 6x$ .
- At 8 seconds, Liam is 16 meters ahead of Sadia.

What is an equation for Sadia's distance?

Time (sec.)	Liam's Distance (m)	Sadia's Distance (m)
0		
2		
4		
6		
8		

How many meters has Sadia run when Liam finishes the race?

## Reflect

- Circle the question you feel most confident about.
- Use the space below to ask one question you have or to share something you are proud of.

## Warm-Up

20

10

2

4

## Practice

1.1 See table.

1.2 Yes, this is a proportional relationship. The constant of proportionality is 1 760 yards per mile.

Distance (mi.)	Distance (yd.)
1	1 760
5	8 800
2	3 520
10	17 600

2. ✓ The total cost,  $t$ , after an 8% sales tax is added to an item's price,  $p$ :  $1.08p = t$ .

✓ The number of marbles each sister gets,  $x$ , when  $m$  marbles are shared equally among four sisters:  $x = \frac{m}{4}$ .

3.  $y$  is proportional to  $x$ .

$x$	$y$
2	5
3	$\frac{15}{2}$
6	15

4.  $s$  is not proportional to  $r$ .

$r$	$s$
1	8.2
2	11.4
4	17.8

5. ✓ 6 cm

✓ 8 cm

## Explore

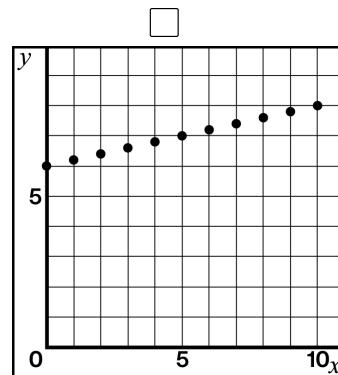
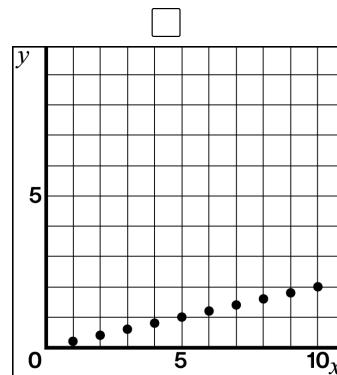
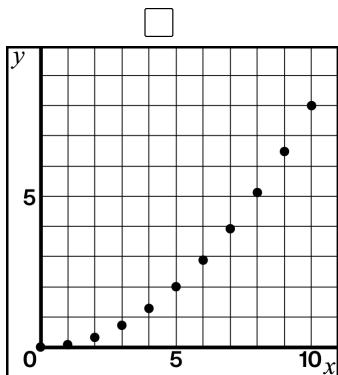
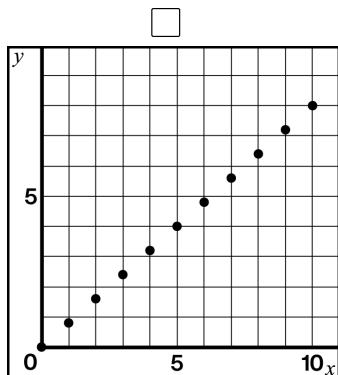
Equation:  $y = 4x$ 

Sadia has run 40 meters when Liam finishes the race.

Time (sec.)	Liam's Distance (m)	Sadia's Distance (m)
0	0	0
2	12	8
4	24	16
6	36	24
8	48	32

**Warm-Up**

Select **all** of the graphs that could represent a proportional relationship.

**Practice**

A lemonade recipe calls for  $\frac{1}{4}$  cup of lemon juice for every 1 cup of water. Use the table to answer each question.

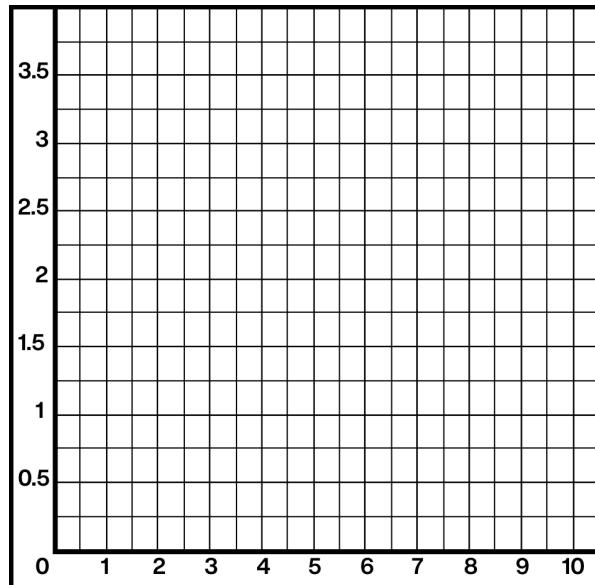
- 1.1 What does  $x$  represent?

$x$	$y$
1	$\frac{1}{4}$
2	$\frac{1}{2}$
3	$\frac{3}{4}$
4	1
5	$1\frac{1}{4}$
6	$1\frac{1}{2}$

- 1.2 What does  $y$  represent?

- 1.3 Is there a proportional relationship between  $x$  and  $y$ ?

- 1.4 Use the coordinate plane below to plot the pairs in the table.



2. Arturo earns \$33.00 for babysitting 4 hours. At this rate, how much will he earn if he babysits for 7 hours?

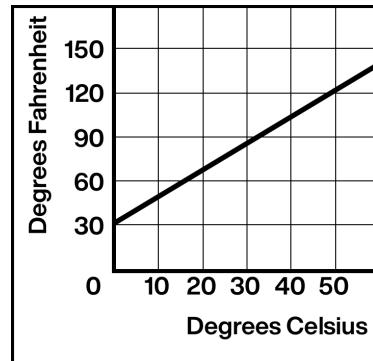
Explain your reasoning.

3. Select **all** of the proportional relationships.

The length and width of scaled copies of a rectangle.

$y = 3x$

$x$	$y$
0	1
1	2
2	3
5	6



## Explore

For each problem, fill in the blanks to create a proportional relationship. Use the digits 0–9 no more than once in each problem. Use the coordinate plane if it helps you with your thinking.

### Problem 1

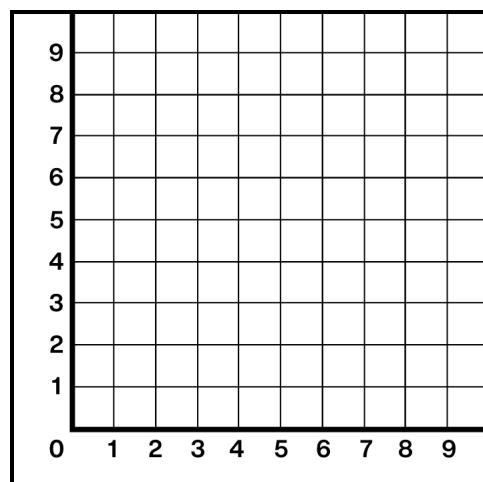
(, ) and (, )

### Problem 2

(, ), (, ) and (, )

### Problem 3

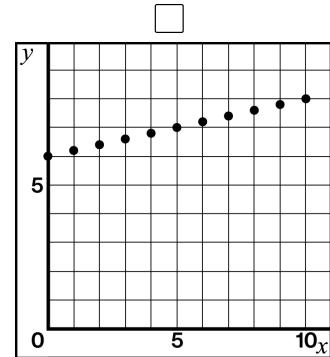
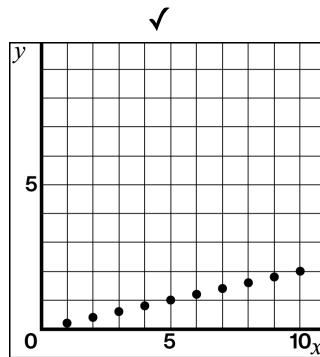
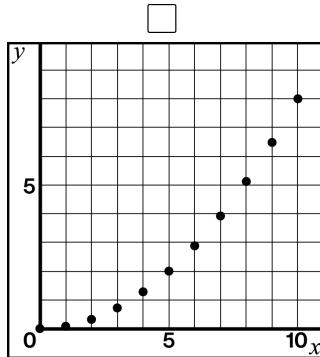
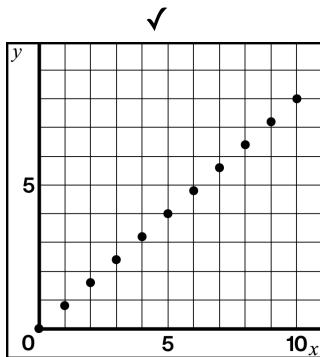
$\left(\frac{\text{input}}{\text{input}}, \frac{\text{output}}{\text{input}}\right)$  and (, )



## Reflect

1. Circle the question you feel most confident about.
2. Use the space below to ask one question you have or to share something you are proud of.

## Warm-Up



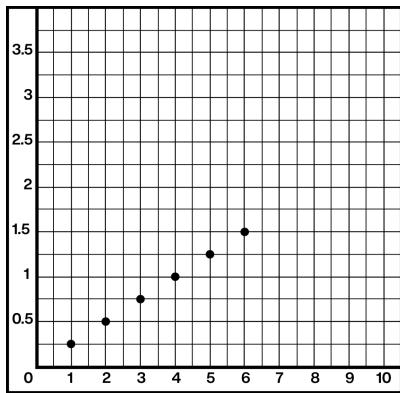
## Practice

1.1 Cups of water.

1.2 Cups of lemon juice.

1.3 Yes.

1.4



2. \$57.75 . Explanations vary. Arturo's rate is \$8.25 per hour. 7 hours at that rate is \$57.75 .

3. ✓  $y = 3x$ 

✓ The length and width of scaled copies of a rectangle.

## Explore\*

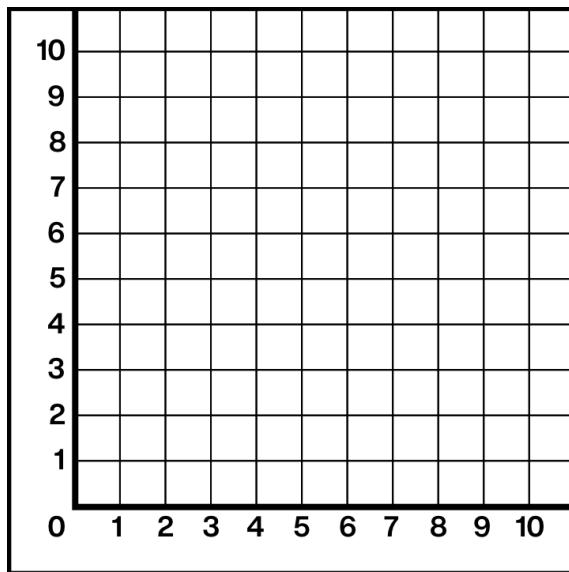
**Problem 1:** Responses vary. (1, 3) and (2, 6)**Problem 2:** (1, 2), (3, 6), and (4, 8)**Problem 3:** Responses vary. (1,  $\frac{2}{3}$ ) and (6, 4)\*See similar problems at [openmiddle.com](http://openmiddle.com).

## Warm-Up

Plot the following points on the coordinate plane:

$$(0, 10), (1, 8), (2, 6), (3, 4), (4, 2)$$

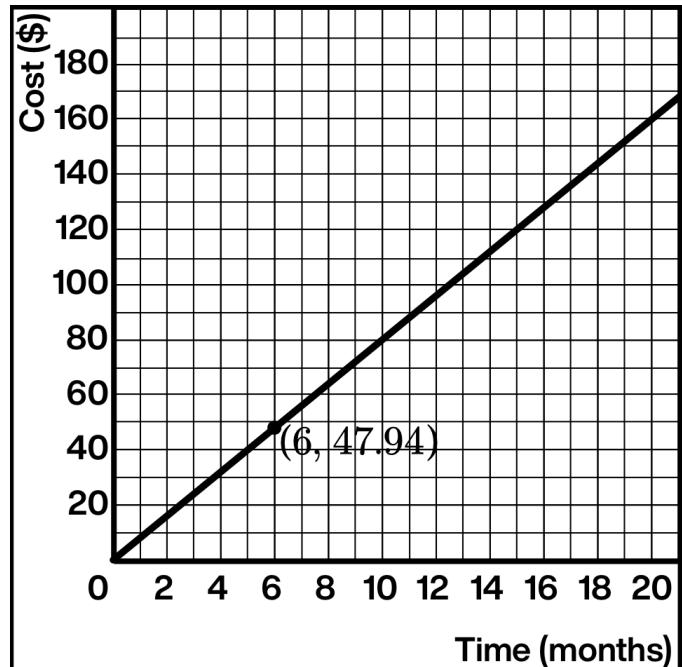
Is this a proportional relationship?



## Practice

There is a proportional relationship between the number of months a person has had a streaming service subscription and the total amount of money they have paid for the subscription. After 6 months, a user has paid \$ 47.94 . The point (6, 47.94) is shown in the graph.

- 1.1 What is the constant of proportionality in this relationship?
  
- 1.2 What does the constant of proportionality mean in this situation?
  
- 1.3 Label the point  $(1, k)$  on the graph. Determine the value of  $k$  .
  
- 1.4 Determine the coordinates of three more points on this line and label them on the graph.
  
- 1.5 Write an equation that represents the relationship between  $C$  , the total cost of the subscription, and  $m$  , the number of months.



Write an equation for each graph. Choose from the equations listed below.

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

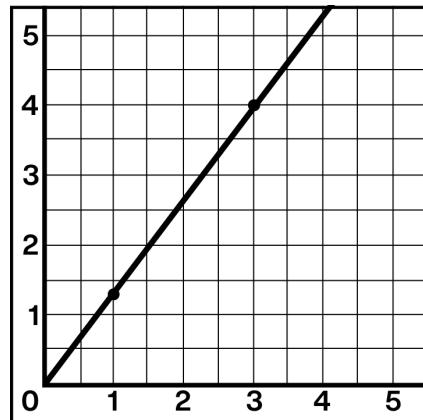
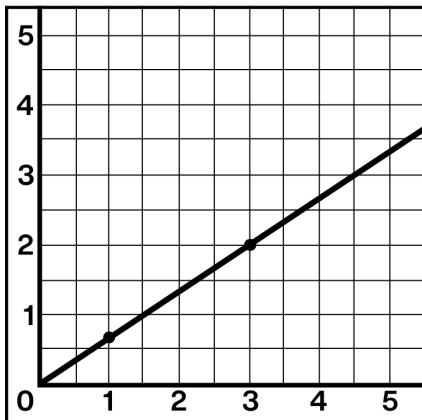
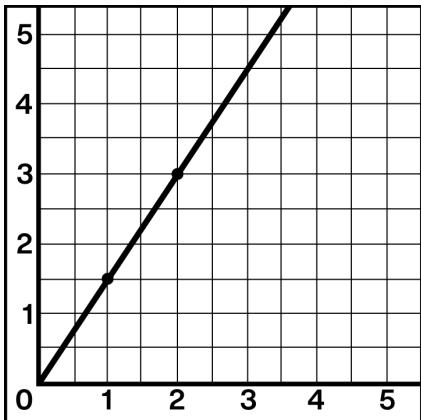
$$y = \frac{4}{3}x$$

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

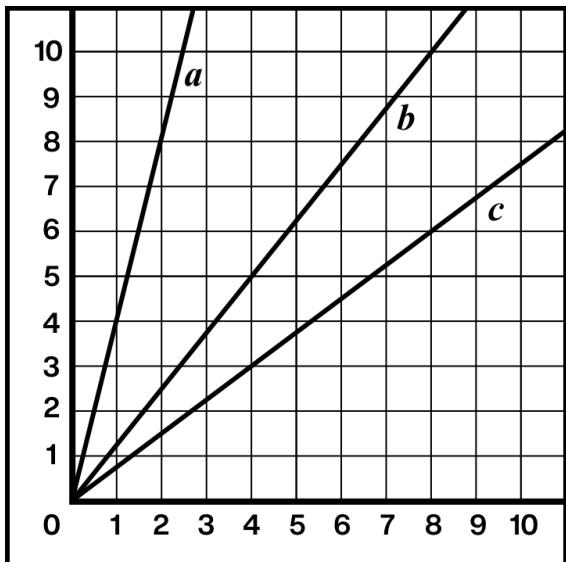
2.1 Equation: \_\_\_\_\_

2.2 Equation: \_\_\_\_\_

2.3 Equation: \_\_\_\_\_



## Explore



Lines *a*, *b*, and *c* represent three different proportional relationships.

Plot and label two points on each line.

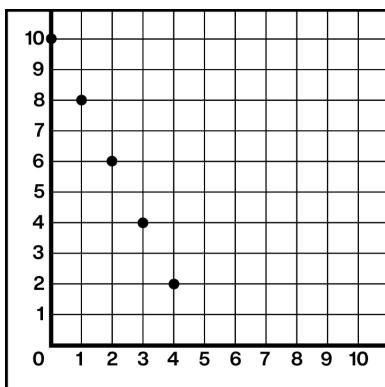
State the constant of proportionality for each proportional relationship in the table below.

Line	Constant of Proportionality
<i>a</i>	
<i>b</i>	
<i>c</i>	

## Reflect

1. Circle the question you enjoyed doing the most.
2. Use the space below to ask one question you have or to share something you are proud of.

## Warm-Up



This is **not** a proportional relationship.

## Practice

1.1  $7.99$

1.2 The service costs \$7.99 per month.

1.3 See graph.  $k = 7.99$

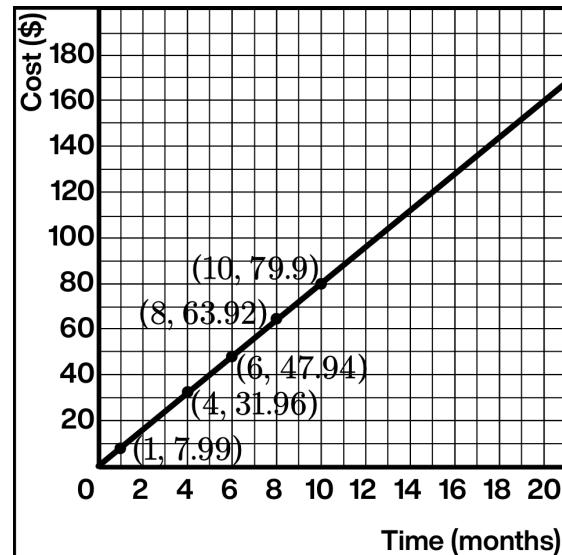
1.4 Responses vary. See graph.

1.5  $C = 7.99m$

2.1  $y = \frac{3}{2}x$

2.2  $y = \frac{2}{3}x$

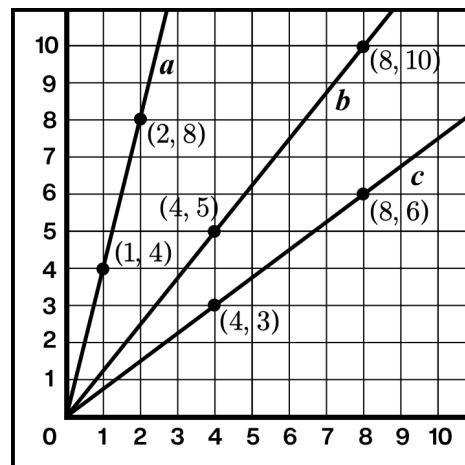
2.3  $y = \frac{4}{3}x$



## Explore

Responses vary. See graph.

Line	Constant of Proportionality
$a$	4 (or equivalent)
$b$	$\frac{5}{4}$ (or equivalent)
$c$	$\frac{3}{4}$ (or equivalent)



## Warm-Up

Select **all** of the equations that are true.

$\frac{3}{2} \cdot 16 = 3 \cdot 8$

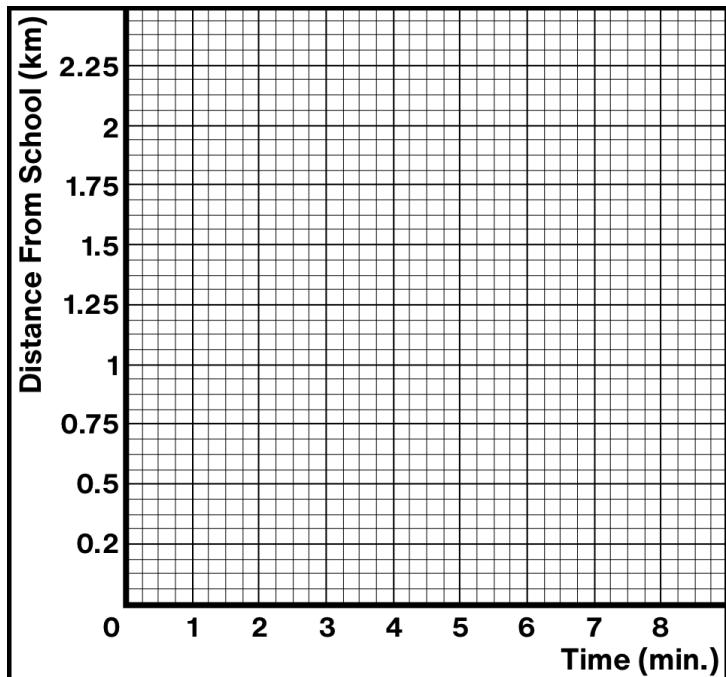
$\frac{3}{4} \div \frac{1}{2} = \frac{6}{4} = \frac{1}{4}$

$2.8 \cdot 13 = 0.7 \cdot 52$

## Practice

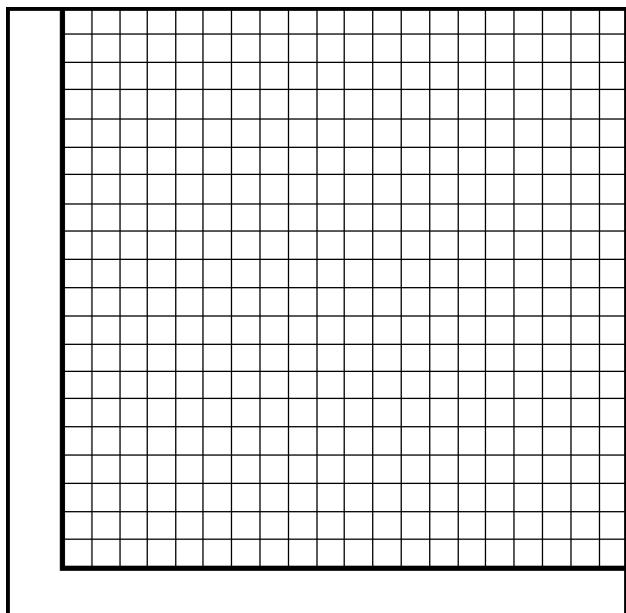
Mia and Jamal bike home from school at a steady pace. Mia bikes 1.25 kilometers and it takes her 4 minutes. Jamal bikes 1.75 kilometers and it takes him 7 minutes.

- 1.1 Graph two lines that represent Jamal's and Mia's bike rides.
- 1.2 For each line, plot and label the point  $(1, k)$ . Then find each value of  $k$ .
- 1.3 Who bikes faster?



At a supermarket, you can fill your own honey container and pay by the ounce. A customer buys 12 ounces of honey for \$5.40.

- 2.1 How much does the honey cost per ounce?
- 2.2 How much honey can you buy per dollar?
- 2.3 Write two different equations that represent this situation. Use  $h$  for ounces of honey and  $c$  for cost in dollars.



- 2.4 Choose one of your equations, and sketch its graph. Be sure to label the axes.
3. The point  $(3, \frac{6}{5})$  lies on a graph representing a proportional relationship. Select **all** of the points that also lie on the same graph.

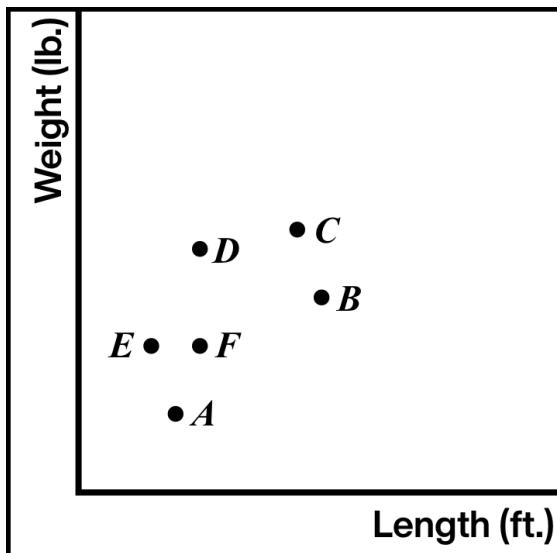
  $(1, 0.4)$   $(1.5, \frac{6}{10})$   $(\frac{6}{5}, 3)$   $(4, \frac{11}{5})$   $(15, 6)$ 

## Explore

A company makes three thicknesses of rope: thin, medium, and thick. Rope can be purchased in any amount. Each point represents one purchase.

For each point, identify whether it represents a purchase of **thin**, **medium**, or **thick** rope.

Point	Thickness
$A$	
$B$	
$C$	
$D$	
$E$	
$F$	



## Reflect

1. Circle the question you feel most confident about.
2. Use the space below to ask one question you have or to share something you are proud of.

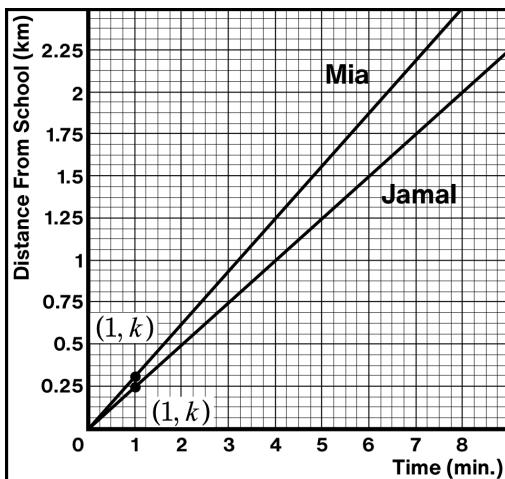
## Warm-Up

✓  $\frac{3}{2} \cdot 16 = 3 \cdot 8$

✓  $2.8 \cdot 13 = 0.7 \cdot 52$

## Practice

1.1



1.2 Mia:  $k = 0.3125$ , Jamal:  $k = 0.25$

1.3 Mia bikes faster.

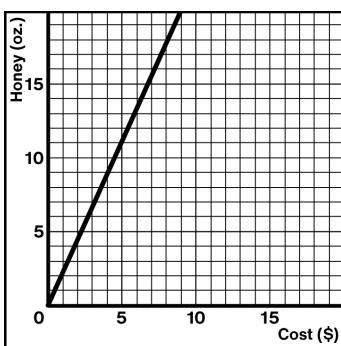
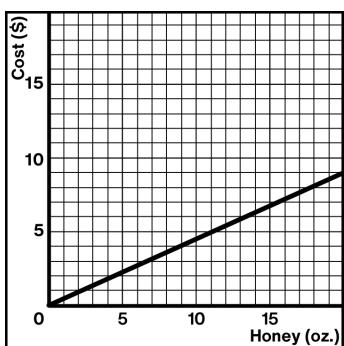
2.1 \$0.45 per ounce

2.2 About 2.2 ounces

2.3  $c = 0.45h$  (or equivalent)

$h = 2.2c$  (or equivalent)

2.4 Students should have one of the two graphs shown.



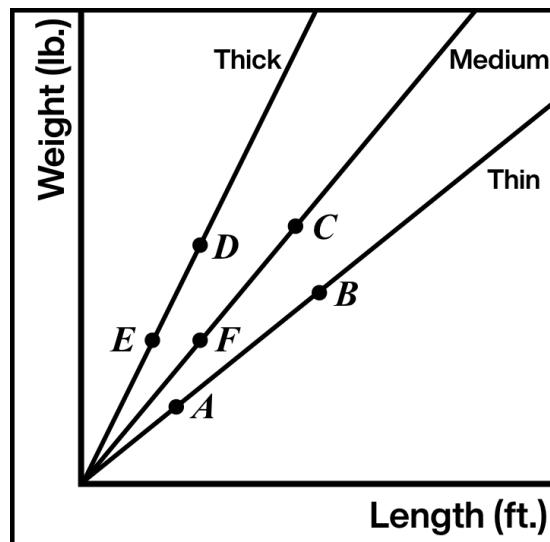
3. ✓ (1, 0.4)

✓  $(1.5, \frac{6}{10})$

✓ (15, 6)

## Explore

Point	Thickness
A	thin
B	thin
C	medium
D	thick
E	thick
F	medium



## Warm-Up

Find each product or quotient.

$$\frac{2}{3} \cdot \frac{1}{2}$$

$$\frac{4}{3} \cdot \frac{1}{4}$$

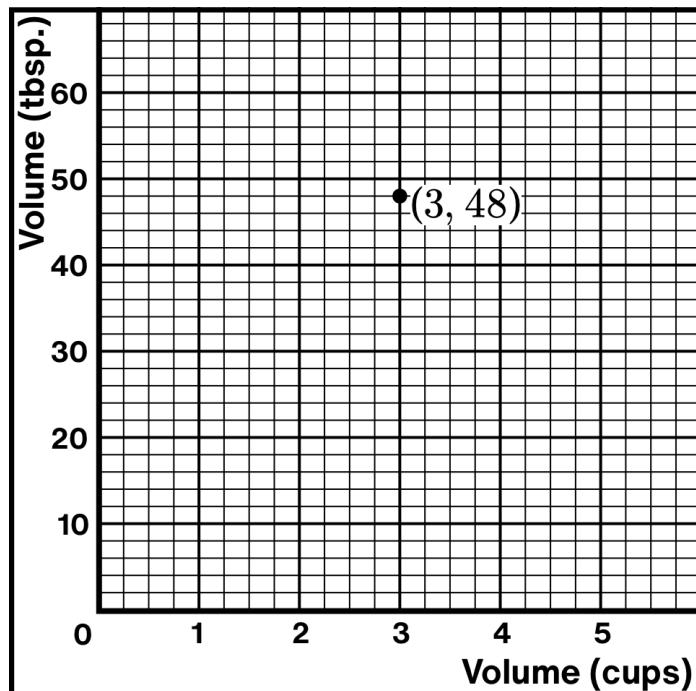
$$4 \div \frac{1}{5}$$

$$\frac{9}{6} \div \frac{1}{2}$$

## Practice

There is a proportional relationship between a volume measured in cups and the same volume measured in tablespoons. 3 cups is equivalent to 48 tablespoons, as plotted in the graph.

- 1.1 Plot and label at least two more points that represent the relationship.
- 1.2 Use a straightedge to draw a line that represents this proportional relationship.
- 1.3 For which value  $y$  is  $(1, y)$  on the line you just drew?
- 1.4 What is a constant of proportionality for this relationship?
- 1.5 Write an equation representing this relationship. Use  $c$  for cups and  $t$  for tablespoons.



2. The high-speed rail supports trains that can travel at constant speeds. An equation relating the distance traveled in miles,  $d$ , to the number of hours traveled,  $t$ , is  $t = \frac{1}{150} d$ .

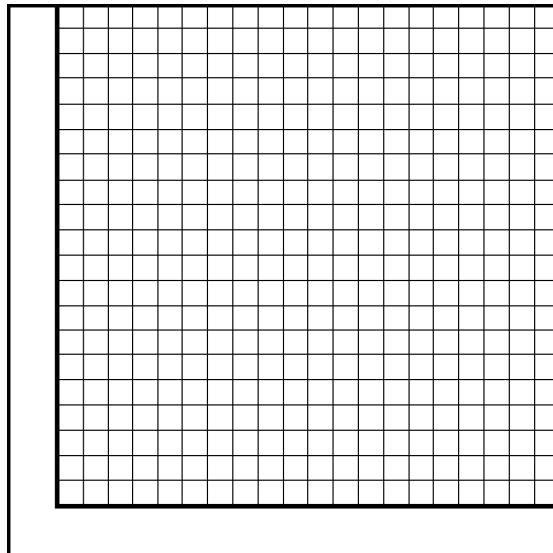
How long will it take the high-speed train to travel 900 miles?

## Unit 7.2, Lesson 11: Practice Problems

The equation  $c = 2.95g$  shows the cost in dollars,  $c$ , to buy  $g$  gallons of gas at a gas station.

- 3.1 Write at least four pairs that fit this relationship: (gallons of gas, cost).

- 3.2 Create a graph of the relationship.

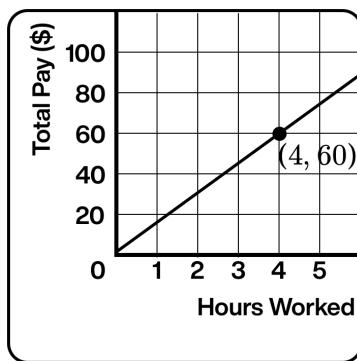


- 3.3 What does 2.95 represent in this situation?

## Explore

Here are three cards. Two of them represent the same relationship and one is different. Which one represents a different relationship than the others?

Lucia has to work 12 hours in a week to earn \$180.



Hours Worked	Total Pay (\$)
0	0
2	25
6	75
10	125
20	250

What is an equation that represents Lucia's total pay per hour? Use  $h$  for hours worked and  $p$  for total pay.

## Reflect

1. Circle the question you feel most confident about.
2. Use the space below to ask one question you have or to share something you are proud of.

**Warm-Up**

$$\frac{2}{3} \cdot \frac{1}{2} = \frac{1}{3}$$

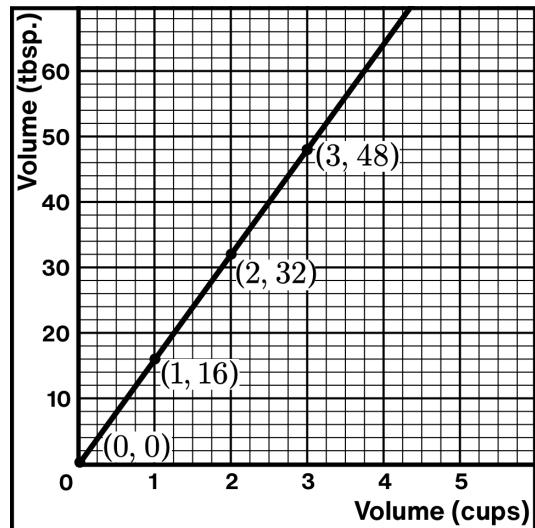
$$\frac{4}{3} \cdot \frac{1}{4} = \frac{1}{3}$$

$$4 \div \frac{1}{5} = 20$$

$$\frac{9}{6} \div \frac{1}{2} = 3$$

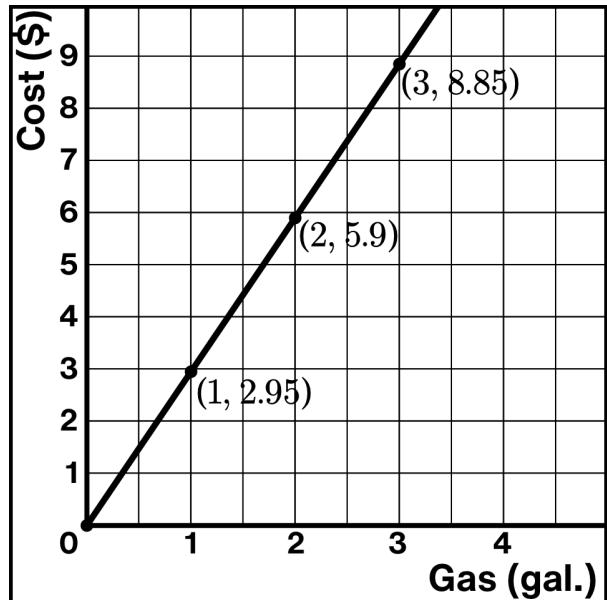
**Practice**

- 1.1 Responses vary. See graph.
- 1.2 See graph.
- 1.3  $y = 16$  when  $x = 1$ .
- 1.4 A constant of proportionality for this relationship is 16.
- 1.5  $t = 16c$



2. The train will take 6 hours to travel 900 miles.

- 3.1 Responses vary.
- $(0, 0), (1, 2.95), (2, 5.9), (3, 8.85)$
- 3.2 See graph.
- 3.3 In this situation, 2.95 represents the cost per gallon of gas.

**Explore**

The table represents a different relationship. It has a different constant of proportionality than the other representations.

$$p = 15h$$

## Warm-Up

Select **all** of the equations that represent a proportional relationship.

$y = 2x + 1$

$C = 3.14d$

$\frac{10}{w} = h$

$\frac{d}{2} = r$

$p = 4s$

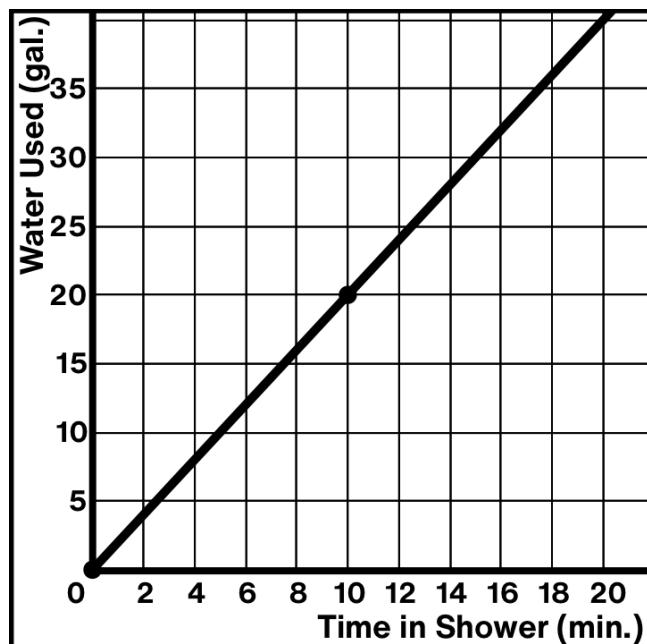
## Practice

Here is a graph of water used,  $w$ , in gallons and time in the shower,  $t$ , in minutes.

- 1.1 Explain how you know these quantities are in a proportional relationship.

- 1.2 What are two constants of proportionality for the proportional relationship?

What do they each mean in this situation?



- 1.3 Write two equations for this relationship.

2. A map of a rectangular park has a length of 4 inches and a width of 6 inches. It uses a scale of 1 inch for every 20 miles.

What is the actual area of the park? Show how you know.

## Unit 7.2, Lesson 12: Practice Problems

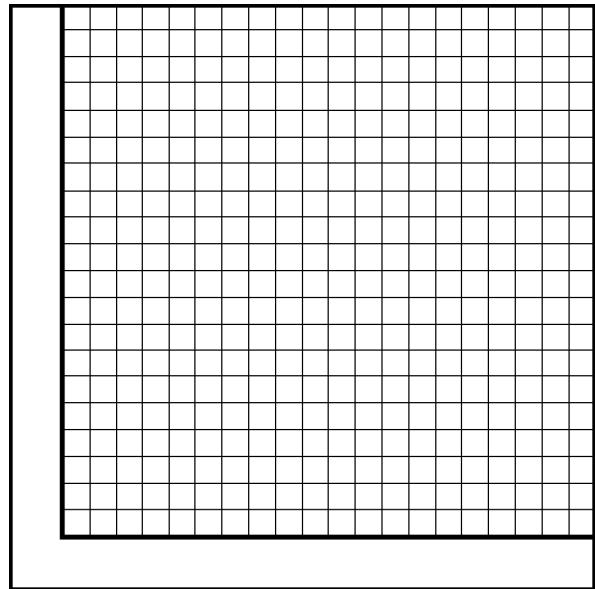
Elena goes to a store where you can scoop your own popcorn and pay by the ounce.

She buys 10 ounces of spicy popcorn for \$2.50 .

- 3.1 How much does the popcorn cost per ounce?    3.4 Choose one of your equations and sketch its graph. Be sure to label the axes.

- 3.2 How much popcorn can you buy per dollar?

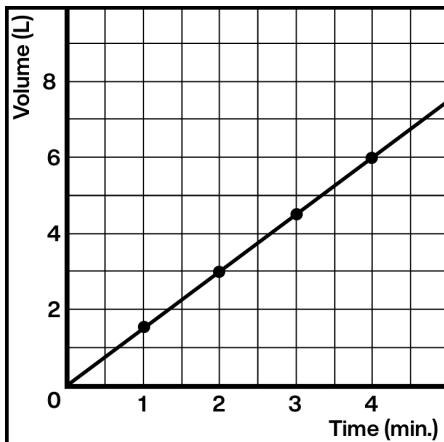
- 3.3 Write two different equations that represent this situation. Use  $p$  for ounces of popcorn and  $c$  for cost in dollars.



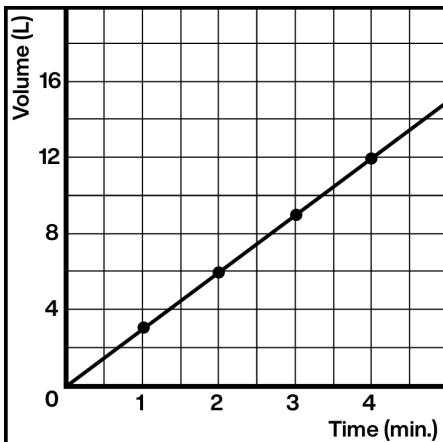
## Explore

The graphs represent the volume of water in two bathtubs over time. Which bathtub is filling up faster?

**Bathtub A**



**Bathtub B**



Explain your thinking.

Bathtub C is filling up at a rate of 1 liter per minute.

Sketch a line to represent this bathtub's volume over time on each coordinate plane.

## Reflect

1. Circle the question you feel most confident about.
2. Use the space below to ask one question you have or to share something you are proud of.

**Warm-Up**

$y = 2x + 1$

$C = 3.14d$

$\frac{10}{w} = h$

$\frac{d}{2} = r$

$p = 4s$

**Practice**

1.1 Responses vary. I know this is a proportional relationship because the graph is a line that goes through the origin.

1.2 2 and  $\frac{1}{2}$  (or equivalent)

There are 2 gallons of water used for every minute in the shower.

It takes  $\frac{1}{2}$  of a minute to use each gallon of water.

1.3  $w = 2t$  and  $t = \frac{1}{2} w$

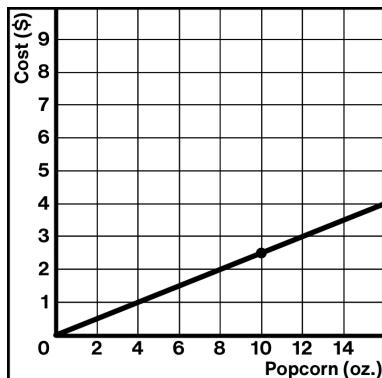
2. 9 600 square miles

3.1 \$0.25

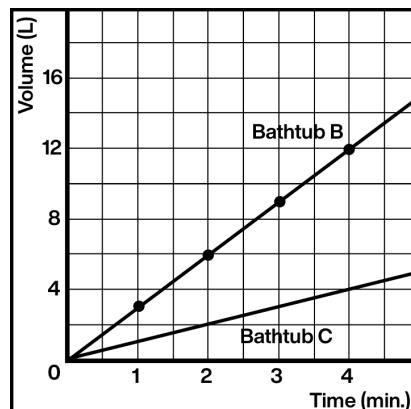
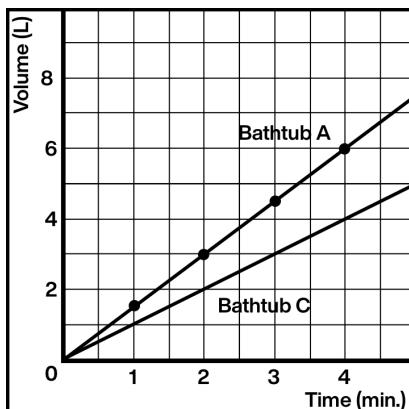
3.2 4 ounces

3.3  $p = 0.25c$  and  $c = 4p$

3.4 See graph.

**Explore**

Bathtub B is filling up faster. Bathtub A is filling at a rate of 1.5 liters per minute and Bathtub B is filling at a rate of 3 liters per minute.



## Warm-Up

Shade in  $\frac{3}{4}$  of the rectangle below.

Shade in  $\frac{3}{5}$  of the rectangle below.

## Practice

1. Here are 24 stars. Circle 25% of these stars.



2. Evan made 40 muffins. 25% of the muffins are chocolate. How many muffins are chocolate?

3. Which is greater: 75% of 12 or 25% of 32?

Show how you know.



## Unit 6.3, Lesson 8: Practice Problems

Complete each statement. Make a tape diagram if it helps you with your thinking.

4.1    25% of 20 is \_\_\_\_\_.      |

4.2    25% of 60 is \_\_\_\_\_.      |

4.3    25% of 200 is \_\_\_\_\_.      |

5. The length of an olympic pool is 50 meters. What is its length in yards?

(11 meters is about 12 yards.)

A. 51

B. 45.8

C. 54.5

D. 58.2

6. At Florida A&M University, the ratio of students from Florida to students **not** from Florida is about 3 : 1. How many of its 12 000 students are from Florida?

## Explore

Which is greater: 50% of 25 or 25% of 50?

Explain your reasoning.

## Reflect

1. Put a smiley face next to a question you were stuck on and then figured out.
2. Use the space below to ask one question you have or to share something you are proud of.

**Warm-Up**

Responses vary.

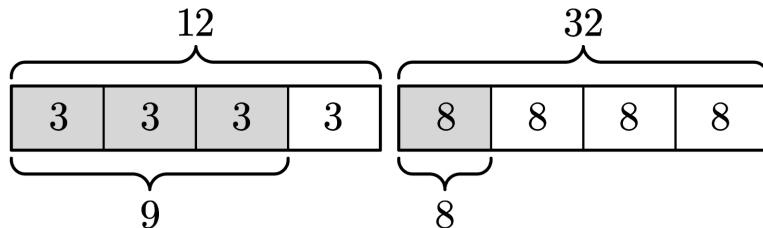
**Practice**

1. Responses vary.



2. 10 muffins  
3. 75% of 12

Explanations vary.



- 4.1 5  
4.2 15  
4.3 50  
5. C. 54.5  
6. 9 000 students

**Explore**

They are the same. Explanations vary. They are both equal to 12.5.

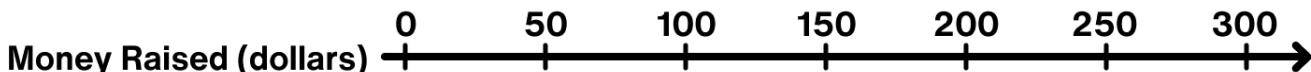
## Warm-Up

What percent of each figure is shaded?

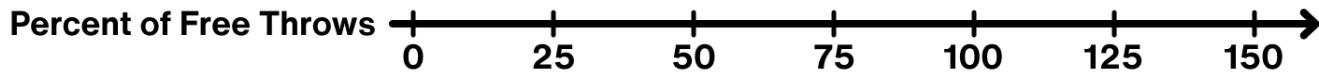
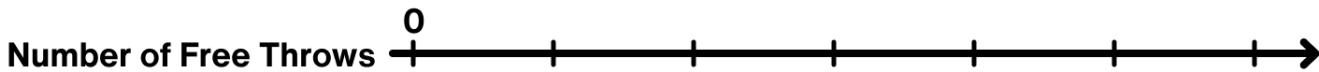


## Practice

Here is a double number line that Deja made to measure her fundraising goal progress.



- 1.1 How much was Deja's fundraising goal?      1.2 A local store donated \$100 .  
What percent of the goal amount is that?
- 1.3 One person donated 10% of the goal.  
How much money did that person  
donate?
- 1.4 Deja ended up raising 140% of her goal.  
How much money did she raise?
2. During basketball practice, Martina attempted 40 free throws. 25% of those attempts went  
into the basket. How many of her free throws went into the basket?  
Use the double number line diagram if it helps with your thinking.





## Unit 6.3, Lesson 9: Practice Problems

Leonardo works as a server in a restaurant. He gets a 20% tip on the food cost for every order.

3.1 What tip will he get when the food costs \$60?

3.2 What tip will he get when food costs \$82?

3.3 Leonardo got an \$18 tip. What was the cost of the food for this order?

Light travels about 180 000 000 kilometers in 10 minutes. This could also be written as:

4.1 \_\_\_\_\_ kilometers **per minute**      4.2 \_\_\_\_\_ kilometers **per second**

4.3 How far can light travel in 7 minutes?

## Explore

Which is greater?

50% of 20% of 200      or      20% of 50% of 200

Explain your reasoning.

## Reflect

1. Circle a question you are still curious about.
2. Use the space below to ask one question you have or to share something you are proud of.

**Warm-Up**

30%, 40%, 75%

**Practice**

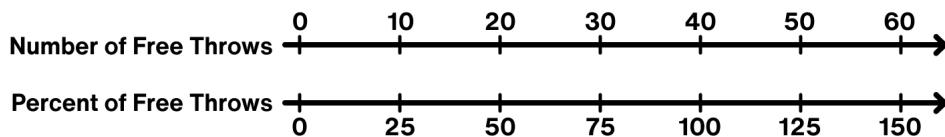
1.1 \$250

1.2 40%

1.3 \$25

1.4 \$350

2. 10 free throws



3.1 \$12

3.2 \$16.40

3.3 \$90

4.1 18 000 000 kilometers per minute

4.2 300 000 kilometers per second

4.3 126 000 000 kilometers

**Explore**

They are the same.

*Explanations vary.* Since 50% of 20% is 10% and 20% of 50% is also 10%, both are just 10% of 200, which is equal to 20.

## Warm-Up

Calculate the following values:

100% of 40

50% of 40

150% of 40

10% of 40

## Practice

A hardware store offers customers a coupon for \$25 off.

- 1.1 The regular price of a power drill is \$125. If a customer uses the coupon, what percent will the customer save?
  
- 1.2 The regular price of a ladder is \$250. If a customer uses the coupon, what percent will the customer save?

Kiri is curious how many people think aliens exist. She asked the 30 students in her class.

- 2.1 12 students said they think aliens exist. What percent of the class is that?
  
- 2.2 Kiri's older brother asked the 25 students in his class. 11 students said they think aliens exist. Which class has a greater percentage of students who think aliens exist: Kiri's or her brother's? Explain your thinking.

Daniela is planning a party and trying to decide how many people to invite. She expects 90% of the people she invites will attend.

- 3.1 If she invites 20 people, how many does she expect will attend?
- 3.2 If she invites 40 people, how many does she expect will attend?

**Unit 6.3, Lesson 10: Practice Problems**

A 16 -ounce bottle of orange juice contains 200 milligrams of vitamin C, which is 250% of the daily recommended amount (for adults).

4.1 What is 100% of the daily recommended amount of vitamin C?

4.2 Yosef drank 4 ounces of orange juice. What percent of the daily recommended amount of vitamin C is this? Explain your thinking.

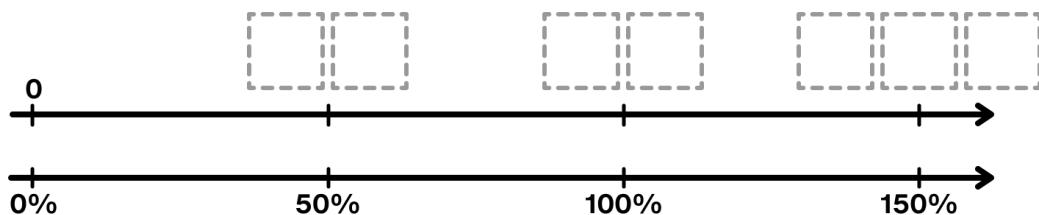
Alexis is 56 inches tall.

5.1 What is her height in centimeters? (100 inches = 254 centimeters)

5.2 What is her height in meters?

**Explore**

Using the digits 0–9, without repeating, fill the blanks to create a true double number line.

**Reflect**

1. Circle a question you want to talk to a classmate about.
2. Use the space below to ask one question you have or to share something you are proud of.

**Warm-Up**

40, 20, 60, 4

**Practice**

1.1 20%

1.2 10%

2.1 40%

2.2 Kiri's brother's class.

*Explanations vary.* 44% of Kiri's brother's class said they think aliens exist, which is 4% more than Kiri's class.

3.1 18 people

3.2 36 people

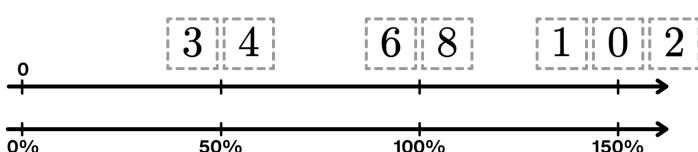
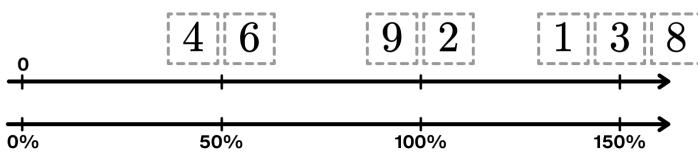
4.1 80 milligrams

4.2 62.5%

*Explanations vary.* 4 ounces of juice contains  $\frac{1}{4} \cdot 200 = 50$  milligrams of vitamin C. If the daily recommendation is 80 milligrams,  $\frac{50}{80} = 62.5\%$ .

5.1 142.24 centimeters

5.2 About 1.42 meters

**Explore***Responses vary.*



## Unit 6.3, Lesson 11: Practice Problems

Name \_\_\_\_\_

### Warm-Up

Calculate the following values.

$$50\% \text{ of } 70$$

$$10\% \text{ of } 70$$

$$1\% \text{ of } 70$$

$$2\% \text{ of } 70$$

### Practice

1. A store is having a 30% off sale. The regular price for headphones is \$150. How much would a customer save with the sale?
2. Order the following expressions from least to greatest.

$$55\% \text{ of } 180$$

$$300\% \text{ of } 26$$

$$12\% \text{ of } 700$$

Least \_\_\_\_\_

Greatest \_\_\_\_\_

3. To find 40% of 75, Jamal calculates  $\frac{2}{5} \cdot 75$ . Does his calculation give the correct value for 40% of 75? Explain or show how you know.
4. Emika has a monthly budget for her cell phone bill. Last month she spent 120% of her budget, and the bill was \$60. What is Emika's monthly budget?

**Unit 6.3, Lesson 11: Practice Problems**

5. Two stores sell identical sandwich rolls in different-size packages. Store A sells a six-pack for \$5.28 . Store B sells a four-pack for \$3.40 . Which store offers the better per-roll price? Explain your reasoning.

On a field trip, there are 3 chaperones for every 20 students. There are 92 total people on the trip.

6.1 How many chaperones are there?

6.2 How many children are there?

## Explore

Using the digits 0–5 without repeating, fill in each blank such that the left expression is greater than the right expression.

Left

Right

$$\boxed{\square}\boxed{\square}\% \text{ of } 50 \quad 50\% \text{ of } \boxed{\square}\boxed{\square}$$

## Are you ready for more?

Is it possible to make the left and right expressions have the same value? Explain your thinking.

## Reflect

1. Put a heart next to the question you are most proud of.
2. Use the space below to ask one question you have or to share something you are proud of.

**Warm-Up**

35, 7, 0.7, 1.4

**Practice**

1. \$45

2. **Least**      300% of 26      12% of 700      55% of 180      **Greatest**

3. Yes.

*Explanations vary.* Multiplying by  $\frac{2}{5}$  is the same as finding 40% because  $\frac{2}{5} = \frac{40}{100}$ .

4. \$50

5. Store B

*Explanations vary.* Sandwich rolls cost \$0.88 each at Store A and \$0.85 each at Store B.

6.1 12 chaperones

6.2 80 children

**Explore***Responses vary.***Left****Right**

$$\boxed{2}\boxed{0}\% \text{ of } 50 \qquad 50\% \text{ of } \boxed{1}\boxed{5}$$

**Left****Right**

$$\boxed{4}\boxed{5}\% \text{ of } 50 \qquad 50\% \text{ of } \boxed{1}\boxed{2}$$

**Are you ready for more?**

No, it's not possible. *Explanations vary.* The only way to make the expressions equivalent is if we can use the same two-digit number again. For instance, 20% of 50 is equivalent to 50% of 20.



## Unit 6.3, Lesson 12: Practice Problems

Name \_\_\_\_\_

### Warm-Up

Calculate the following values:

$$10\% \text{ of } 27$$

$$1\% \text{ of } 27$$

$$6\% \text{ of } 27$$

$$16\% \text{ of } 27$$

### Practice

1. Select **all** of the expressions that will correctly calculate what percent 19 is of 20.

$\frac{19}{20} \cdot 100$

$\frac{19}{20} \div 100$

$\frac{20}{19} \cdot 100$

$\frac{19 \cdot 100}{20}$

2. A bathtub can hold 80 gallons of water. The faucet flows at a rate of 4 gallons per minute. What percent of the tub will be filled after 6 minutes? Explain your thinking.

A 6th grade class did a weekend fitness challenge. Each student set a goal of 75 minutes of fitness.

- 3.1 Luca exercised for 54 minutes. What percent of the goal did he achieve?

- 3.2 Brandon did 64% of the recommendation. How many minutes did he exercise for?

- 3.3 Amanda exercised for 78 minutes. What percent of the goal did she achieve?



## Unit 6.3, Lesson 12: Practice Problems

Complete each statement.

4.1 20% of 60 is \_\_\_\_\_.    4.2 \_\_\_\_% of 50 is 41.    4.3 75 is \_\_\_\_% of 250.

5. Demetrius needs 48 hot dogs. He can buy them in six-packs for \$2.10 per pack, or eight-packs for \$3.12 per pack. What's the cheapest way for him to buy 48 hot dogs? Explain your reasoning.

## Explore

The numbers 5 and 20 have a special relationship:

$\frac{1}{5}$  is equivalent to 20%.  $\frac{1}{20}$  is equivalent to 5%.

Are there any other numbers that have a relationship like this? Why does this relationship happen?

## Reflect

1. Put a star next to the question you understood best.
2. Use the space below to ask one question you have or to share something you are proud of.

**Warm-Up**

2. 7, 0.27, 1.62, 4.32

**Practice**

1. ✓  $\frac{19}{20} \cdot 100$  ✓  $\frac{19 \cdot 100}{20}$

2. 30%

*Explanations vary.*

- The tub will hold 24 gallons after 6 minutes, and 24 is 30% of 80.
- 4 gallons per minute is the same as 5% per minute. For 6 minutes:  $5\% \cdot 6 = 30\%$ .

3.1 72%

3.2 48 minutes

3.3 104%

4.1 12

4.2 82%

4.3 30%

5. 8 six-packs of hotdogs

*Explanations vary.* 6 eight-packs of hotdogs cost \$18.72, whereas 8 six-packs of hotdogs cost \$16.80.**Explore***Responses vary.*

- $\frac{1}{50}$  is equivalent to 2%.  $\frac{1}{2}$  is equivalent to 50%.
- $\frac{1}{4}$  is equivalent to 25%.  $\frac{1}{25}$  is equivalent to 4%.
- $\frac{1}{8}$  is equivalent to 12.5%.  $\frac{1}{12.5}$  is equivalent to 8%.

*Explanations vary.* Any pair of numbers that multiply to 100 will have this same relationship. For instance: take any unit fraction, like  $\frac{1}{4}$ . To convert it to a percent, we'll need to multiply by  $\frac{25}{25}$ .

$$\frac{1}{4} \cdot \frac{25}{25} = \frac{25}{100} = 25\%. \text{ When we convert } \frac{1}{25} \text{ to a percent, we'll need to multiply by } \frac{4}{4}.$$

$$\frac{1}{25} \cdot \frac{4}{4} = \frac{4}{100} = 4\%.$$

## Warm-Up

Fill in each blank.

14 is 100% of \_\_\_\_\_. 14 is 50% of \_\_\_\_\_. 14 is 10% of \_\_\_\_\_. 14 is 40% of \_\_\_\_\_.

## Practice

The sale price of every item in a store is 85% of its regular price.

1.1 The regular price of a backpack is \$30. What is its sale price?

1.2 The sale price of a soccer ball is \$15.30. What is its regular price?

1.3 The sale price of a jacket is \$21.08. What is its regular price?

Last Sunday, an amusement park had 1 575 visitors.

2.1 56% of the visitors were adults. How many adults visited the park?

2.2 16% of the visitors were teenagers. How many teenagers visited the park?

2.3 28% of the visitors were children ages 12 and under. How many children visited the park?

**Unit 6.3, Lesson 13: Practice Problems**

3. A school has 1 140 students. On the last day of school, 1 092 students attended. What percent of students were at school that day?

Complete each statement.

4.1 5% of 70 is \_\_\_\_\_.

4.2 25% of \_\_\_\_\_ is 6.

4.3 12% of 700 is \_\_\_\_\_.

Calculate the price for 11 cans of dog food at each store. Show or explain your reasoning.

- 5.1 The cost of 5 cans of dog food at Store A is \$4.35 .

- 5.2 The cost of 20 cans of dog food at Store B is \$18.40 .

## Explore

Fill in the boxes to make a true sentence. First, use the digits 0–9 as many times as you want. Then try again without repeating any digits.

is 50% of    
and 25% of

What do you notice about all the solutions?

## Reflect

1. Put a star next to a question you are still curious about.
2. Use the space below to ask one question you have or to share something you are proud of.

**Warm-Up**

14, 28, 140, 35

**Practice**

1.1 \$25.50

1.2 \$18

1.3 \$24.80

2.1 882 adults

2.2 252 teenagers

2.3 441 children

3. About 95.8%

4.1 3.5

4.2 24

4.3 84

5.1 \$9.57

*Explanations vary.* Each can costs  $\frac{\$4.35}{5} = \$0.87$ , so 11 cans cost  $\$0.87 \times 11 = \$9.57$ .

5.2 \$10.12

*Explanations vary.* Each can costs  $\frac{\$18.40}{20} = \$0.92$ , so 11 cans cost  $\$0.92 \times 11 = \$10.12$ .

**Explore**

Responses vary.

Responses vary. I notice that the first two-digit number is half of the second and a quarter of the third.

## Warm-Up

What number is 40% of 160?

What number is 160% of 40?

## Practice

A cyclist bikes 3.75 miles in 0.3 hours.

- 1.1 How fast was she biking in miles per hour?
  
- 1.2 At that rate, how long will it take her to bike 4.5 miles?
  
2. A recipe calls for  $\frac{1}{2}$  cup of sugar and 1 cup of flour. Complete the table to show how much sugar and flour is needed for different batches of the recipe.

Sugar (cups)	Flour (cups)
$\frac{1}{2}$	1
$\frac{3}{4}$	
	$1\frac{3}{4}$
1	
	$2\frac{1}{2}$

A punch recipe calls for  $1\frac{1}{2}$  quarts of sparkling water and  $\frac{3}{4}$  of a quart of grape juice.

- 3.1 How much sparkling water would you need to mix with 9 quarts of grape juice?
  
- 3.2 How much grape juice would you need to mix with  $3\frac{3}{4}$  quarts of sparkling water?
  
- 3.3 How much of each ingredient would you need to make 75 quarts of punch?



## Unit 7.4, Lesson 2: Practice Problems

4. Circle **all** of the ratios that are equivalent to  $4 : 5$ .
- A.  $2 : 2.5$       B.  $3 : 4$       C.  $3 : 3.75$       D.  $8 : 10$       E.  $14 : 27.5$

Crater Lake in Oregon is shaped like a circle with a diameter of about 5.5 miles.

5.1 How far is it around the outside of Crater Lake?

5.2 What is the area of Crater Lake's surface?

A certain type of car has room for 4 passengers.

6.1 Write an equation relating the number of cars,  $n$ , to the number of passengers,  $p$ .

6.2 How many passengers could fit in 78 cars?

6.3 How many cars would be needed to fit 78 passengers?

## Explore

A school sends out a survey to all of its students. 93.6% of the students complete the survey.

What are some possibilities for the exact number of students that attend the school?

## Reflect

1. Circle the question you feel most confident about.
2. Use the space below to ask one question you have or to share something you are proud of.

**Warm-Up**

Both are 64.

**Practice**

1.1 12.5 miles per hour

1.2 0.36 hours or 21.6 minutes

2.

Sugar (cups)	Flour (cups)
$\frac{1}{2}$	1
$\frac{3}{4}$	$1\frac{1}{2}$
$\frac{7}{8}$	$1\frac{3}{4}$
1	2
$1\frac{1}{4}$	$2\frac{1}{2}$

3.1 18 quarts. Note: The ratio  $1\frac{1}{2}$  quarts of

sparkling water to  $\frac{3}{4}$  quarts of grape

juice is equivalent to a 2 : 1 ratio. While not needed, this ratio can help answer all three questions.

3.2  $\frac{15}{8}$  quarts (or equivalent)

3.3 50 quarts of sparkling water and 25 quarts of grape juice

4. A, C, D

5.1 About 17 miles ( $5.5\pi$ )

5.2 About 24 square miles ( $\pi \cdot 2.75^2$ )

6.1  $p = 4n$  (or equivalent)

6.2 312 passengers because  $4 \cdot 78 = 312$ .

6.3 20 cars because  $78 \div 4 = 19.5$ , and you can't use half of a car.

**Explore**

Responses vary. The number of students must be a whole number, so 93.6% could represent 936 out of 1000 students in the school. Other possibilities can be found by finding fractions that are equivalent to  $\frac{936}{1000}$ . Using that method, here are some other possibilities for number of students in the school: 1000, 500, 250, 125, 1250.

## Warm-Up

It takes an ant farm 3 days to consume  $\frac{1}{2}$  of an apple. At that rate, how many days will it take the ant farm to consume 3 apples?

## Practice

A snail is moving away from a rock. The equation  $d = 3t$  represents the relationship between the distance,  $d$ , in inches that the snail is from the rock and time,  $t$ , in minutes.

1.1 What does the number 3 represent in the equation?

1.2 How many minutes does it take for the snail to reach a distance of 9 inches from the rock?

1.3 How far will the snail be from the rock after 9 minutes?

At a deli counter, someone buys:

- $1\frac{3}{4}$  pounds of ham for \$14.50.
- $2\frac{1}{2}$  pounds of turkey for \$26.25.
- $\frac{3}{8}$  of a pound of roast beef for \$5.50.

2.1 Which deli meat is the **least** expensive per pound?

2.2 Which deli meat is the **most** expensive per pound?

3. Angel checks out 12 library books and Inola checks out  $\frac{1}{3}$  less than that. How many books does Inola check out?



## Unit 7.4, Lesson 3: Practice Problems

4. To make a shade of paint called Jasper Green, mix 4 quarts of green paint with  $\frac{2}{3}$  of a cup of black paint.

How much green paint should be mixed with 4 cups of black paint to make Jasper Green?

5. Could a circle have both a diameter of 7.2 inches and a circumference of 28 inches? Explain why or why not.

## Explore

Fill in the blanks using the digits 0 to 9 no more than once each.

Use the space below to record any of your thinking as you experiment.

$$\frac{\square}{\square} \text{ of } \square = \frac{\square}{\square} \text{ of } \square$$

## Reflect

1. Put a smiley face next to the question you spent most time on.
2. Use the space below to ask one question you have or to share something you are proud of.

**Warm-Up**

18 days

**Practice**

1.1 The constant of proportionality or the speed of the snail (3 inches per minute).

1.2 3 minutes

1.3 27 inches

2.1 Ham is the least expensive. It costs about \$8.29 per pound because

$$14.50 \div 1\frac{3}{4} = 8\frac{2}{7} \approx 8.29.$$

2.2 Roast beef is the most expensive. It costs about \$14.67 per pound because

$$5.50 \div \frac{3}{8} = 14\frac{2}{3} \approx 14.67.$$

3. 8 books

4. 24 quarts

5. No. *Explanations vary.*  $7.2 \cdot \pi \approx 22.6$ , not 28 inches.**Explore\****Responses vary.* Some examples:

- $\frac{1}{3}$  of 9 =  $\frac{2}{4}$  of 6

- $\frac{1}{4}$  of 8 =  $\frac{3}{9}$  of 6

- $\frac{9}{3}$  of 8 =  $\frac{6}{1}$  of 4

\*See similar problems at [openmiddle.com](http://openmiddle.com).

**Warm-Up**

Solve each equation.

$$\frac{5}{2} \cdot x = 1$$

$$x \cdot \frac{7}{3} = 1$$

$$1 \div \frac{11}{2} = x$$

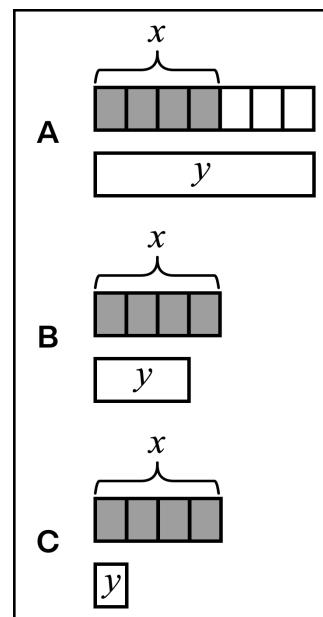
**Practice**

Match each situation to a diagram.

- 1.1 Hoang drinks  $x$  ounces of juice. Nekeisha drinks  $\frac{1}{4}$  less than that.

- 1.2 Hoang runs  $x$  miles. Nekeisha runs  $\frac{3}{4}$  more than that.

- 1.3 Hoang buys  $x$  pounds of almonds. Nekeisha buys  $\frac{1}{4}$  of that.



Draw diagrams to represent the following situations.

- 2.1 The amount of flour that the bakery used this month was a 40% increase compared to last month.
- 2.2 The amount of milk that the bakery used this month was a 75% decrease compared to last month.
3. At the beginning of the month, there were 80 ounces of peanut butter in the pantry. Since then, our family has eaten 30% of the peanut butter. Which expression represents the ounces of peanut butter left in the pantry?
- A.  $0.7 \cdot 80$       B.  $0.3 \cdot 80$       C.  $8 - 0.30$       D.  $(1 + 0.3) \cdot 80$

**Unit 7.4, Lesson 4: Practice Problems**

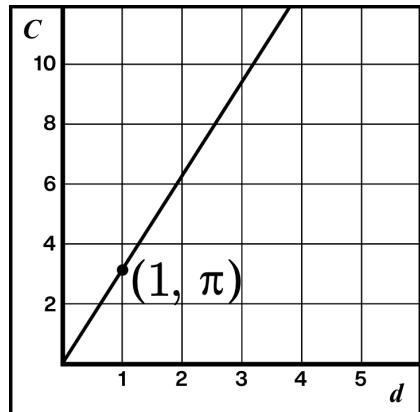
A grocer can buy strawberries for \$1.38 per pound.

- 4.1 Write an equation relating the cost,  $c$ , and the pounds of strawberries,  $p$ .

- 4.2 A strawberry order costs \$241.50. How many pounds did the grocer order?

5. This graph shows the relationship between the diameter and the circumference of a circle, with the point  $(1, \pi)$  shown.

Find and label **three** more points that are on the line.



## Explore

Fill in the boxes to make a true sentence. First, use digits 1–9 as many times as you want. Then try again without repeating any digits.

[ ] is 50% of [ ]  
and 75% of [ ]

What do you notice about all the solutions?

## Reflect

1. Circle the problem you are most proud of completing.
2. Use the space below to ask one question you have or to share something you are proud of.

## Warm-Up

$$x = \frac{2}{5}$$

$$x = \frac{3}{7}$$

$$x = \frac{2}{11}$$

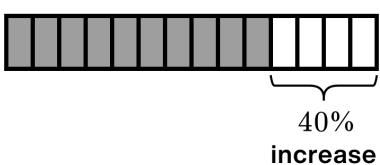
## Practice

1.1 B

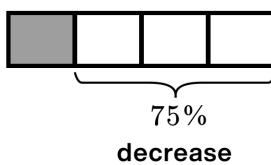
1.2 A

1.3 C

2.1 Responses vary. See below.



2.2 Responses vary. See below.



3. A

4.1  $c = 1.38p$  (or equivalent)

4.2 175 pounds

5. Responses vary. Possible answers:  $(0, 0)$ ,  $(2, 2\pi)$ ,  $(3, 9.4)$ 

## Explore\*

Responses vary.

With repeating digits:

- 15 is 50% of 30 and 75% of 20
- 21 is 50% of 42 and 75% of 28

Without repeating digits:

- 18 is 50% of 36 and 75% of 24
- 27 is 50% of 54 and 75% of 36
- 36 is 50% of 72 and 75% of 48
- 39 is 50% of 78 and 75% of 52

Note: There are only four possible solutions.

What do you notice? Responses vary.

The first number is always a multiple of 3.

The second number is always a multiple of 6.

The third number is always a multiple of 4.

That is because  $\frac{3}{6}$  is 50% and  $\frac{3}{4}$  is 75%.\*See similar problems at [openmiddle.com](http://openmiddle.com).

## Warm-Up

Circle the decimal number that is the best estimate of the fraction  $\frac{29}{40}$ . Explain your reasoning.

A. 0.5

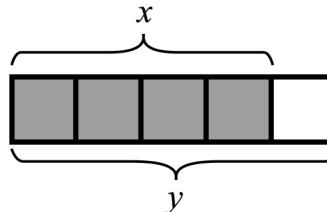
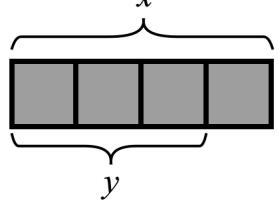
B. 0.6

C. 0.7

D. 0.8

## Practice

Write a situation that matches the diagram, or make a diagram that matches the situation.

Situation	Diagram
1.1 The number of people in a town with high-speed internet access has increased by 50% in the past decade.	
1.2	
1.3 The amount of paper that the copy shop used this month decreased by 20% compared to what they used last month.	
1.4	
1.5 The number of miles driven this month is 30% less than the number of miles driven last month.	

**Unit 7.4, Lesson 5: Practice Problems**

A pair of designer sneakers was purchased for \$120. Since the purchase, the price of the sneakers has increased by 15%.

2.1 What is the new price?

2.2 If  $x$  is the price before the increase and  $y$  is the price after the increase, which equations are correct? Circle **all** that apply.

- A.  $y = 1.15x$    B.  $y = x + 0.1$    C.  $y = x + 0.15$    D.  $y = x + 1$    E.  $y = (1 + 0.1)x$

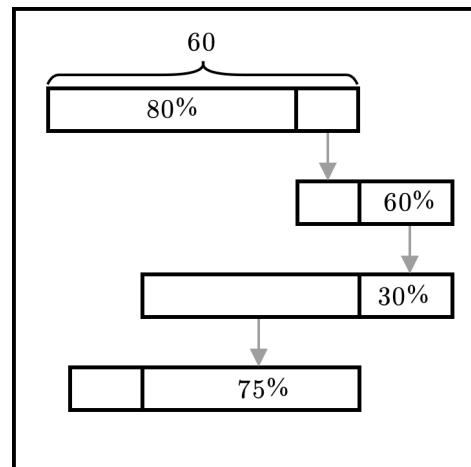
3.1 Write a story that can be represented by the equation  $y = x + \frac{1}{5}x$ .

3.2 What is the value of  $y$  when  $x$  is 40? What does that number mean in your story?

## Explore

Here are four tape diagrams. Each diagram is split into two pieces that add up to 100%.

The top diagram has a length of 60 units. Determine the length of the bottom diagram.



## Reflect

1. Circle the question you feel most confident about.
2. Use the space below to ask one question you have or to share something you are proud of.

**Warm-Up**

0.7 is the best estimate.  $\frac{30}{40}$  would be exactly between 0.7 and 0.8. Since  $\frac{29}{40}$  is a little bit less than  $\frac{30}{40}$ , 0.7 makes a better estimate than 0.8.

**Practice**

- 1.1 *Responses vary.*



- 1.2 *Responses vary.* The number of pets in my family increased by 25%.

- 1.3 *Responses vary.*



- 1.4 *Responses vary.* The amount of pretzels I ate this week is 25% less than the amount of pretzels I ate last week.

- 1.5 *Responses vary.*



- 2.1 \$138

- 2.2 A, C, E

- 3.1 *Responses vary.* The number of goals our team scored this season is 20% more than last season.

- 3.2 When  $x$  is 40,  $y$  is 48. *Explanations vary.* This means my team scored 40 goals last season and 48 goals this season.

**Explore**

## Warm-Up

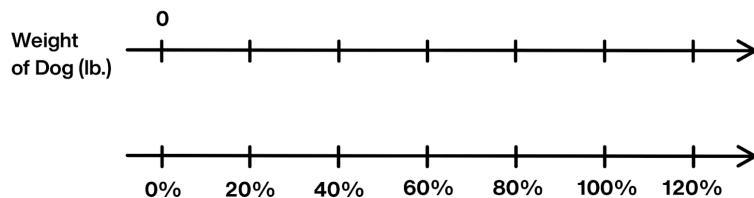
Circle **all** of the expressions that represent an 8% increase compared to  $x$ .

- A.  $0.08x$       B.  $x + 0.08$       C.  $1.08x$       D.  $x + 0.08x$       E.  $(1 + .08)x$

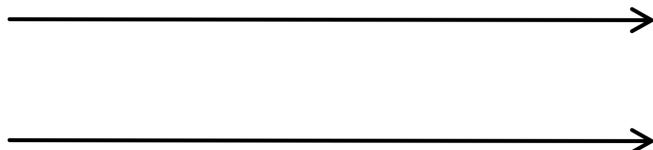
## Practice

For each problem, complete the double number diagram if it is helpful. Then answer the question.

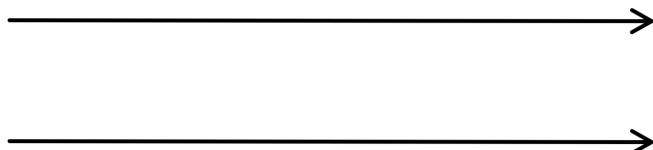
- 1.1 A dog weighs 20% more than it did three months ago. It weighs 36 pounds now. How much did the dog weigh three months ago?



- 1.2 Jessica estimated that her family used 30% more water this month compared to last month. They used 12 000 gallons of water last month. How much water did they use this month?



- 1.3 A bakery used 25% less butter this month than last month. The bakery used 240 kilograms of butter this month. How much did it use last month?



Each week, the price of oranges at the farmer's market increases by 20%.

- 2.1 Circle **all** the equations that represent the relationship between the price of oranges last week,  $x$ , and the price of oranges this week,  $y$ .

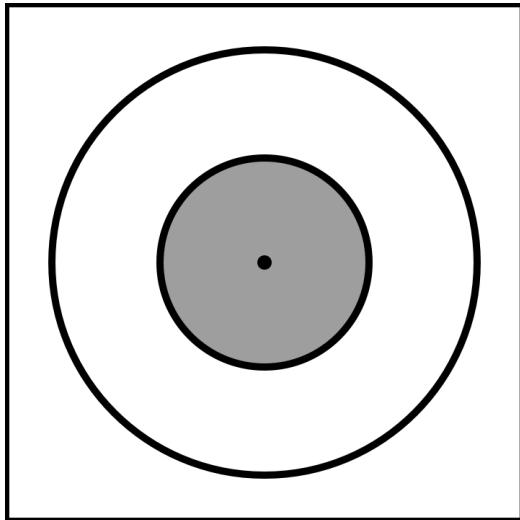
- A.  $y = \frac{1}{5}x$       B.  $y = \frac{6}{5}x$       C.  $y = x + \frac{1}{5}x$       D.  $y = x + 2$       E.  $y = 1.2x$

**Unit 7.4, Lesson 6: Practice Problems**

- 2.2 The price of oranges this week is \$4.50. What was the price last week?

Here is a circle and a scaled copy of the circle with a scale factor of 2.

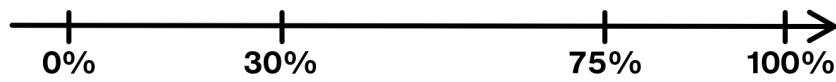
- 3.1 How does the **circumference** of the scaled copy compare to the circumference of the original circle?



- 3.2 How does the **area** of the scaled copy compare to the area of the original circle? Explain your thinking.

## Explore

Using the digits 0–9 no more than once each, fill in the boxes to create an accurate number line. Use the space below to record any of your thinking as you experiment.



## Reflect

1. Put a smiley face next to the question you spent most time on.
2. Use the space below to ask one question you have or to share something you are proud of.

**Warm-Up**

C, D, E

**Practice**

1.1 30 pounds

1.2 15 600 gallons of water

1.3 320 kilograms of butter

2.1 B, C, E

2.2 \$3.75

3.1 The circumference of the scaled copy is twice the circumference of the original.

3.2 The area of the scaled copy is 4 times the area of the original.

**Explore\***

6, 15, 20

\*See similar problems at [openmiddle.com](https://openmiddle.com).

## Warm-Up

If  $x$  represents a positive number, circle **all** of the expressions whose value is greater than  $x$ .

A.  $\frac{7}{8}x$

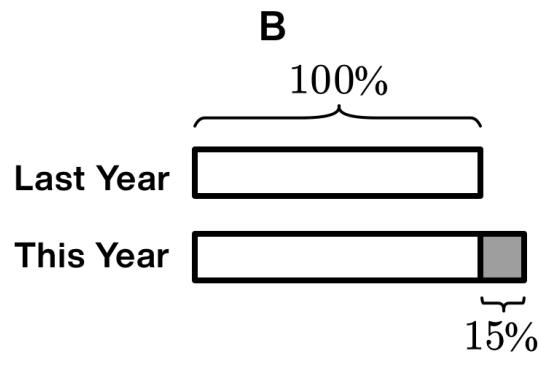
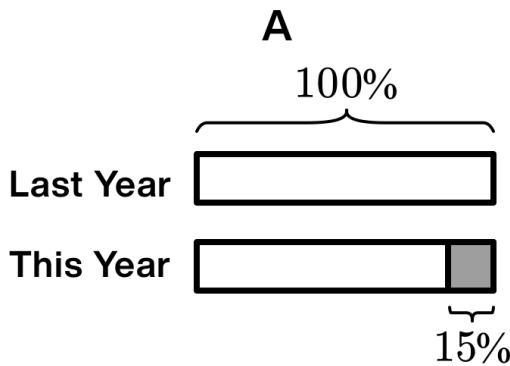
B.  $\frac{9}{8}x$

C.  $(1 - \frac{1}{4})x$

D.  $(1 + \frac{1}{4})x$

## Practice

For each situation below, decide whether diagram A or B represents the situation.



- 1.1 The amount of apples this year decreased by 15% compared to last year's amount. \_\_\_\_\_
- 1.2 The amount of pears this year is 85% of last year's amount. \_\_\_\_\_
- 1.3 The amount of cherries this year increased by 15% compared to last year's amount. \_\_\_\_\_
- 1.4 The amount of oranges this year is 115% of last year's amount. \_\_\_\_\_
  
2. Mateo's aunt bought a share of stock many years ago. The value of the stock increased by 80%. Its value is now \$270. What was the value of the stock when Mateo's aunt bought it?

**Unit 7.4, Lesson 7: Practice Problems**

3.1 What is 18% more than 61?

3.2 10% more than a number is 132. What is the number?

3.3 140 is what percent less than 160?

Determine how many feet each member of Lola's family walked.

4.1 Lola's pet turtle walked 10 feet, and then half that length again.

4.2 Lola's baby brother walked 3 feet, and then half that length again.

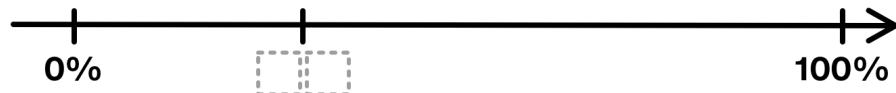
4.3 Lola's hamster walked 6.5 feet, and then half that length again.

4.4 Lola's mom walked  $x$  feet, and then half that length again.

**Explore**

Using the digits 0–9 no more than once each, fill in the boxes to create an accurate number line. How many solutions can you find?

Use the space below to record any of your thinking as you experiment.



## Reflect

1. Circle the question you feel most confident about.
2. Use the space below to ask one question you have or to share something you are proud of.

## Warm-Up

B, D

## Practice

- 1.1 A  
1.2 A  
1.3 B  
1.4 B  
2. \$150  
3.1 71.98  
3.2 120  
3.3 12.5%  
4.1 15 feet  
4.2 4.5 feet  
4.3 9.75 feet  
4.4  $1.5x$  feet

## Explore\*

*Responses vary.*

- 21, 35%, 60
- 09, 25%, 36
- 17, 34%, 50

\*See similar problems at [openmiddle.com](https://openmiddle.com).

## Warm-Up

Maia walks 12 miles. Then she walks  $\frac{1}{4}$  of that distance.

Circle **all** of the expressions that represent how far she walks altogether.

- A.  $12 + 0.25 \cdot 12$     B.  $12(1 + 0.25)$     C.  $12 \cdot 1.25$     D.  $12 \cdot 0.25$     E.  $12 + 0.25$

## Practice

1. In a city in Ohio, the sales tax rate is 7.25%. Complete the table.

Item	Price Before Tax (\$)	Sales Tax (\$)	Price Including Tax (\$)
Pillow	8.00		
Blanket	24.00		
Trash can		1.16	

A family eats at a restaurant. The bill is \$42. The family leaves a tip and spends \$49.77 total.

- 2.1 How much money does the family tip?

- 2.2 How much is the tip as a percentage of the bill?

A music store buys instruments and then sells them for 30% more than they paid.

- 3.1 If the store buys a guitar for \$45, what will the store sell it for?

- 3.2 If the price tag on a trumpet says \$104, how much did the store pay for it?

- 3.3 During a 20% off sale, the store offers a clarinet for \$93.60. How much did the store pay for the clarinet?

**Unit 7.4, Lesson 8: Practice Problems**

- 4.1 The sales tax rate in New Mexico is 5.125%. Circle **all** of the equations that represent the sales tax,  $t$ , you would pay in New Mexico for an item of cost  $c$ .

A.  $t = 5.125c$

D.  $t = c \div 0.05125$

B.  $t = 0.5125c$

C.  $t = 0.05125c$

E.  $t = \frac{5.125}{100}c$

- 4.2 A pair of pants in New Mexico costs \$30 before tax. How much does the pair of pants cost after tax?

**Explore**

Three different items' price tags have fallen off. Match up the original price, the discount, and the discounted price for each item. Then fill in the missing discounted price.

Original Price	Discount	Discounted Price
\$24	20%	\$21
\$35	30%	\$24
\$30	40%	\$

Use the table to show your solution.

Original Price	Discount	Discounted Price
	20%	
	30%	
	40%	

**Reflect**

1. Circle a question that you are still unsure of or are wondering about.
2. Use the space below to ask one question you have or to share something you are proud of.

**Warm-Up**

A, B, C

**Practice**

1.

Item	Price Before Tax (\$)	Sales Tax (\$)	Price Including Tax (\$)
Pillow	8.00	0.58	8.58
Blanket	24.00	1.74	25.74
Trash can	16.00	1.16	17.16

2.1 \$7.77

2.2 18.5%

3.1 \$58.50

3.2 \$80

3.3 \$90

4.1 C, E

4.2 \$31.54

**Explore**

Original Price	Discount	Discounted Price
\$30	20%	\$24
\$24	30%	\$16.80
\$35	40%	\$21

## Warm-Up

Circle the expression that represents a 15% tip on a \$20 meal.

Put a check next to the expression that represents the total bill.

$15 \cdot 20$

$20 + 1.5 \cdot 20$

$1.15 \cdot 20$

$$\frac{15}{100} \cdot 20$$

## Practice

Match each situation with one equation.

- |   |                 |
|---|-----------------|
| 1.1 Tay practices piano for $x$ hours. Omar practices for $\frac{2}{5}$ less than that. _____ | A. $y = 2.3x$   |
| 1.2 Tay sleeps for $x$ hours. Omar sleeps for $\frac{1}{5}$ less than that. _____             | B. $y = 1.375x$ |
| 1.3 Tay drinks $x$ ounces of juice. Omar drinks $\frac{13}{10}$ more than that. _____         | C. $y = 0.6x$   |
| 1.4 Tay spends $x$ dollars. Omar spends $\frac{1}{4}$ less than that. _____                   | D. $y = 0.8x$   |
| 1.5 Tay eats $x$ grams of almonds. Omar eats 40% more than that. _____                        | E. $y = 0.75x$  |
| 1.6 Tay collects $x$ pounds of recycling. Omar collects $\frac{3}{5}$ less than that. _____   | F. $y = 1.6x$   |
| 1.7 Tay walks $x$ kilometers. Omar walks $\frac{3}{8}$ more than that. _____                  | G. $y = 0.4x$   |
| 1.8 Tay completes $x$ puzzles. Omar completes $\frac{3}{5}$ more than that. _____             | H. $y = 1.4x$   |

Write each percent increase or decrease as a percentage of the initial amount. Then write an equation for the situation. The first one is done for you.

- 2.1 There was 40% more snow this year than last year.

**The amount of snow this year is 140% of the amount of snow last year.**  $y = 1.4x$

- 2.2 There were 22% fewer sunny days this year than last year.

- 2.3 There was an 8.5% increase in the number of houses sold this month compared to last month.

- 2.4 A runner took 5.4% less time to complete a marathon this year than she did last year.

## Unit 7.4, Lesson 9: Practice Problems

3. A store has a 30% off sale on shirts. With this discount, the price of one shirt is \$15.40. What was the original price of the shirt?
4. Circle  $A$  has a circumference of  $2\frac{2}{3}$  meters. Circle  $B$  has a diameter that is  $1\frac{1}{2}$  times as long as circle  $A$ 's diameter. What is the circumference of circle  $B$ ? Explain your thinking.

## Explore

Here are three receipts for meals at the same restaurant. Fill in the missing values on each receipt.

Receipt #1	
Burger	<input type="text"/>
Chips	\$3.00
Total	\$12.00
18% Tip	<input type="text"/>
Total With Tip	<input type="text"/>

Receipt #2	
Salad	<input type="text"/>
Chips	\$3.00
Total	<input type="text"/>
18% Tip	+ \$1.98
Total With Tip	<input type="text"/>

Receipt #3	
Salad	<input type="text"/>
Water	<input type="text"/>
Total	<input type="text"/>
18% Tip	<input type="text"/>
Total With Tip	\$11.21

## Reflect

1. Circle the question that you are **least** confident about on this practice worksheet.
2. Use the space below to ask one question you have or to share something you are proud of.

**Warm-Up**

- $\frac{15}{100} \cdot 20$  represents a 15% tip on a \$20 meal.
- $1.15 \cdot 20$  represents the total bill.

**Practice**

1.1 C

1.2 D

1.3 A

1.4 E

1.5 H

1.6 G

1.7 B

1.8 F

2.2 This year, there were 78% of the sunny days there were last year.  $y = 0.78x$ .

2.3 The number of houses sold this month is 108.5% of the houses sold last month.  $y = 1.085x$ .

2.4 The runner's time to complete this year's marathon was 94.6% of the time to complete last year's marathon.  
 $y = 0.946x$ .

3. \$22

4. Circle  $B$ 's circumference is 4 meters.  
*Explanations vary.*

- There is a proportional relationship between any circle's diameter and its circumference. If the diameter grows by  $1\frac{1}{2}$ , the circumference will also grow by  $1\frac{1}{2}$  and  $1\frac{1}{2} \cdot 2\frac{2}{3} = 4$ .
- The diameter of circle  $A$  is  $\frac{2\frac{2}{3}}{\pi}$ . The diameter of circle  $B$  is  $1\frac{1}{2} \left( \frac{2\frac{2}{3}}{\pi} \right)$ . The circumference of circle  $B$  is  $\pi \cdot 1\frac{1}{2} \left( \frac{2\frac{2}{3}}{\pi} \right)$ . This expression could be rewritten as  $\pi \cdot 1\frac{1}{2} \cdot 2\frac{2}{3} \cdot \frac{1}{\pi}$  and then  $1\frac{1}{2} \cdot 2\frac{2}{3}$ , which is 4.

**Explore**

**Receipt #1:** Burger is \$9. Tip is \$2.16. Total with tip is \$14.16.

**Receipt #2:** Salad is \$8. Total is \$11. Total with tip is \$12.98.

**Receipt #3:** Salad is \$8. Water is \$1.50. Total with tip is \$9.50. Tip is \$1.71.

## Warm-Up

A person's resting heart rate is typically between 60 and 100 beats per minute. Rishi looks at his watch and counts 8 heartbeats in 10 seconds. Is his heart rate typical? Explain how you know.

## Practice

1. A student estimates that it would take 3 hours to write a book report, but it actually takes her 5 hours. What is the percent error for her estimate?
2. It takes 48 minutes to drive downtown. An app estimated it would be less than that. If the error was 20%, what was the app's estimate?

For each story, write an equation that describes the relationship between the two quantities.

3.1 Ahmed collects  $x$  kilograms of recycling. Kimaya collects  $\frac{2}{5}$  more than that.

3.2 Ahmed bikes  $x$  kilometers. Kimaya bikes  $\frac{3}{10}$  less than that.

3.3 Ahmed reads for  $x$  minutes. Kimaya reads for  $\frac{4}{7}$  of that time.

**Unit 7.4, Lesson 11: Practice Problems**

4. A radar gun measured the speed of a baseball at 92 miles per hour. If the baseball was actually going 90.3 miles per hour, what was the percent error in this measurement?

The reading on a car's speedometer may have an error up to 6.25%. The speed limit on a road is 65 miles per hour.

- 5.1 The car is driving 63 miles per hour. Is it possible that the speedometer will show the car driving over the speed limit? Explain your thinking.
- 5.2 The speedometer shows 67 miles per hour. Is the car definitely going over the speed limit? Explain your thinking.

## Explore

A farmer sells eggs at a market. She offers three different sizes. For any size, the weight of each egg can vary by up to 8%. Calculate the missing values in the table.

Size	Advertised Weight (g)	Lightest Possible Egg (g)	Heaviest Possible Egg (g)
Medium	45		
Large		50.6	
Extra Large			66.96

Is it possible for an egg to be both large and extra large? Explain your reasoning.

## Reflect

1. Put a smiley face next to the question you spent most time on.
2. Use the space below to ask one question you have or to share something you are proud of.

**Warm-Up**

No. Rishi's heart rate is 48 beats per minute because  $10 \cdot 6 = 60$  seconds, and  $8 \cdot 6 = 48$  beats.

**Practice**

1. 40% because  $\frac{2}{5} = 0.4$ .

2. 38.4 minutes because  $48 - 0.2(48) = 38.4$ .

3.1  $y = \frac{7}{5} x$

3.2  $y = \frac{7}{10} x$

3.3  $y = \frac{4}{7} x$

4. About 1.9% because  $\frac{1.7}{90.3} \approx 0.019$ .

5.1 Yes. *Explanations vary.* With a 6.25% error, the speedometer might show the car traveling  $63 \cdot 1.0625$ , or 66.9375 mph.

5.2 No. *Explanations vary.* A car could be traveling 63 miles per hour. With an error of 6.25%, the speedometer could show  $63 \cdot 1.0625$ , or about 67 miles per hour.

**Explore**

Size	Advertised Weight (g)	Lightest Possible Egg (g)	Heaviest Possible Egg (g)
Medium	45	41.4	48.6
Large	55	50.6	59.4
Extra large	62	57.04	66.96

Yes. Eggs that are between 57.04 grams and 59.4 grams could be large or extra large.

## Warm-Up

Mio bought  $x$  grams of flour. Sol bought  $\frac{3}{8}$  more than that.

Circle **all** of the equations that represent the relationship between the amount of flour that Mio bought,  $x$ , and the amount of flour that Sol bought,  $y$ .

- A.  $y = \frac{3}{8}x$       B.  $y = \frac{5}{8}x$       C.  $y = x + \frac{3}{8}x$       D.  $y = x - \frac{3}{8}x$       E.  $y = \frac{11}{8}x$

## Practice

A city has a 5% sales tax.

1.1 A toothbrush costs \$3.40 before tax. How much does it cost including tax?

1.2 Is there a proportional relationship between the cost of items before tax and the cost of items after tax?

If yes, what is the constant of proportionality? If no, explain why not.

1.3 A book costs \$32.55 after tax. How much did it cost before tax?

1.4 A greeting card costs \$4 before tax. A customer has a 15% discount. Then the 5% sales tax is added. How much will the customer pay for the card?

1.5 Does it matter if the discount is applied before or after the sales tax? Explain your thinking.

**Unit 7.4, Lesson 12: Practice Problems**

2. The price of gold is often reported per ounce. At the end of 2005, gold was \$513 per ounce. At the end of 2015, it was \$1 060 per ounce. By what percent did the price increase?

Zoe's oven thermometer gives a reading that is 2% higher than the actual temperature.

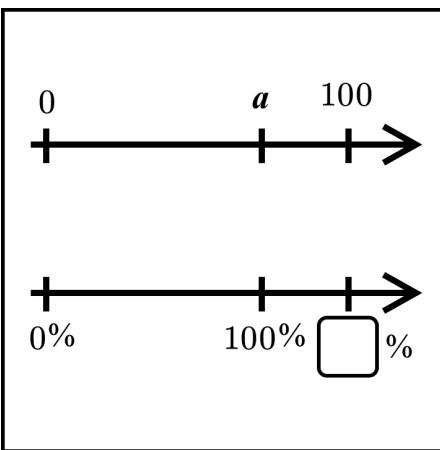
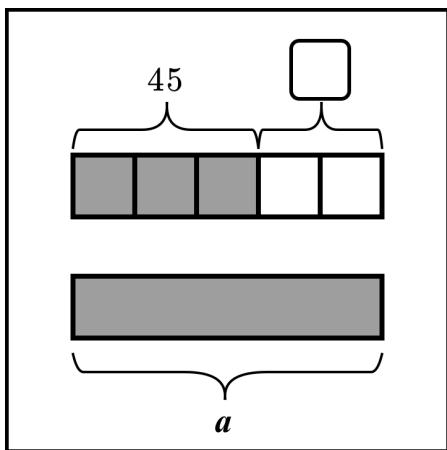
- 3.1 If the actual temperature is 325 °F, what will the thermometer reading be?

- 3.2 If the thermometer reading is 76 °F, what is the actual temperature?

## Explore

The value of  $a$  is the same in each image. Determine the value of  $a$  and write it here: \_\_\_\_\_

Then fill in the blank value in each image.



## Reflect

1. Draw a heart next to the question you are most proud of.
2. Use the space below to ask one question you have or to share something you are proud of.

**Warm-Up**

C, E

**Practice**

1.1 \$3.57

1.2 Yes, the constant of proportionality is 1.05.

1.3 \$31

1.4 \$3.57

1.5 The order doesn't matter.

*Explanations vary.* In this problem, we are multiplying three numbers:  $4 \cdot 0.85 \cdot 1.05$ . If all we are doing is multiplying numbers, the order in which we perform the multiplication never matters.

2. About 107% because an increase of \$47 divided by the \$513 original price is about 1.07.

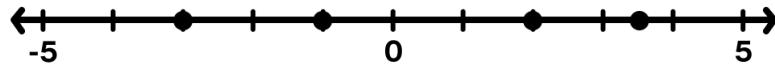
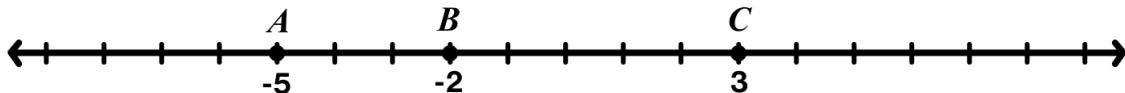
3.1  $325 \cdot 1.02 = 331.5$ .3.2 About 74.5 °F because  $76 \div 1.02 \approx 74.5$ .**Explore**

$$a = 75$$

**Left image's blank:** 30**Center image's blank:** 133%**Right image's blank:** 20%

**Warm-Up**

Label each point on the number line.

**Practice**

- 1.1 Point  $D$  is 1 unit to the left of point  $A$ . Plot and label point  $D$ .
- 1.2 Point  $E$  is at 0. Plot and label point  $E$ .
- 1.3 List both locations that are 4 units away from point  $B$ .
- 1.4 Point  $F$  is the same distance from point  $A$  and point  $C$ . Plot and label point  $F$ .
- 1.5 Write your own clue for point  $G$ , which is located at  $-3.5$ .
- 1.6 Describe where you would plot  $-100$  on the number line.

## Unit 6.7, Lesson 1: Practice Problems

Two friends at soccer practice are drinking from their water

bottles. Julian drinks  $\frac{3}{5}$  of his 15-ounce bottle. DeAndre

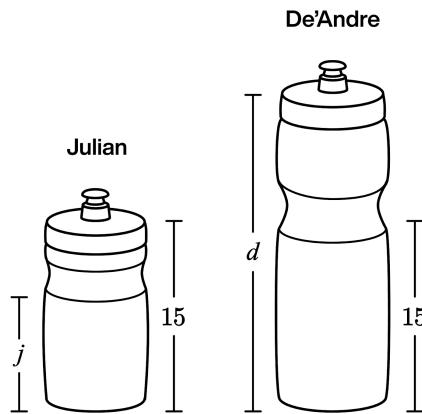
drinks 15 ounces of water, which is  $\frac{3}{5}$  of his bottle.

2.1 How are these two situations similar?

2.2 How are these two situations different?

2.3 Write an equation to represent the amount of water Julian drinks,  $j$ .

2.4 Write an equation to represent the total amount of water in DeAndre's bottle,  $d$ .



3. A rectangle has an area of 24 square centimeters.

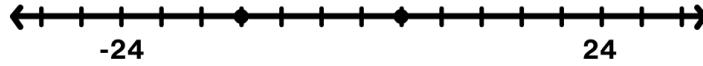
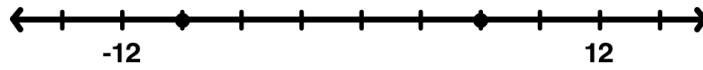
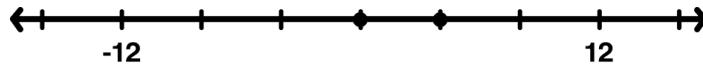
If one side is  $2\frac{2}{5}$  centimeters long, how long is the other side? Show your reasoning.

$2\frac{2}{5}$

24 square cm

## Explore

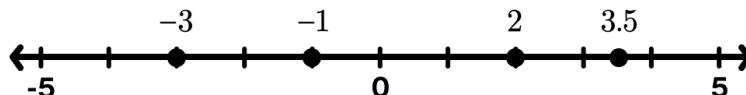
Label the two points on each number line with their location.



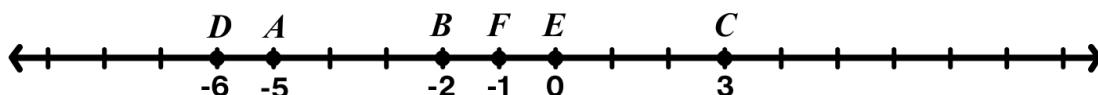
## Reflect

- Put a question mark next to one question you are still wondering about.
- Use the space below to ask one question you have or to share something you are proud of.

## Warm-Up

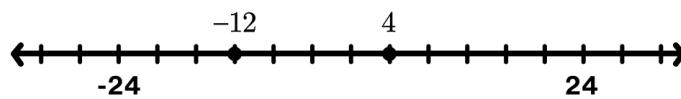
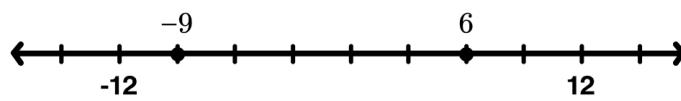
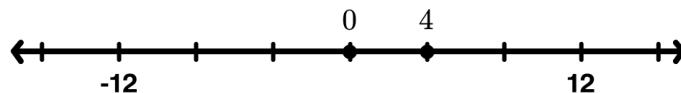


## Practice



- 1.1 See number line above.
- 1.3 2 and  $-6$
- 1.2 See number line above.
- 1.4 See number line above.
- 1.5 Responses vary.
  - Point  $G$  is halfway between  $-3$  and  $-4$ .
  - Point  $G$  is  $1.5$  units to the right of point  $A$ .
- 1.6 Responses vary. The number  $-100$  would be really far to the left of  $0$  on the number line.
- 2.1 Responses vary.
  - Both situations are about a person drinking from a water bottle.
  - Both situations use the number  $15$  and the fraction  $\frac{3}{5}$ .
- 2.2 Responses vary.
  - In Julian's situation, the whole bottle is  $15$  ounces. In De'Andre's situation, the  $15$  ounces is how much water he drinks.
  - De'Andre's water bottle is bigger than Julian's water bottle.
- 2.3  $\frac{3}{5} \cdot 15 = j$  (or equivalent)
- 2.4  $\frac{3}{5} \cdot d = 15$  (or equivalent)
3. 10 centimeters

## Explore



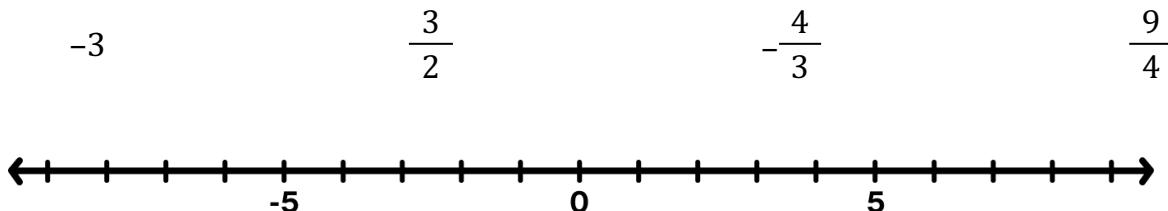
## Warm-Up

Select **all** the numbers that are equivalent to  $\frac{7}{2}$ .

- 3.5        $-\frac{7}{2}$         $3\frac{1}{2}$        -3.5       7.2

## Practice

1. Plot and label each number in its approximate location on the number line.



- ### 2.1 Complete each statement below.

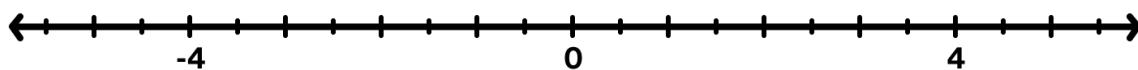
The opposite of  $-2$  is \_\_\_\_.

The opposite of  $\frac{5}{4}$  is \_\_\_\_.

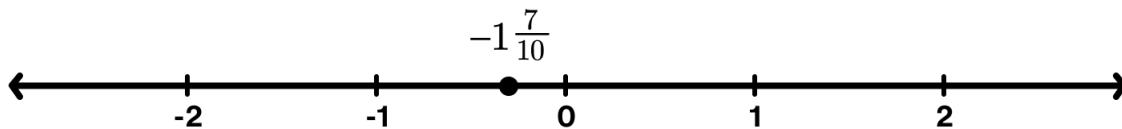
The opposite of  $-3,4$  is

The opposite of 0 is .

- 2.2 Plot and label each number from the statements above **and** its opposite on the number line.



Remy plotted the point  $-1\frac{7}{10}$  on the number line.



- 3.1 What advice would you give Remy to help them see their mistake?

- 3.2 Plot  $-1\frac{7}{10}$  in the correct location on the number line.

**Unit 6.7, Lesson 2: Practice Problems**

Use any strategy to solve each equation.

4.1  $3x = 6$

4.2  $\frac{1}{3}x = 6$

4.3  $\frac{1}{3} = 6x$

4.4  $\frac{1}{3} = \frac{1}{6}x$

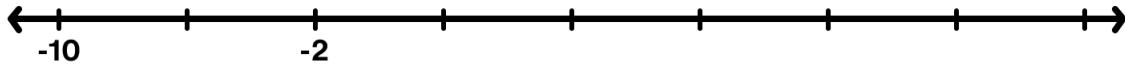
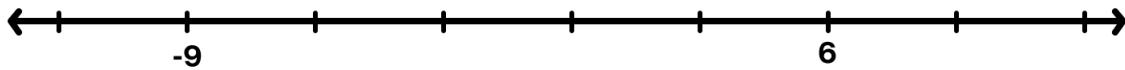
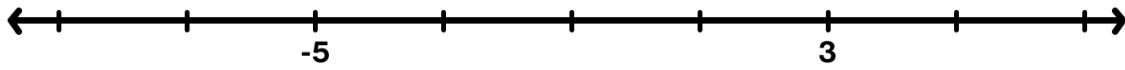
There are 15.24 centimeters in 6 inches.

5.1 There are 12 inches in a foot. How many centimeters are in a foot?

5.2 There are 3 feet in a yard. How many centimeters are in a yard?

**Explore**

Label the location of zero on each number line.

**Reflect**

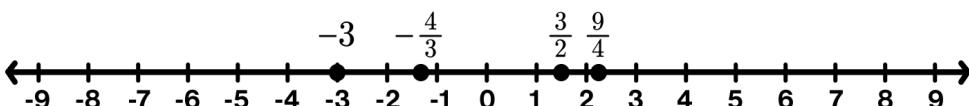
1. Circle the question you found most interesting.
2. Use the space below to ask one question you have or to share something you are proud of.

## Warm-Up

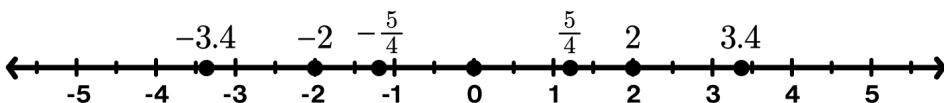
 3.5  $-\frac{7}{2}$   $3\frac{1}{2}$  -3.5 7.2

## Practice

1.

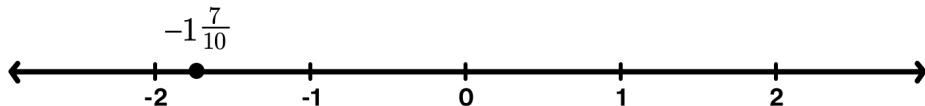
2.1  $2, -\frac{5}{4}, 3.4, 0$ 

2.2



3.1 Responses vary.  $-1\frac{7}{10}$  is between  $-1$  and  $-2$ , not between  $-1$  and  $0$ . Remy's answer is  $-\frac{7}{10}$  to the right of  $-1$  instead of  $\frac{7}{10}$  to the left of  $-1$ .

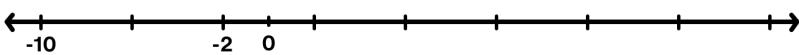
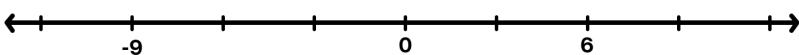
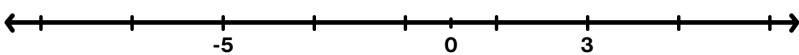
3.2

4.1  $x = 2$ 4.2  $x = 18$ 4.3  $x = \frac{1}{18}$ 4.4  $x = 2$ 

5.1 30.48 centimeters

5.2 91.44 centimeters

## Explore



**Warm-Up**

Order the numbers from least to greatest.

1.3

0

-7

1.25

 $\frac{1}{7}$ **Least**

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**Greatest****Practice**

1. Complete each number sentence with a number that makes it true.

 $\underline{\quad} < 5$  $\underline{\quad} < -5$  $-5 < \underline{\quad}$  $-5 > \underline{\quad}$ 

2. Complete each number sentence with the symbol
- $>$
- ,
- $<$
- , or
- $=$
- .

 $-5 \underline{\quad} 2$  $5 \underline{\quad} -5$  $-12 \underline{\quad} -15$  $-12.5 \underline{\quad} -12$ 

Determine whether each statement is true or false.

- 3.1
- $-8.4$
- is to the right of
- $-8.7$
- on the number line. True False

- 3.2
- $-2.4$
- is greater than
- $-2.3$
- . True False

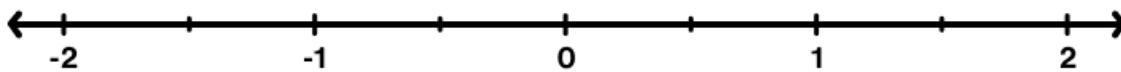
- 3.3
- $-\frac{11}{12} < -\frac{7}{12}$
- True False

- 3.4 Choose one statement above. Explain how you know whether it is true or false.

4. Plot and label each number in its approximate location on the number line.

• 0.4

• -1.5

•  $-1\frac{4}{5}$ •  $-\frac{9}{10}$ 

**Unit 6.7, Lesson 3: Practice Problems**

Solve each equation. Write each solution as a fraction and as a decimal.

5.1  $2x = 3$

5.2  $5y = 3$

5.3  $0.3z = 0.09$

6.1 Each lap around a track is 400 meters. How many meters will someone run in . . .

. . . 2 laps? \_\_\_\_\_

. . . 5 laps? \_\_\_\_\_

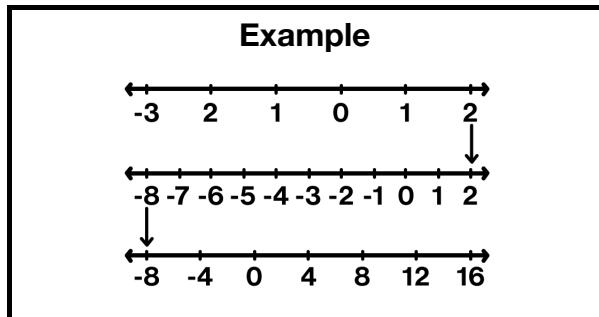
. . .  $x$  laps? \_\_\_\_\_

6.2 If Sol ran 7 600 meters, how many laps did they run? Explain how you know.

**Explore**

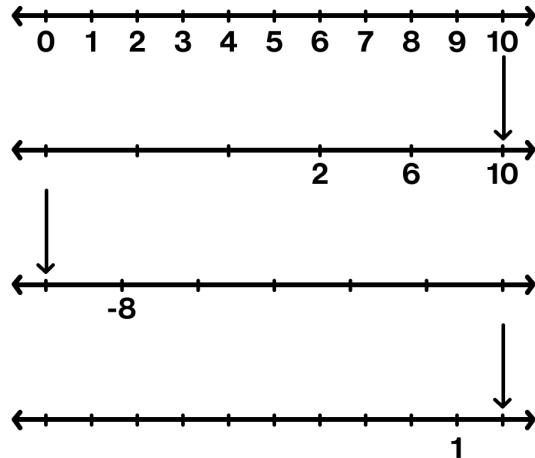
Here is a number line maze.

Each number line has a different scale, but at least one matching number, which is shown by the arrows.



Determine the missing values in this number line maze.

Optional: Create your own number maze.

**Reflect**

1. Put a question mark on a question you want to talk about with another person.
2. Use the space below to ask one question you have or to share something you are proud of.

**Warm-Up**

**Least**     $-7$      $0$      $\frac{1}{7}$      $1.25$      $1.3$     **Greatest**

**Practice**

1. Responses vary.

$$-2 < 5 \quad -10 < -5 \quad -5 < 0 \quad -5 > -10$$

2.  $-5 < 2$      $5 > -5$      $-12 > -15$      $-12.5 < -12$

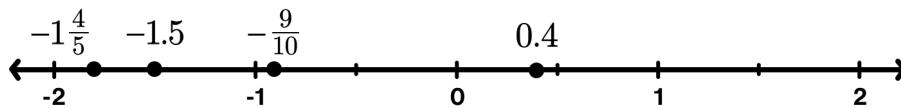
3.1 True

3.2 False

3.3 True

- 3.4 Responses vary. “ $-2.4$  is greater than  $-2.3$ ” is false because  $-2.4$  is farther left on the number line, so  $-2.4 < -2.3$ .

4.



5.1  $x = \frac{3}{2}$  (or equivalent)  
 $x = 1.5$  (or equivalent)

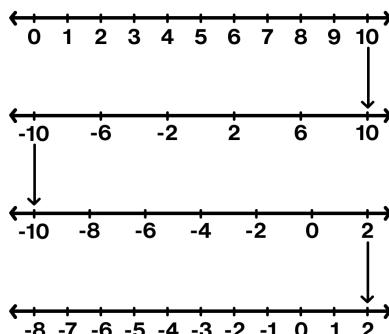
5.2  $y = \frac{3}{5}$  (or equivalent)  
 $y = 0.6$  (or equivalent)

5.3  $z = \frac{3}{10}$  (or equivalent)  
 $z = 0.3$  (or equivalent)

6.1 2 laps? 800 meters    5 laps? 2000 meters     $x$  laps?  $400x$  meters

6.2 19 laps.

*Explanations vary.* If Sol ran 8 000 meters, that would be 20 laps. Since they ran 400 meters less than 8000 meters, they ran  $20 - 1 = 19$  laps.

**Explore**



## Unit 6.7, Lesson 4: Practice Problems

Name \_\_\_\_\_

### Warm-Up

Complete each number sentence with a number that makes it true.

$$\underline{\quad} < 0.5$$

$$\underline{\quad} < -0.5$$

$$-0.5 < \underline{\quad}$$

$$-0.5 > \underline{\quad}$$

### Practice

- 1.1 Write each of these temperatures as a positive or a negative number.

5 degrees above zero	3 degrees below zero	2 degrees above zero	2.75 degrees below zero
_____	_____	_____	_____

- 1.2 Order the temperatures above from coldest to warmest.

**Coldest** \_\_\_\_\_

**Warmest** \_\_\_\_\_

- 1.3 Which temperature is warmer? Circle one.

-11°F

-15°F

Explain your reasoning.

This table shows five states and the lowest elevation in each state.

State	California	Colorado	Delaware	Louisiana	Wyoming
Lowest Elevation (ft.)	-282	3315	0	-8	3099

- 2.1 Order the states' lowest elevations from lowest to highest.

**Lowest** \_\_\_\_\_

**Highest** \_\_\_\_\_

- 2.2 Write an elevation that is lower than all of the elevations listed here.



## Unit 6.7, Lesson 4: Practice Problems

Determine if each quotient is greater than, less than, or equal to 1. Then determine its value.

3.1  $\frac{1}{2} \div 2$

3.2  $\frac{1}{2} \div \frac{1}{2}$

3.3  $\frac{2}{1} \div \frac{1}{2}$

3.4  $\frac{2}{3} \div 3$

Determine the value of each expression.

4.1  $2^3 \cdot 4$

4.2  $\frac{2^3}{4}$

4.3  $2^4 - 4$

4.4  $2^3 + 4^3$

A stadium can seat 16 000 people at full capacity.

- 5.1 If there are 13 920 people in the stadium, what percent of the stadium is **full**?  
Explain or show your reasoning.

- 5.2 What percent of the stadium is **empty**?

## Explore

List 3–5 situations in life where negative numbers might appear. Consider asking family and friends to add to your list.

## Reflect

1. Star the question you are most proud of.
2. Use the space below to ask one question you have or to share something you are proud of.



## Unit 6.7, Lesson 4: Practice Problems

## Answer Key

### Warm-Up

Responses vary.

$$0 < 0.5$$

$$-1 < -0.5$$

$$-0.5 < 0.5$$

$$-0.5 > -1.5$$

### Practice

1.1

$$5$$

$$-3$$

$$2$$

$$-2.75$$

1.2 **Coldest**  $-3$   $-2.75$   $2$   $5$  **Warmest**

1.3  $-11^{\circ}\text{F}$

*Explanations vary.*  $-11^{\circ}\text{F}$  is higher on a vertical number line, so it's warmer.

2.1 California ( $-282$ ) , Louisiana ( $-8$ ) , Delaware ( $0$ ), Wyoming ( $3099$ ), Colorado ( $3315$ )

2.2 *Responses vary.*  $-1000$  feet.

3.1 Less than 1

3.2 Equal to 1

3.3 Greater than 1

3.4 Less than 1

$$\frac{1}{4}$$

$$1$$

$$4$$

$$\frac{2}{9}$$

4.1  $32$

4.2  $2$

4.3  $12$

4.4  $72$

5.1  $87\%$

*Explanations vary.*  $\frac{13\,920}{16\,000} = 0.87$ , which is equivalent to  $87\%$ .

5.2  $13\%$

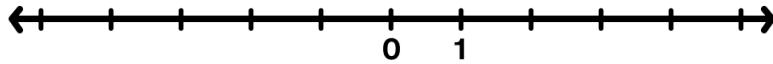
### Explore

Responses vary.

- Cold temperatures
- Store credits
- IOUs
- When you are down by some points in sports

**Warm-Up**

Select **all** the numbers that are less than  $-5$ .

  $-5.3$   $-6$   $3$   $-4$   $-4.75$ **Practice**

1.1 Plot and label all numbers that are 4 units away from 0.

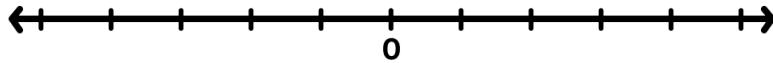
1.2 Plot and label all numbers with an absolute value of  $\frac{5}{2}$ .

1.3 Ivory claims that a number and its opposite will always have the same absolute value.

Is Ivory correct? Explain your thinking.

Complete each number sentence with the symbol  $<$ ,  $>$ , or  $=$ .

Use the number line if it helps you with your thinking.



2.1  $-3.2 \underline{\hspace{1cm}} 1.5$

2.2  $|-3.2| \underline{\hspace{1cm}} |1.5|$

2.3  $2 \underline{\hspace{1cm}} -1.5$

2.4  $|2| \underline{\hspace{1cm}} |-1.5|$

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2.5  $\frac{3}{2} \underline{\hspace{1cm}} -1.5$

2.6  $\frac{3}{2} \underline{\hspace{1cm}} |-1.5|$

2.7  $|-2.7| \underline{\hspace{1cm}} |-4.5|$

2.8  $|-2.7| \underline{\hspace{1cm}} -4.5$



## Unit 6.7, Lesson 5: Practice Problems

3. The coldest temperature on record in Death Valley, CA, was  $-10^{\circ}\text{C}$  in January 1913. The coldest temperature on record in Danbury, CT, was  $-38^{\circ}\text{C}$  in February 1943. Which temperature was colder? Explain how you know.

Determine the value of each quotient.

4.1  $24 \div 15$

4.2  $0.24 \div 0.15$

4.3  $0.24 \div 0.015$

4.4  $0.024 \div 0.015$

- 4.5 What do you notice? What do you wonder?

## Explore

Fill in the blanks using each number at most **once**.

$-3, -2, -1, 0, 1, 2, 3$

Use the extra space to record your thinking.

$$| \underline{\quad} | = \underline{\quad}$$

$$| \underline{\quad} | > | \underline{\quad} |$$

$$\underline{\quad} < | \underline{\quad} |$$

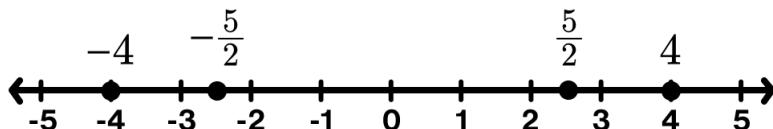
## Reflect

1. Star a question that you are still feeling confused about.
2. Use the space below to ask one question you have or to share something you are proud of.

## Warm-Up

 -5.3 -6 3 -4 -4.75

## Practice



1.1 See number line above.

1.2 See number line above.

1.3 Yes.

*Explanations vary.* Opposite numbers are the same distance away from 0. Since absolute value is another way of saying how far away a number is from 0, opposites have the same absolute value.

2.1  $-3.2 < 1.5$

2.2  $|-3.2| > |1.5|$

2.3  $2 > -1.5$

2.4  $|2| > |-1.5|$

2.5  $\frac{3}{2} > -1.5$

2.6  $\frac{3}{2} = |-1.5|$

2.7  $|-2.7| < |-4.5|$

2.8  $|-2.7| > -4.5$

3.  $-38^{\circ}\text{C}$

*Explanations vary.*  $-38^{\circ}\text{C}$  is farther away from 0 in the negative direction, so it is colder.

4.1 1.6 (or equivalent)

4.2 1.6 (or equivalent)

4.3 16

4.4 1.6 (or equivalent)

4.5 *Responses vary.* I notice that if you change the place value of both numbers in the same way, the answer is the same. I wonder what other division sentences have the same value.

## Explore

*Responses vary.*

$$|-3| = 3$$

$$|-2| > 1$$

$$-1 < |2|$$

## Warm-Up

Complete using the symbols > (greater than) , < (less than), or = (equal to).

$3 \underline{\quad} -3$

$12 \underline{\quad} 24$

$-12 \underline{\quad} -24$

$7.2 \underline{\quad} 7$

$-7.2 \underline{\quad} -7$

## Practice

- 1.1 One Monday in December, it was  $-8^{\circ}\text{C}$  in Harbin, China and  $-2^{\circ}\text{C}$  in Beijing, China.

Which city was colder on that day? Explain your thinking.



- 1.2 On the same day, it was about 7 degrees warmer in Shanghai than it was in Beijing. What was the temperature in Shanghai?
- 1.3 How many degrees warmer was it in Shanghai than in Harbin?
- 1.4 On Tuesday in Beijing, it was 5 degrees colder than it was the day before. What was the new temperature?
- 1.5 On Tuesday in Harbin, the temperature started at  $-6^{\circ}\text{C}$  and reached a high of  $3^{\circ}\text{C}$ . By how much did the temperature rise throughout the day?
- 1.6 How is changing temperature similar to adding and removing floats and anchors on a submarine?



## Unit 7.5, Lesson 1: Practice Problems

A shade of green paint is made by mixing 2 cups of yellow with 3.5 cups of blue.

- 2.1 How many cups of yellow and blue paint will make the same shade of green but a smaller amount?
  
- 2.2 Write a recipe for a mixture that will make the same shade of green but a larger amount.
  
- 2.3 Will a mixture that is 3 cups of yellow and 4.5 cups of blue be more blue, more yellow, or the same shade of green? Explain your reasoning.

## Explore

Use the digits 1, 2, 3, 4, 5, 6, 7, 8, and 9 in that order to create 100. You can add, subtract, and join digits as many ways as you can. Here is one example:  $1 + 2 + 34 - 5 + 67 - 8 + 9 = 100$ .

Try going backwards! Use the digits 9, 8, 7, 6, 5, 4, 3, 2, and 1 in that order to create 100.

## Reflect

1. Draw a star on your favorite question on this worksheet.
2. Use the space below to ask one question you have or to share something you are proud of.

**Warm-Up**

- $3 > -3$
- $12 < 24$
- $-12 > -24$
- $7.2 > 7$
- $-7.2 < -7$

**Practice**

1.1 Harbin.

*Explanations vary.* It was colder in Harbin than it was in Beijing because  $-8 < -2$ .

1.2  $5^{\circ}\text{C}$ 

1.3 13 degrees

1.4  $-7^{\circ}\text{C}$ 

1.5 9 degrees

1.6 *Responses vary.* Adding floats and increasing temperatures represent positive values. Adding anchors and decreasing temperatures represent negative values.

2.1 *Responses vary.* 1 cup of yellow and 1.75 cups of blue

2.2 *Responses vary.* 4 cups of yellow and 7 cups of blue.

2.3 More yellow.

*Explanations vary.* For a mixture with 3 cups of yellow, 5.25 cups of blue paint is needed. 4.5 cups is less than 5.25 cups, so this mixture would need more blue paint, making the shade of green look more yellow.

**Explore**

Many solutions exist. Here are some examples:

- $1 + 2 + 3 - 4 + 5 + 6 + 78 + 9 = 100$
- $12 + 3 - 4 + 5 + 67 + 8 + 9 = 100$
- $123 - 4 - 5 - 6 - 7 + 8 - 9 = 100$
- $-1 + 2 - 3 + 4 + 5 + 6 + 78 + 9 = 100$

Many solutions exist. Here are some examples:

- $9 - 8 + 7 + 65 - 4 + 32 - 1 = 100$
- $9 - 8 + 76 - 5 + 4 + 3 + 21 = 100$
- $98 + 7 + 6 - 5 - 4 - 3 + 2 - 1 = 100$
- $98 - 76 + 54 + 3 + 21 = 100$
- $-9 - 8 + 76 - 5 + 43 + 2 + 1 = 100$



## Unit 7.5, Lesson 2: Practice Problems

Name \_\_\_\_\_

### Warm-Up

Complete each statement with a temperature that makes the statement true.

$\underline{\quad} < 7^{\circ}\text{F}$

$\underline{\quad} < -3^{\circ}\text{F}$

$\underline{\quad} < -0.1^{\circ}\text{F}$

$\underline{\quad} > -2^{\circ}\text{F}$

### Practice

Determine the value of each expression.

1.1  $5 + (-3)$

1.2  $-5 + 3$

1.3  $-5 - 3$

1.4  $-5 - (-3)$

Tracking temperature change is important in many industries, including agriculture. For each situation, determine the final temperature or change in temperature.

2.1 The temperature was  $13^{\circ}\text{F}$  and then **fell** 5 degrees. What was the final temperature?

2.2 The temperature was  $-13^{\circ}\text{F}$  and then **fell** 5 degrees. What was the final temperature?

2.3 The temperature was  $-13^{\circ}\text{F}$  and then **rose** 5 degrees. What was the final temperature?

2.4 The temperature was  $-13^{\circ}\text{F}$  and then **rose to**  $5^{\circ}\text{F}$ . What was the change in temperature?

2.5 Riku wrote the expression  $-13 - 5$  for Problem 2.2.

Charlie wrote the expression  $-13 + (-5)$ .

Who is correct? Explain your reasoning.



## Unit 7.5, Lesson 2: Practice Problems

Imani was assigned to make 64 cookies for the bake sale.

- 3.1 If Imani made 25% more than they were assigned, how many cookies were made?
- 3.2 Only 90% of the cookies Imani made were sold. How many of the cookies were left after the bake sale?

## Explore

Complete each of the puzzles so that each row, column, and diagonal adds up to the same total.

Puzzle 1

3		1
-2		
-1	4	

Puzzle 2

		-2
		3
4		2

Puzzle 3

7		-6	4
	2		
0		-3	
-5	5	6	-8

## Reflect

1. Put a smiley face next to the question you spent most time on.
2. Use the space below to ask one question you have or to share something you are proud of.

**Warm-Up**

Responses vary.

- $6^{\circ}\text{F} < 7^{\circ}\text{F}$
- $-4^{\circ}\text{F} < -3^{\circ}\text{F}$
- $-0.2^{\circ}\text{F} < -0.1^{\circ}\text{F}$
- $-1^{\circ}\text{F} > -2^{\circ}\text{F}$

**Practice**

1.1 2

1.2 -2

1.3 -8

1.4 -2

2.1  $8^{\circ}\text{F}$

2.2  $-18^{\circ}\text{F}$

2.3  $-8^{\circ}\text{F}$

2.4 18 degrees

2.5 Both. *Explanations vary.* Subtracting 5 in Riku's expression is like removing floats and adding  $-5$  in Charlie's is like adding anchors. Both will make you move in the same way.

3.1 80 cookies

3.2 8 cookies

**Explore****Puzzle 1**

3	-4	1
-2	0	2
-1	4	-3

**Puzzle 2**

0	5	-2
-1	1	3
4	-3	2

**Puzzle 3**

7	-7	-6	4
-4	2	1	-1
0	-2	-3	3
-5	5	6	-8



## Unit 7.5, Lesson 3: Practice Problems

Name \_\_\_\_\_

### Warm-Up

Determine the value of the variable that makes each equation true.

$$30 + a = 40$$

$$40 + b = 30$$

$$c - 3 = 8$$

$$d - 3 = -8$$

### Practice

Determine the value of each expression.

$$1.1 \quad 4.4 - 2.9$$

$$1.2 \quad -2.9 + 4.4$$

$$1.3 \quad -4.4 + (-2.9)$$

$$1.4 \quad 4.4 - (-2.9)$$

The table shows how the amount of Ariel's bank account changed over several weeks.

- 2.1 Fill in the missing values.

Week #	Account Balance (\$)	Change From Previous Week (\$)
1	360.00	
2	337.50	-22.50
3	182.35	
4	-41.40	
5		40.00
6	-5.80	

- 2.2 By how much did Ariel's account change from week 1 to week 6? Make sure to show whether the change is positive or negative.



## Unit 7.5, Lesson 3: Practice Problems

- 3.1 Last week, the price of gasoline per gallon was  $g$  dollars. This week, the price of gas increased by 5%.

Select all of the expressions that represent this week's price of gasoline per gallon.

- $g + 0.05$
- $g + 0.05g$
- $1.05g$
- $0.05g$
- $(1 + 0.05)g$

- 3.2 If the price of gas increases by 5% again next week, will the price be 10% higher than it was originally? Explain your reasoning.

## Explore

These are equation puzzles.

Fill in each blank with a number so that each row and column makes a true equation.

Puzzle 1

1	-		=	8
+		+		
	-		=	
=		=		
-5		-4		

Puzzle 2

3	+		-	-1	=	0
+		+		+		
	+		-		=	0
+		-		+		
	-	-4	-	3	=	0
=		=		=		
0	0			0		

## Reflect

1. Circle the question you feel most confident about.
2. Use the space below to ask one question you have or to share something you are proud of.

**Warm-Up**

$$a = 10, b = -10, c = 11, d = -5$$

**Practice**

$$1.1 \quad 1.5$$

$$1.2 \quad 1.5$$

$$1.3 \quad -7.3$$

$$1.4 \quad 7.3$$

2.1

Week	Account Balance (\$)	Change From Previous Week
1	360.00	
2	337.50	-22.50
3	182.35	-155.15
4	-41.40	-223.75
5	-1.40	40.00
6	-5.80	-4.40

$$2.2 \quad -365.80 \text{ dollars}$$

$$3.1 \quad \checkmark \quad g + 0.05g$$

$$\checkmark \quad 1.05g$$

$$\checkmark \quad (1 + 0.05)g$$

3.2 No.

*Explanations vary.* 10% higher than it was originally would be  $1.1g$ . If it were to increase by 5% again, the new price would be  $1.05(1.05g)$ , which is equal to  $1.1025g$ .

**Explore****Puzzle 1**

1	-	-7	=	8
+		+		
-6	-	3	=	-9
=		=		
-5		-4		

**Puzzle 2**

3	+	-4	-	-1	=	0
+		+		+		
-2	+	0	-	-2	=	0
+		-		+		
-1	-	-4	-	3	=	0
=		=		=		
0		0		0		

**Warm-Up**

Evaluate each expression.

$(-11) + 2$

$2 + (-11)$

$-11 - 2$

$2 - (-11)$

**Practice**

- 1.1 Fill in the table with the value of each expression.

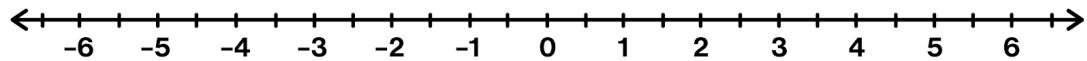
A		B	
$3 - 2$		$2 - 3$	
$5 - (-9)$		$(-9) - 5$	
$(-11) - 2$		$2 - (-11)$	
$(-6) - (-3)$		$(-3) - (-6)$	
$(-1.5) - (-4.7)$		$(-4.7) - (-1.5)$	
$(7) - (-3.5)$		$(-3.5) - (7)$	

- 1.2 What pattern do you notice between the values and expressions in column A and those in column B?

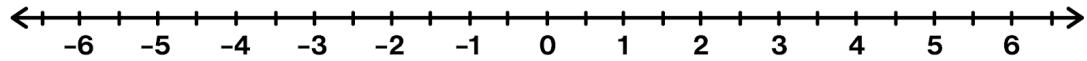
- 1.3 Explain why this pattern makes sense.

2. Use the number line to determine the value of each expression.

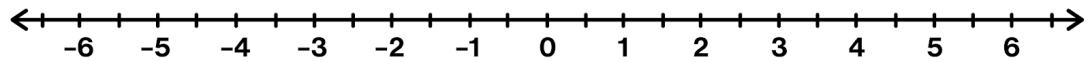
$(-2) - 4$



$(-3.1) + (-2)$



$(-4.3) - (-8)$





## Unit 7.5, Lesson 4: Practice Problems

Bettie's Boutique is having a 20% off sale.

- 3.1 Is the relationship between original price and sale price proportional? Explain your reasoning.

Original Price	Sale Price
\$15	\$12
\$25	\$20
\$35	\$28

- 3.2 If the relationship is proportional, what is the constant of proportionality?  
If the relationship is not proportional, what values could you change to make it proportional?

## Explore

Complete each of the puzzles so that each row, column, and diagonal adds up to the same total.

Puzzle 1

0.4		0.2
	0.1	0.3
0	0.5	

Puzzle 2

0.2		0
		0.1
	0.3	-0.4

Puzzle 3

7.5		-5.5	4.5
	2.5		
0.5		-2.5	
-4.5	5.5	6.5	-7.5

## Reflect

- Put a smiley face next to the question you spent most time on.
- Use the space below to ask one question you have or to share something you are proud of.

**Warm-Up** $-9, -9, -13, 13$ **Practice**

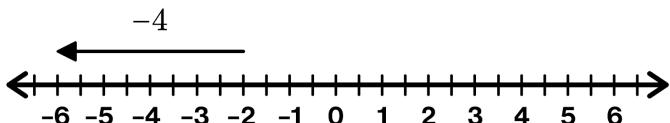
1.1

A	B		
$3 - 2$	1	$2 - 3$	-1
$5 - (-9)$	14	$(-9) - 5$	-14
$(-11) - 2$	-13	$2 - (-11)$	13
$(-6) - (-3)$	-3	$(-3) - (-6)$	3
$(-1.5) - (-4.7)$	3.2	$(-4.7) - (-1.5)$	-3.2
$(7) - (-3.5)$	10.5	$(-3.5) - (7)$	-10.5

- 1.2 *Responses vary.* All of the values in A are the opposite sign of the values in B, but the same distance from zero.

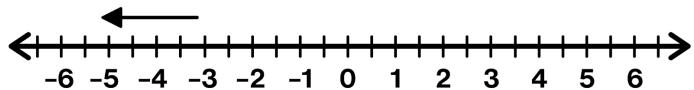
- 1.3 *Responses vary.* In column B, the terms in each expression have been switched around. This gives each expression for column B the same magnitude as column A, but with opposite signs. This makes sense because on a number line, the distances between the two terms would be the same, but the direction would be different.

2.  $-2 - 4 = -6$



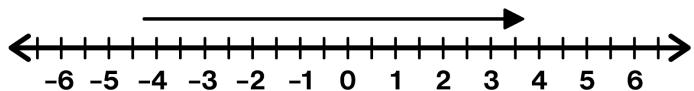
$$(-3.1) + (-2) = -5.1$$

$$+(-2)$$



$$(-4.3) - (-8) = 3.7$$

$$-(-8)$$



- 3.1 Yes.

*Explanations vary.* The relationship is proportional because the sale price is a percentage of the original price.

- 3.2 The constant of proportionality is 0.8.

**Explore****Puzzle 1**

0.4	-0.3	0.2
-0.1	0.1	0.3
0	0.5	-0.2

**Puzzle 2**

0.2	-0.5	0
-0.3	-0.1	0.1
-0.2	0.3	-0.4

**Puzzle 3**

7.5	-6.5	-5.5	4.5
-3.5	2.5	1.5	-0.5
0.5	-1.5	-2.5	3.5
-4.5	5.5	6.5	-7.5

## Warm-Up

Order the expressions by value from least to greatest.

$$-5 - (-4)$$

$$-4 - (-5)$$

$$-4 - (5)$$

$$4 - (-5)$$

**Least**

---

 \_\_\_\_\_**Greatest**

## Practice

- 1.1 Is the solution to  $-2.7 + x = -3.5$  positive or negative? Explain how you know.

- 1.2 Select **all** of the equations that are equivalent to  $-2.7 + x = -3.5$ .

$-3.5 + 2.7 = x$       $3.5 - 2.7 = x$       $-3.5 - (-2.7) = x$       $-3.5 - 2.7 = x$

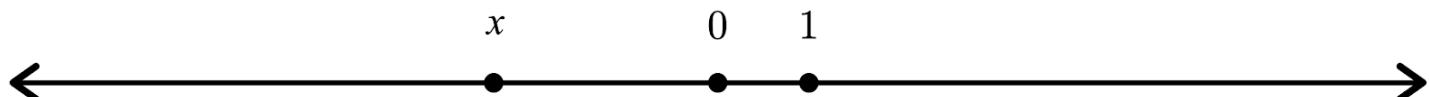
Determine the value of the variable that makes each equation true.

2.1  $33 + a = -33.8$

2.2  $-9 - b = 3.5$

2.3  $c = \left(-\frac{3}{4}\right) + \frac{3}{2}$

2.4  $d + 0.7 = -4$



- 3.1 Plot the approximate location of  $x + 4$  on the number line.

- 3.2 Plot the approximate location of  $4 - x$  on the number line.



## Unit 7.5, Lesson 5: Practice Problems

Annie's Attic is having a \$5 off sale.

- 4.1 Is the relationship between original price and sale price proportional? Explain your reasoning.

Original Price	Sale Price
\$15	\$10
\$25	\$20
\$35	\$30

- 4.2 If the relationship is proportional, what is the constant of proportionality?  
If the relationship is not proportional, what values could you change to make it proportional?

## Explore

These are equation puzzles.

Fill in each blank with + or – so that each row and column makes a true equation.

**Puzzle 1**

-3		5	=	2
-2		-1	=	-3
=		=		
-1		6		

**Puzzle 2**

-1		1		2	=	0
1		2		-1	=	0
-2		1		-1	=	0
=		=		=		
0		0		0		

## Reflect

- Put a star next to the question you are most proud of answering.
- Use the space below to ask one question you have or to share something you are proud of.

**Warm-Up****Least**

- $-4 - (5)$
- $-5 - (-4)$
- $-4 - (-5)$
- $4 - (-5)$

**Greatest****Practice**

## 1.1 Negative

*Explanations vary.* On a number line,  $-3.5$  is to the left of  $-2.7$ . If  $x$  were positive,  $-2.7 + x$  would be to the right of  $-2.7$ . Therefore,  $x$  must be negative.

1.2  $\checkmark -3.5 + 2.7 = x$

$\checkmark -3.5 - (-2.7) = x$

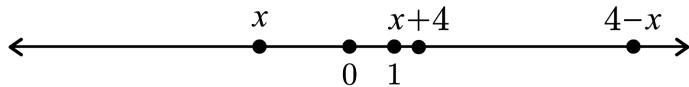
2.1  $a = -66.8$

2.2  $b = -12.5$

2.3  $c = \frac{3}{4}$

2.4  $d = -4.7$

3.



## 4.1 No.

*Explanations vary.* Each price has been reduced by the same amount. If it were a proportional relationship, the difference between the original price and sale price would be smaller for lower prices and larger for higher prices.

- 4.2 Responses vary. If it were a 20% off sale, the relationship would be proportional. Changing the \$10 to \$12 and the \$30 to \$28 would make it proportional.

Original Price	Sale Price
\$15	\$12
\$25	\$20
\$35	\$28

**Explore****Puzzle 1**

-3	+	5	=	2
-		-		
-2	+	-1	=	-3
=		=		
-1		6		

**Puzzle 2**

-1	-	1	+	2	=	0
-		-		+		
1	-	2	-	-1	=	0
-		+		+		
-2	+	1	-	-1	=	0
=		=		=		
0		0		0		

## Warm-Up

Determine the value of the variable that makes each equation true.

$$3 \cdot a = 12$$

$$-3 \cdot 4 = b$$

$$-3 \cdot c = 12$$

$$d \cdot -4 = -12$$

## Practice

A submarine starts at 0 units and has groups of 3 floats and groups of 4 anchors attached.

- 1.1 Select **all** of the expressions that would make the submarine's final position positive.

$-(5)(3) + (2)(-4)$

$(2)(3) + (5)(-4)$

$(5)(3) - (2)(-4)$

$-(2)(3) - (5)(-4)$

$-(5)(3) - (2)(-4)$

$(2)(3) - (5)(-4)$

- 1.2 Which expression would make the submarine float the highest? What will its final position be?
- 1.3 Which expression would make the submarine sink the lowest? What will its final position be?
- 1.4 Using these groups of floats and anchors, write as many different expressions as you can that would make the submarine's final position  $-5$  units.

A weather station on top of a mountain reports that the temperature is currently  $0^{\circ}\text{C}$  and has been **decreasing** at a constant rate of  $3^{\circ}\text{C}$  per hour.

- 2.1 What will the temperature be . . .

. . . in 2 hours?

- 2.2 What was the temperature . . .

. . . 1 hour ago?

. . . in 5 hours?

. . . 3 hours ago?

**Unit 7.5, Lesson 6: Practice Problems**

Tyler orders a meal that costs \$15. The sales tax rate in Tyler's county is 6.6%.

- 3.1 How much will the sales tax be on Tyler's meal?
- 3.2 Write an equation to represent the relationship between the original cost of the meal and the total cost after sales tax. Use  $x$  for the original cost of the meal and  $y$  for the cost after sales tax.

Tyler also wants to leave a tip between 15% and 20% for the server.

- 3.3 How much do you think he should tip?
- 3.4 What would the total bill be (including the tip)? Explain your reasoning.

**Explore**

For each value, make an expression using exactly four 4s, the operations  $+$ ,  $-$ ,  $\times$ ,  $\div$ , and parentheses. You may also use  $-4$ s. The first two have been done for you.

$$(4 - 4) \times 4 - 4 = -4$$

$$(-4 - 4 - 4) \div 4 = -3$$

$$4 \quad 4 \quad 4 \quad 4 = -2$$

$$4 \quad 4 \quad 4 \quad 4 = -1$$

$$4 \quad 4 \quad 4 \quad 4 = 0$$

$$4 \quad 4 \quad 4 \quad 4 = 1$$

$$4 \quad 4 \quad 4 \quad 4 = 2$$

$$4 \quad 4 \quad 4 \quad 4 = 3$$

$$4 \quad 4 \quad 4 \quad 4 = 4$$

**Reflect**

1. Circle the question you feel most confident about.
2. Use the space below to ask one question you have or to share something you are proud of.

**Warm-Up**

$$a = 4, b = -12, c = -4, d = 3$$

**Practice**

- 1.1 ✓  $(5)(3) - (2)(-4)$   
✓  $-(2)(3) - (5)(-4)$   
✓  $(2)(3) - (5)(-4)$

1.2  $(2)(3) - (5)(-4)$

Its final position would be 26 units.

1.3  $-(5)(3) + (2)(-4)$

Its final position would be -23 units.

- 1.4 Responses vary.

- $(1)(3) + (2)(-4)$
- $(5)(3) + (5)(-4)$
- $(9)(3) + (8)(-4)$

2.1 2 hours:  $-6^{\circ}\text{C}$

5 hours:  $-15^{\circ}\text{C}$

2.2 1 hour ago:  $3^{\circ}\text{C}$

3 hours ago:  $9^{\circ}\text{C}$

3.1 \$0.99

- 3.2  $y = 1.066x$ , where  $x$  represents the original cost and  $y$  represents the cost after sales tax.

3.3 Responses vary. \$3.20

3.4 Responses and explanations vary. \$19.19

This amount includes the cost of the meal including the sales tax and a 20% tip for the server.

**Explore**

Responses vary.

$$(4 - 4) \times 4 - 4 = -4$$

$$(-4 - 4 - 4) \div 4 = -3$$

$$-4 \times 4 \div (4 + 4) = -2$$

$$4 - 4 - 4 \div 4 = -1$$

$$4 + 4 - 4 - 4 = 0$$

$$(4 \times 4) \div (4 \times 4) = 1$$

$$4 \div 4 + 4 \div 4 = 2$$

$$(4 \times 4 - 4) \div 4 = 3$$

$$4 + (4 - 4) \times 4 = 4$$



## Unit 7.5, Lesson 7: Practice Problems

Name \_\_\_\_\_

### Warm-Up

Decide whether each expression is negative, positive, or zero.

$2 \cdot 3$

$(-2) \cdot 3$

$(-2) \cdot (-3)$

$(-1) \cdot (-2) \cdot (-3)$

### Practice

Determine the value of each expression.

1.1  $5(-3)$

1.2  $-5 \cdot 3$

1.3  $(-5)(-3)$

1.4  $-5 \cdot (-0.3)$

A bug is crawling down a tree at a rate of  $-7$  millimeters per second. The bug passes a big branch, which we will call position  $0$ .

- 2.1 Which equation represents the bug's position  $8$  seconds **after** it passes the branch?
- A.  $-7 \cdot 8 = 56$       B.  $-7 \cdot 8 = -56$       C.  $-7 \cdot -8 = 56$       D.  $-7 \cdot -8 = -56$
- 2.2 Which equation represents the bug's position  $8$  seconds **before** it passes the branch?
- A.  $-7 \cdot 8 = 56$       B.  $-7 \cdot 8 = -56$       C.  $-7 \cdot -8 = 56$       D.  $-7 \cdot -8 = -56$
- 2.3 Describe a situation that could be represented by the equation  $7 \cdot -8 = -56$ .

The bug has friends on nearby trees. Write equations similar to Problem 2 for each description. Assume each bug starts at the same position as the bug in Problem 2.

- 3.1 Buggo crawls for  $28$  minutes at a rate of  $-2$  centimeters per minute. \_\_\_\_\_
- 3.2 Buggy slides for  $3.2$  seconds at  $-8.1$  millimeters per second. \_\_\_\_\_
- 3.3 Buggum creeps for  $3.5$  seconds and finishes at  $-28.5$  centimeters. \_\_\_\_\_

**Unit 7.5, Lesson 7: Practice Problems**

A tank of water breaks and begins draining at a constant rate.

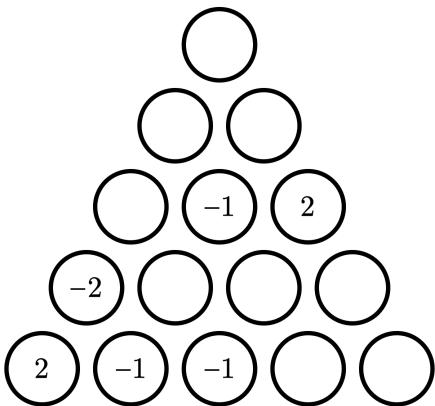
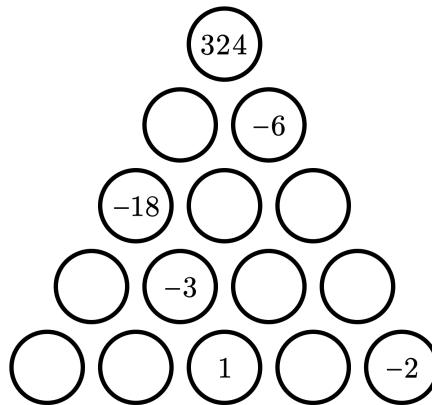
- 4.1 Complete the table.

Time (minutes)	Change in Water (liters)	Expression	Water in the Tank (liters)
0	0	$770 + (0)(-14)$	770
1	-14	$770 + (1)(-14)$	756
2			
5			

- 4.2 Is there a proportional relationship between time and the amount of water left in the tank? Explain your reasoning.

**Explore**

Complete the number pyramid puzzles. Each number is the product of the two numbers directly below it. For example, in the bottom-left corner  $-2 = 2 \cdot -1$ .

**Puzzle 1****Puzzle 2****Reflect**

1. Circle the question you understand best.
2. Use the space below to ask one question you have or to share something you are proud of.

**Warm-Up**

Positive, negative, positive, negative

**Practice**

1.1  $-15$

1.2  $-15$

1.3  $15$

1.4  $1.5$

2.1 B.  $-7 \cdot 8 = -56$

2.2 C.  $-7 \cdot -8 = 56$

2.3 *Responses vary.* A bug is crawling up a tree at a rate of 7 millimeters per second. The bug passes a big branch. The expression shows the position of the bug 8 seconds before he passes the branch.

3.1 *Responses vary.*  $-2 \cdot 28 = -56$

3.2 *Responses vary.*  $-8.1 \cdot 3.2 = -25.92$

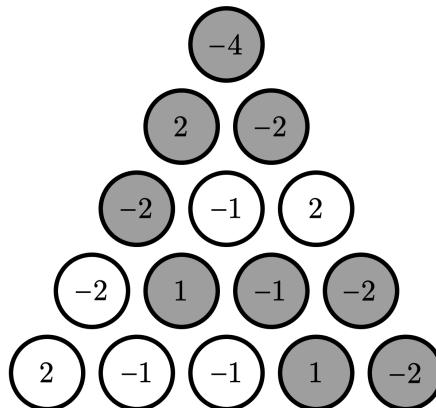
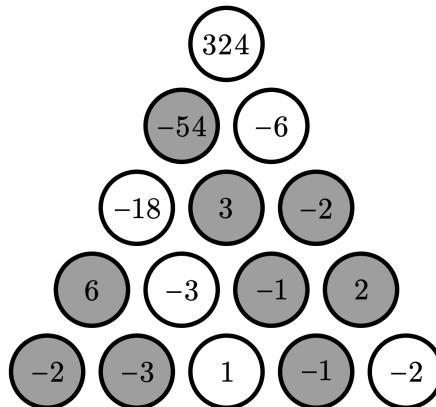
3.3 *Responses vary.*  $x \cdot 3.5 = -28.5$

4.1

Time (min.)	Change in Water (liters)	Expression	Water in the Tank (liters)
0	0	$770 + (0)(-14)$	770
1	-14	$770 + (1)(-14)$	756
2	-28	$770 + (2)(-14)$	742
5	-70	$770 + (5)(-14)$	700

4.2 No.

*Explanations vary.* The water left in the tank at the beginning is 770 liters. For it to be a proportional relationship, it would need to begin at 0 liters.

**Explore****Puzzle 1****Puzzle 2**

## Warm-Up

Determine the value of the variable that makes each equation true.

$$3 \cdot (-4) = a$$

$$b \cdot (-3) = -12$$

$$(-12) \cdot c = 12$$

$$d \cdot 24 = -12$$

## Practice

Determine the value of each expression.

$$1.1 \quad \frac{-15}{12}$$

$$1.2 \quad \frac{15}{-12}$$

$$1.3 \quad \frac{-15}{-12}$$

$$1.4 \quad -\frac{15}{12}$$

Determine the value of  $x$  that makes each equation true.

$$2.1 \quad -3x = 6.3$$

$$2.2 \quad \frac{x}{3} = -12$$

$$2.3 \quad -1.2x = -30$$

$$2.4 \quad \frac{x}{-1.2} = -0.3$$

A machine that drills holes for wells drilled to a depth of  $-72$  feet in one day (24 hours).

3.1 How much did the depth change each hour? Make sure to show whether the change is positive or negative.

3.2 If the machine drilled at a constant rate, what was the depth after 15 hours?

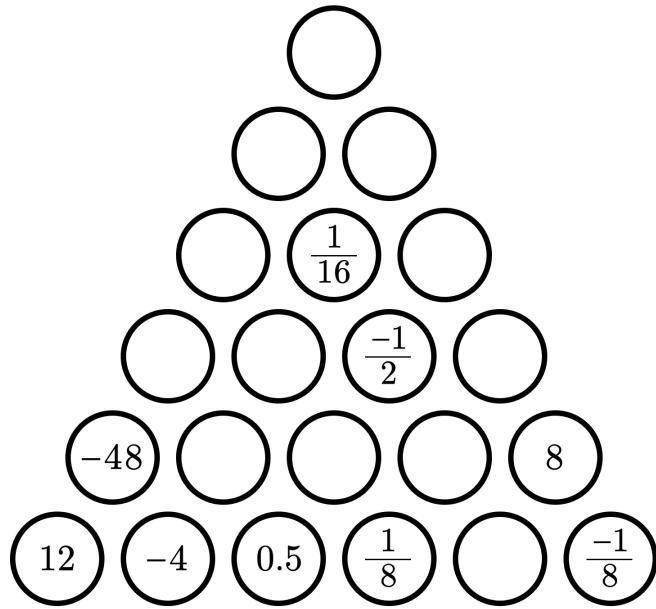
3.3 At this rate, how many hours will it take until the drill reaches its final depth of  $-132$  feet? Explain your reasoning.

**Unit 7.5, Lesson 8: Practice Problems**

- 4.1  $30 + (-30) = 0$ . Write a different equation with **two** numbers whose sum equals 0.
- 4.2 Write an equation with **three** numbers whose sum equals 0.
- 4.3 Write an equation with **four** numbers whose sum equals 0, none of which are opposites. One example of opposites is  $-30$  and  $30$ .
- 4.4 Write an equation using four numbers that multiply to 0, none of which are opposites.

**Explore**

Here is a number pyramid puzzle. Fill in the blanks so that each number is the product of the two numbers directly beneath it.

**Reflect**

1. Put a smiley face on the question you spent the most time on.
2. Use the space below to ask one question you have or to share something you are proud of.

**Warm-Up**

$$a = -12, b = 4, c = -1, d = -0.5$$

**Practice**

1.1  $-1.25$

1.2  $-1.25$

1.3  $1.25$

1.4  $-1.25$

2.1  $x = -2.1$

2.2  $x = -36$

2.3  $x = 25$

2.4  $x = 0.36$

3.1  $-3$  feet per hour

3.2  $-45$  feet

3.3 44 hours

*Explanations vary.* The time it will take to drill to a depth of  $-132$  feet can be represented by  $-3 \cdot x = -132$ . Solving this equation gives a value of 44 hours.

4.1 *Responses vary.*

$$44 + (-44) = 0$$

4.2 *Responses vary.*

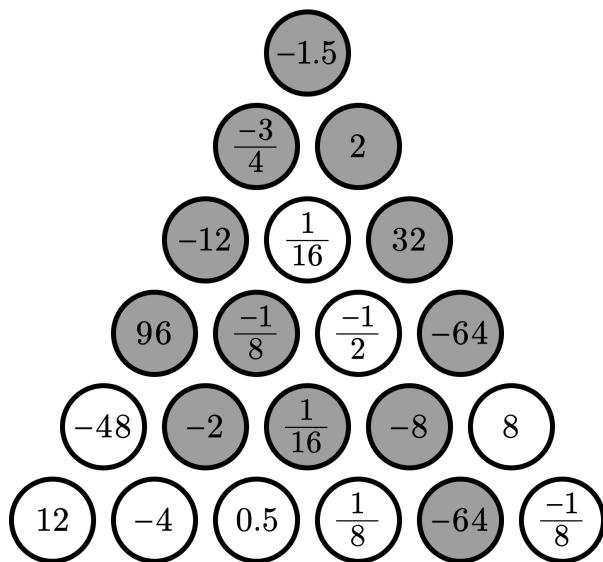
$$33 + (-22) + (-11) = 0$$

4.3 *Responses vary.*

$$44 + (-33) + (-22) + 11 = 0$$

4.4 *Responses vary.*

$$33 \cdot 22 \cdot 11 \cdot 0 = 0$$

**Explore**

**Warm-Up**

The value of  $x$  is  $-3$ . Order these expressions by value from least to greatest.

$x$

$1 - x$

$x - 1$

$\frac{-1}{x}$

**Least**

---

 \_\_\_\_\_**Greatest****Practice**

- 1.1 Evaluate each expression and record your answers in the table.

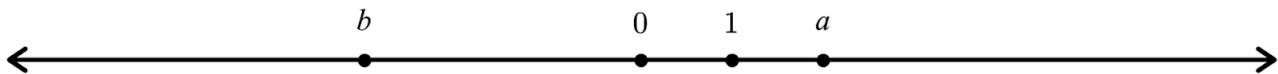
For example, if  $a = -\frac{1}{2}$ , then  $-a = \frac{1}{2}$ .

Value		Expression					
$a$	$b$	$-a$	$ab$	$-ab$	$a - b$	$b - a$	$-a + b$
$-\frac{1}{2}$	6	$\frac{1}{2}$		3			
$\frac{1}{2}$	-6						
-6	$-\frac{1}{2}$						

- 1.2 Describe any patterns you noticed in the table.

- 1.3 Create values for  $a$  and  $b$  so that  $ab$  is negative and  $a - b$  is positive. Show your thinking.

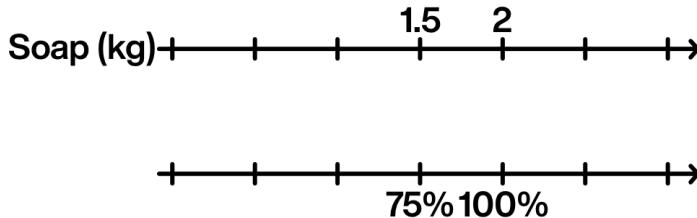
2. Select **all** of the expressions that have a positive value based on the positions of  $a$  and  $b$ .

  $-b$   $a + b$   $a - b$   $a \cdot b$   $-\frac{b}{a}$ 

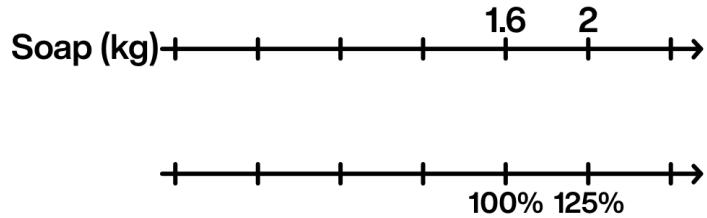
**Unit 7.5, Lesson 9: Practice Problems**

3. Two students are both working on the same problem: A new box of laundry soap has 25% more soap in it. The new box holds 2 kg of soap. How much soap did the old box hold?

Here is Marcela's double number line.



Here is Mohamed's double number line.



Do you agree with either of them? Explain your reasoning.

## Explore

Enter a value for  $n$ . Then order the cards from least to greatest.

$$n = \underline{\hspace{2cm}}$$

$n$	$1 - \frac{n}{2}$	$-n$	$\frac{n+1}{2}$	$n \cdot n$	$4n$
-----	-------------------	------	-----------------	-------------	------

Least

$\underline{\hspace{1cm}} \quad \underline{\hspace{1cm}} \quad \underline{\hspace{1cm}} \quad \underline{\hspace{1cm}} \quad \underline{\hspace{1cm}} \quad \underline{\hspace{1cm}}$  Greatest

Will the order always be the same? Explain your reasoning.

## Reflect

1. Circle the question you spent the most time on.
2. Use the space below to ask one question you have or to share something you are proud of.

## Warm-Up

**Least**  $x - 1$   $x$   $\frac{-1}{x}$   $1 - x$  **Greatest**

## Practice

1.1

Value		Expression					
$a$	$b$	$-a$	$ab$	$-ab$	$a - b$	$b - a$	$-a + b$
$-\frac{1}{2}$	6	$\frac{1}{2}$	-3	3	-6.5	6.5	6.5
$\frac{1}{2}$	-6	$-\frac{1}{2}$	-3	3	6.5	-6.5	-6.5
-6	$-\frac{1}{2}$	6	3	-3	-5.5	5.5	5.5

1.2 Responses vary.  $b - a$  and  $-a + b$  are the same for each row and always the opposite sign to  $a - b$ .

1.3 Responses vary.  $a = 3$  and  $b = -4$ . Since  $b$  is negative and  $a$  is positive, subtracting  $b$  from  $a$  will always be positive and multiplying  $a$  and  $b$  will always be negative because one is positive and the other is negative.

2.  $-b$ ,  $a - b$ ,  $-\frac{b}{a}$

3. Yes. Mohamed.

Explanations vary. 25% of 1.6 kg is 0.4 kg, and  $1.6 + 0.4 = 2$ . Therefore, Mohamed is correct.

## Explore

Responses vary.

$n = 2$       **Least**  $-n$        $1 - \frac{n}{2}$        $\frac{n+1}{2}$        $n$        $n \cdot n$        $4n$       **Greatest**

No. Explanations vary.



## Unit 7.5, Lesson 10: Practice Problems

Name \_\_\_\_\_

### Warm-Up

Select all of the expressions that are equivalent to  $-\frac{1}{2} \cdot (-16)$ .

- $2 \cdot (-4)$       $2 \cdot 4$       $(-1) \cdot (2) \cdot (-4)$       $\frac{-1}{8} \cdot (-32)$       $-\frac{16}{2}$

### Practice

Determine the value of the variable that makes each equation true.

1.1  $-22 + a = -5$     1.2  $-22 - 5 = b$     1.3  $-5c = -22$     1.4  $\frac{d}{-5} = 22$

- 1.5 Which expression has the greater value:  $(-22) - (-5)$  or  $(-5) - (-22)$ ?  
Explain your reasoning.

- 2.1 The value of  $x$  is  $-2$ ,  $y$  is  $4$ , and  $z$  is  $2$ .

Order these expressions from least to greatest:

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

Least \_\_\_\_\_

Greatest \_\_\_\_\_

- 2.2 Would your order be different if the value of  $x$  was  $2$  instead? Why or why not?

- 2.3 Make your own values for  $x$  and  $y$  so that  $\frac{x}{y}$  is positive and  $x + y$  is negative.



## Unit 7.5, Lesson 10: Practice Problems

Starting at noon, the temperature changed steadily at a rate of  $-0.8^{\circ}\text{C}$  every hour.

- 3.1 How many hours did it take for the temperature to change by  $-4.4^{\circ}\text{C}$ ?

- 3.2 At 3 p.m., the temperature was  $-2.5^{\circ}\text{C}$ . What was the temperature at noon?

Use long division to write each fraction as a decimal.

4.1  $\frac{5}{10}$

4.2  $\frac{5}{15}$

4.3  $\frac{5}{11}$

## Explore

Using the numbers  $-2$ ,  $-1$ ,  $0$ ,  $1$ , and  $2$  without repeating, fill in the blanks to make a true statement.

**Work Space**

$$\square - \frac{\square}{\square} < \square - \square$$

Using the numbers  $-4$  to  $4$  without repeating, fill in the blanks to make a true statement.  
One number will be unused.

**Work Space**

$$\frac{\square}{\square} \times \square < \square - \frac{\square}{\square} < \square - \square$$

## Reflect

1. Put a heart next to the question you found most interesting to complete.
2. Use the space below to ask one question you have or to share something you are proud of.

**Warm-Up**

$\checkmark 2 \cdot 4$

$\checkmark (-1) \cdot (2) \cdot (-4)$

**Practice**

1.1  $a = 17$

1.2  $b = -27$

1.3  $c = 4.4$

1.4  $d = -110$

1.5  $(-5) - (-22)$

*Explanations vary.*  $(-5) - (-22)$  evaluates to 17 because  $(-5) - (-22) = -5 + 22$ , whereas  $(-22) - (-5)$  evaluates to -17 because  $(-22) - (-5) = -22 + 5$ . Since  $-17 < 17$ ,  $(-5) - (-22)$  has a greater value than  $(-22) - (-5)$ .

2.1 Least  $xyz$        $x - 2y$        $x \cdot y$        $x - z$  Greatest

2.2 Yes.

*Explanations vary.* Since 2 is positive, the signs of the expressions  $xyz$  and  $x \cdot y$  would be the opposite of what they were when  $x = -2$ , changing the order of the values.

2.3 Responses vary.  $x = -2, y = -1$ 

3.1 5.5 hours

3.2  $-0.1^\circ\text{C}$ 

4.1 0.5

4.2  $0.\overline{33}$

4.3  $0.\overline{45}$

**Explore**

Responses vary.

$$\boxed{-2} - \frac{\boxed{-1}}{\boxed{1}} < \boxed{2} - \boxed{0}$$

Responses vary.

$$\frac{\boxed{3}}{\boxed{1}} \times \boxed{-4} < \boxed{-3} - \frac{\boxed{-1}}{\boxed{-2}} < \boxed{4} - \boxed{0}$$

## Warm-Up

Select all of the expressions that are equivalent to  $4(5) + 3(5)$ .

  $7(5)$   $12(5)$   $7 \cdot 2(5)$   $10(5) - 3(5)$   $3(5) - 10(5)$ 

## Practice

Determine the value of the variable that makes each equation true.

1.1  $3 \cdot (-2.5) = x$

1.2  $-3y = 33$

1.3  $-3 - \frac{1}{2} = z$

On January 22 in 1943, the town of Spearfish, South Dakota, set the record for the world's fastest temperature change.

- At 7:30 a.m., the temperature was  $-4^{\circ}\text{F}$ .
  - By 7:32 a.m., the temperature was  $45^{\circ}\text{F}$ .
  - By 9:00 a.m. on that same day, the temperature was  $54^{\circ}\text{F}$ .
  - By 9:27 a.m., the temperature was  $-4^{\circ}\text{F}$ .
- 2.1 How many degrees did the temperature change each minute from 7:30 to 7:32? Make sure to show whether the change was positive or negative.
- 2.2 How many degrees did the temperature change each minute from 9:00 to 9:27? Make sure to show whether the change was positive or negative.
- 2.3 What is the difference between the temperature at 7:30 and the temperature at 9:27? Make sure to show whether the change was positive or negative.



## Unit 7.5, Lesson 11: Practice Problems

Use long division to write each fraction as a decimal.

3.1  $\frac{4}{9}$

3.2  $\frac{5}{8}$

3.3 What is different about these answers?

## Explore

These are equation puzzles. Fill in the blanks so that each row and column makes a true equation. Use numbers to complete Puzzle 1 and the symbols  $+$ ,  $-$ ,  $\times$ , and  $\div$  to complete Puzzle 2.

**Puzzle 1**

4	$\div$		$\times$		=	0
$\times$		$+$		$+$		
	$\times$	2	$-$		=	0
$+$		$-$		$+$		
4	$\div$		$+$	2	=	0
=		$=$		$=$		
0		0		0		

**Puzzle 2**

- 4		-1		3	=	1
1		-3		-3	=	1
4		1		-2	=	1
=		=		=		
1		1		1		

## Reflect

1. Circle the question you feel most confident about.
2. Use the space below to ask one question you have or to share something you are proud of.

**Warm-Up**

✓ 7(5)

✓  $10(5) - 3(5)$ **Practice**

1.1  $x = -7.5$

1.2  $y = -11$

1.3  $z = -3.5$

2.1 24.5 degrees per minute

2.2  $-\frac{58}{27}$  degrees per minute

2.3 0 degrees

3.1  $0.\overline{44}$

3.2 0.625

3.3 Responses vary.  $\frac{4}{9}$  is a repeating decimal, but  $\frac{5}{8}$  is a terminating decimal.**Explore**

Responses vary.

**Puzzle 1**

4	÷	- 4	×	0	=	0
×		+		+		
-1	×	2	-	-2	=	0
+		-		+		
4	÷	-2	+	2	=	0
=		=		=		
0		0		0		

**Puzzle 2**

- 4	×	-1	-	3	=	1
+		-		÷		
1	×	-3	÷	-3	=	1
+		-		-		
4	-	1	+	-2	=	1
=		=		=		
1		1		1		

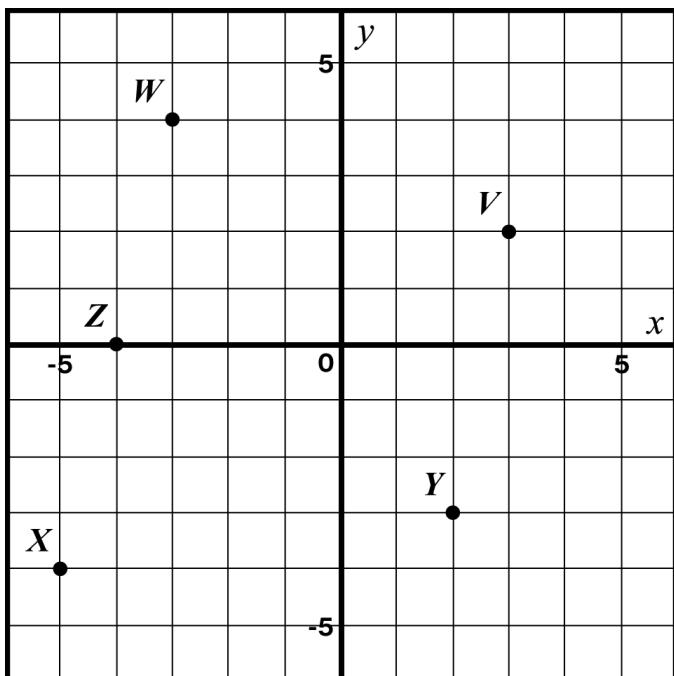
**Warm-Up**

Select **all** of the values of  $x$  that are solutions to the inequality  $x > -2$ .

 -1 -2 -3 -2.1 -1.8**Practice**

Here are five points on the coordinate plane.

- 1.1 What are the coordinates of each point?

 $V$  \_\_\_\_\_ $W$  \_\_\_\_\_ $X$  \_\_\_\_\_ $Y$  \_\_\_\_\_ $Z$  \_\_\_\_\_

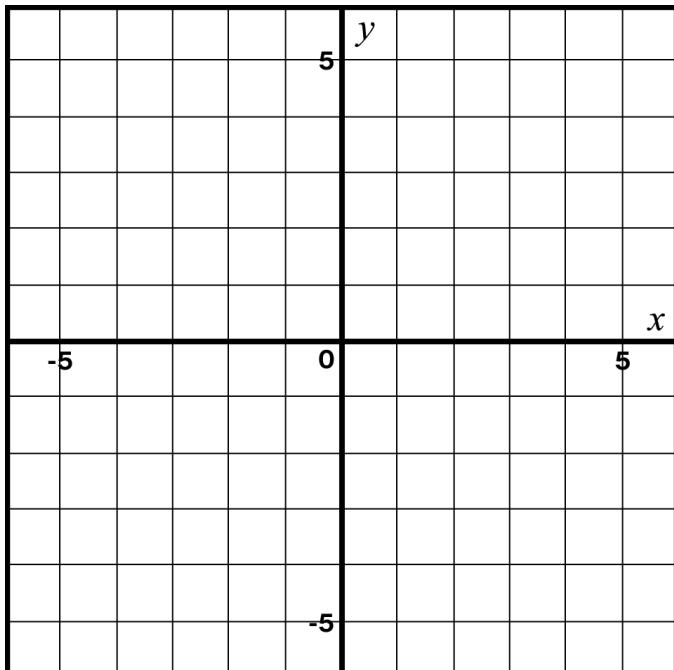
- 1.2 Plot and label the point  $A$  at  $(-2, 1)$ .

- 2.1 Plot the point  $P = (1, -2)$ .

- 2.2 Plot two points that are 3 units away from point  $P$ .

Label each point with its coordinates.

- 2.3 Point  $Q$  is more than 3 units directly to the left of point  $P$ . What do you know about the coordinates of point  $Q$ ?



**Unit 6.7, Lesson 9: Practice Problems**

3. An amusement park ride's height requirement is written as  $h > 42$ , where  $h$  represents a rider's height in inches. Write a sentence or draw a sign that describes these rules as clearly as possible.

Use any strategy to solve each equation.

4.1  $3a = 12$

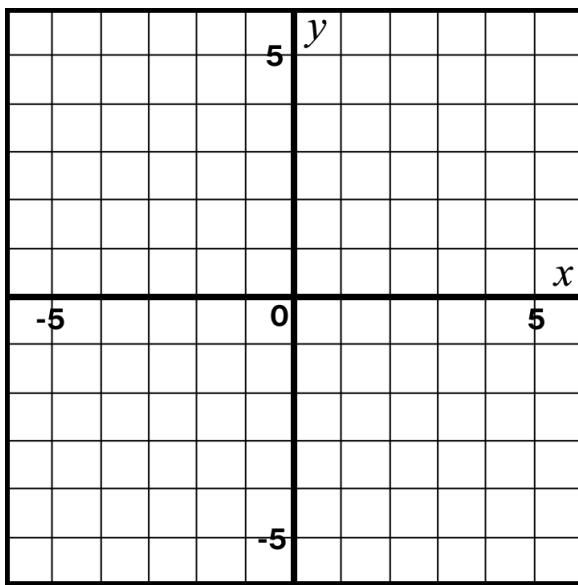
4.2  $b + 3.3 = 8.9$

4.3  $1 = \frac{1}{4} c$

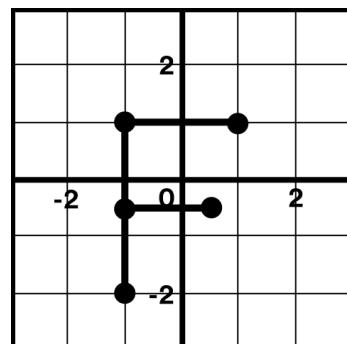
4.4  $2d = 6.4$

## Explore

1. Draw the first letter of your name on the coordinate plane so that at least part of your drawing is in each quadrant (quarter).



### Example Drawing



2. List the coordinates of each point in your drawing so someone else could recreate it.

## Reflect

1. Circle the question you are most interested to know more about.
2. Use the space below to ask one question you have or to share something you are proud of.

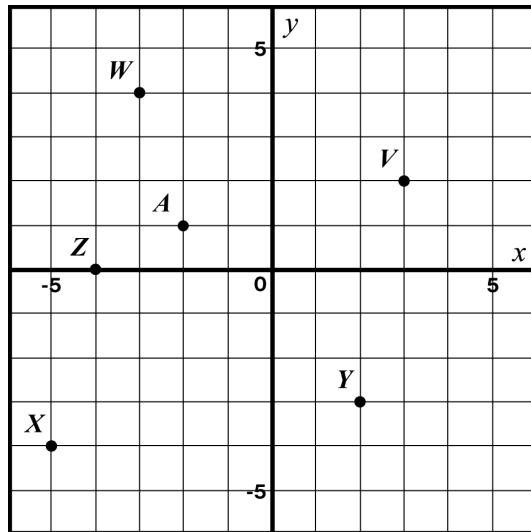
## Warm-Up

 -1 -2 -3 -2.1 -1.8

## Practice

1.1  $V$  (3, 2)       $W$  (-3, 4)       $X$  (-5, -4)       $Y$  (2, -3)       $Z$  (-4, 0)

- 1.2 See the coordinate plane to the right.

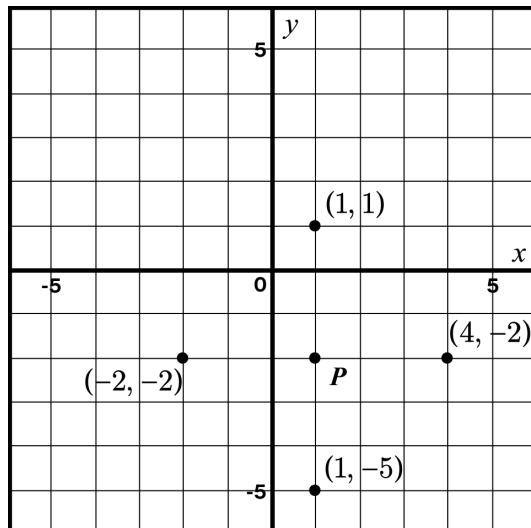


- 2.1 See the coordinate plane to the right.

- 2.2 See the coordinate plane to the right.

- 2.3 Responses vary.

- Both coordinates are negative.
- The  $y$ -coordinate will be  $-2$ .
- The  $x$ -coordinate will be less than the  $y$ -coordinate.
- I know that it will be  $(\#, -2)$  and the number is less than  $-2$ .



3. Responses vary. Anyone over 42 inches tall can ride!

4.1  $a = 4$

4.2  $b = 5.6$

4.3  $c = 4$

4.4  $d = 3.2$

## Explore

Drawings vary.

## Warm-Up

Complete each number sentence with the symbol  $<$ ,  $>$ , or  $=$ .

$$\left| -\frac{3}{2} \right| \underline{\hspace{2cm}} -\frac{2}{3}$$

$$-\frac{3}{2} \underline{\hspace{2cm}} -\frac{2}{3}$$

$$-\frac{3}{2} \underline{\hspace{2cm}} \frac{2}{3}$$

$$\frac{3}{2} \underline{\hspace{2cm}} \left| -\frac{2}{3} \right|$$

## Practice

- 1.1 Plot and connect each coordinate pair in order.

(-2, -9)

(-2, -3)

(-4, -3)

(-6, -1)

(-6, 4)

(-4, 2)

(-2, 4)

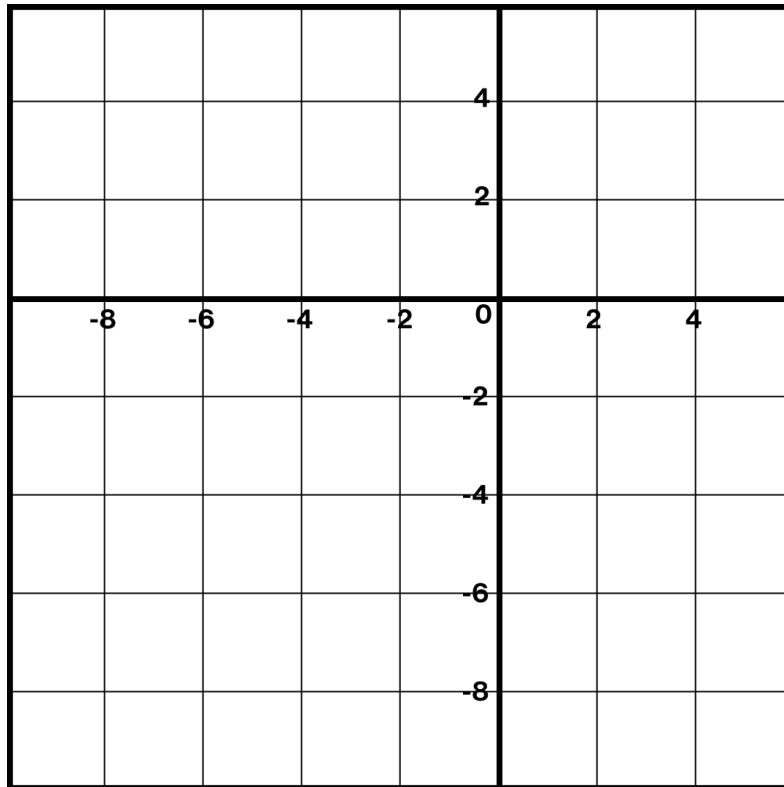
(0, 2)

(2, 4)

(2, -1)

(0, -3)

(-2, -3)



- 1.2 Describe your strategy for plotting the point (-2, -9).

2. Point A is located at (3,  $n$ ). Point B is located at (-3,  $n$ ).

What do you know about points A and B?

**Unit 6.7, Lesson 10: Practice Problems**

- 3.1 DeShawn's dog weighs 34 pounds. Jacy's dog weighs 12 pounds more than DeShawn's dog.  
Select **all** the equations that show the weight of Jacy's dog,  $j$ .

$j = 34 + 12$    $j = 34 - 12$    $j + 12 = 34$    $j - 12 = 34$    $j = 34 \cdot 12$

- 3.2 Use one equation to determine how much Jacy's dog weighs.

- 4.1 Apples cost \$1.60 at the farmers market. They cost 1.5 times as much at the grocery store.  
Select **all** the equations that show the cost of apples at the grocery store,  $g$ .

$g = 1.5 \cdot 1.60$    $g = 1.60 \div 1.5$    $1.5g = 1.60$

$g = 1.5 \div 1.60$    $g \div 1.5 = 1.60$

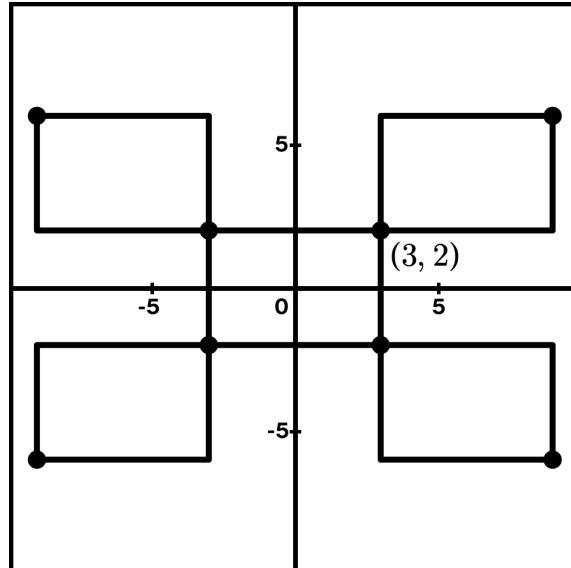
- 4.2 Use one equation to determine how much apples cost at the grocery store.

## Explore

Here are identical rectangles on a coordinate plane.

The origin is in the center of the middle rectangle.

1. Label the coordinates of the remaining points.
2. What patterns do you notice?



## Reflect

1. Put a heart next to the question you are most proud of.
2. Use the space below to ask one question you have or to share something you are proud of.

**Warm-Up**

$$\left| -\frac{3}{2} \right| > -\frac{2}{3}$$

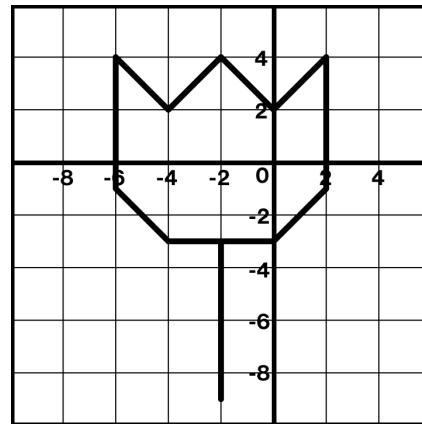
$$-\frac{3}{2} < -\frac{2}{3}$$

$$-\frac{3}{2} < \frac{2}{3}$$

$$\frac{3}{2} > \left| -\frac{2}{3} \right|$$

**Practice**

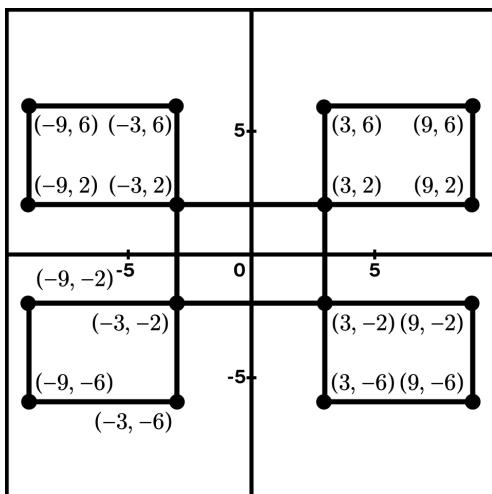
- 1.1 See the coordinate plane on the right.
- 1.2 *Responses vary.* For the  $x$ -coordinate, I counted 2 units to the left of 0. For the  $y$ -coordinate, I knew that  $-9$  is halfway between  $-10$  and  $-8$ .
2. *Responses vary.* The points are a mirror image of each other. One point is on the left half of the graph and one is on the right half of the graph.



- 3.1
- $j = 34 + 12$    $j = 34 - 12$    $j + 12 = 34$    $j - 12 = 34$    $j = 34 \cdot 12$
- 3.2 Jacy's dog weighs 46 pounds.
- 4.1
- $g = 1.5 \cdot 1.60$    $g \div 1.5 = 1.60$
- 4.2 Apples cost \$2.40 at the grocery store.

**Explore**

1.



2. *Responses vary.* The points that are mirror images of each other have similar numbers. For example,  $(2, 3)$  and  $(-2, 3)$  are on opposite sides of the  $y$ -axis.

**Warm-Up**

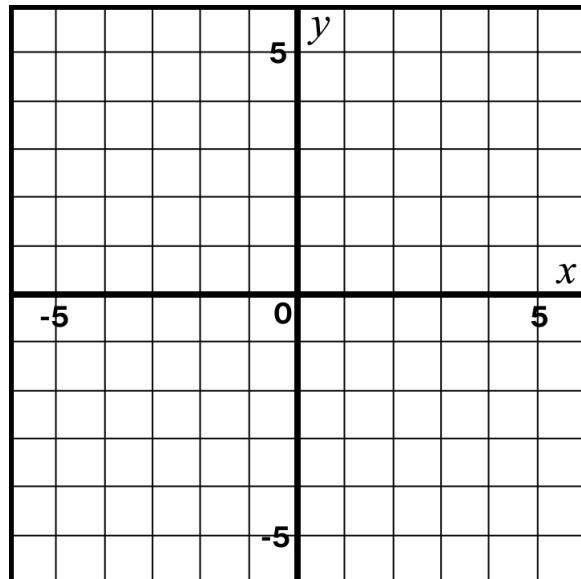
Select **all** of the values of  $x$  that are solutions to the inequality  $-0.5 > x$ .

 0 -1 -0.40 -0.6 -0.55**Practice**

- 1.1 Plot and label each point.

Connect the points in order to create a polygon.

Point	Coordinates
A	(-3, 1)
B	(3, 1)
C	(3, -4)
D	(-1, -4)
E	(-1, -2)
F	(-3, -2)



- 1.2 What is the length of the segment between A and B?

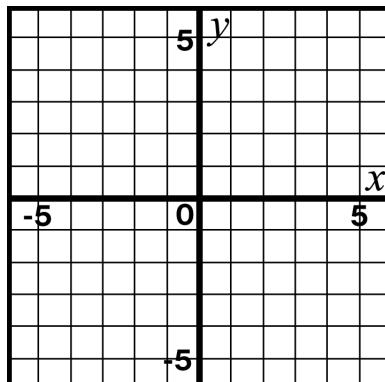
- 1.3 Determine the perimeter of the polygon.

Three points of a rectangle are (3, 0), (3, -5), and (-4, -5).

- 2.1 What are the coordinates of the missing point?

- 2.2 What is the perimeter of the rectangle?

- 2.3 What is the area of the rectangle?



**Unit 6.7, Lesson 11: Practice Problems**

Decide if each quotient is greater than, less than, or equal to 1. Then determine its value.

3.1  $\frac{1}{5} \div 5$

3.2  $\frac{12}{5} \div \frac{3}{5}$

3.3  $\frac{3}{5} \div \frac{5}{3}$

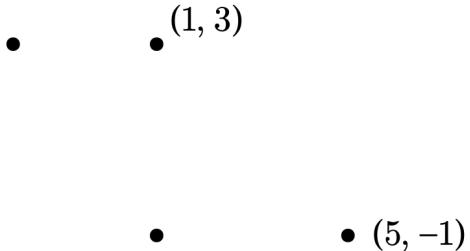
3.4  $\frac{3}{5} \div \frac{3}{5}$

4. At top speed, an elephant can run 25 miles per hour. A giraffe can run 16 miles in  $\frac{1}{2}$  an hour. Which animal runs faster? Explain your reasoning.

**Explore**

Here are some points on a coordinate plane.

1. Draw in the approximate location of the missing axes.
2. Determine the rest of the coordinates.
3. Connect the points in any order to create a polygon.

**Reflect**

1. Put a star next to the question you spent the most time on.
2. Use the space below to ask one question you have or to share something you are proud of.

## Warm-Up

 0 -1 -0.40 -0.6 -0.55

## Practice

1.1 See the coordinate plane on the right.

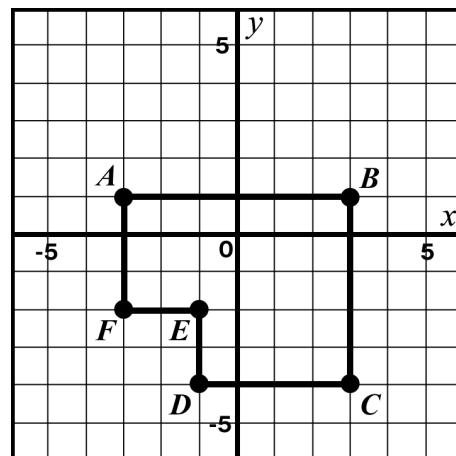
1.2 6 units

1.3 22 units

2.1  $(-4, 0)$ 

2.2 24 units

2.3 35 square units



3.1 Less than 1

$$\frac{1}{25}$$

3.2 Greater than 1

$$\frac{4}{ }$$

3.3 Less than 1

$$\frac{9}{25}$$

3.4 Equal to 1

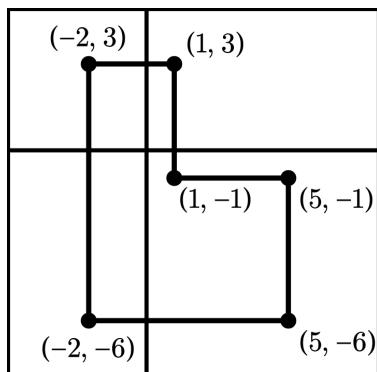
$$\frac{1}{ }$$

4. Giraffe

*Explanations vary.*

- If the elephant can go 25 miles in one hour, then it can go  $25 \div 2 = 12.5$  miles in  $\frac{1}{2}$  hour. The giraffe goes more miles in the same amount of time, so it is faster.
- The giraffe would move 32 miles per hour because  $\frac{1}{2} \cdot 2 = 1$  and  $16 \cdot 2 = 32$ . This is faster than the elephant.

## Explore

*Polygons vary.*



## Unit 6.8, Lesson 2: Practice Problems

Name \_\_\_\_\_

### Warm-Up

Here are three animals.

Squirrel

Giraffe

Dog

Here are their heights. Match each animal with the height that makes sense.

15 centimeters

15 inches

15 feet

\_\_\_\_\_

\_\_\_\_\_

\_\_\_\_\_

### Practice

5 sixth-grade students at a school were each asked the following survey questions.

- A. What grade are you in?
- B. How many books did you read in the last year?
- C. How many inches are in 1 foot?
- D. How many dogs and cats do you have?

Their answers are shown below. Match each question with the data it produced.

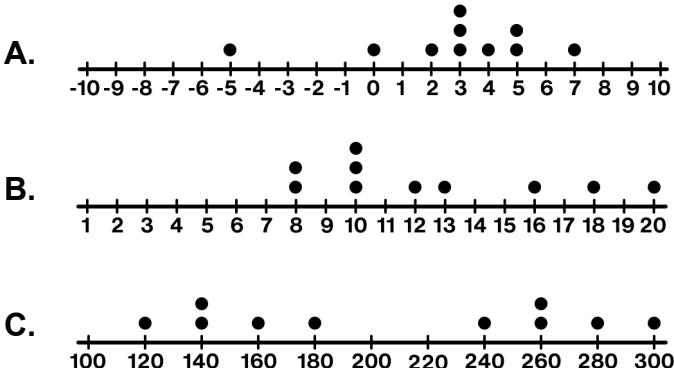
	Question	Diya	Peter	Tiana	Marc	Callen
1.1		0	1	1	3	0
1.2		12	12	12	12	12
1.3		6	6	6	6	6
1.4		11	5	18	20	9

- 2. How are questions A and C different from the other questions?

## Unit 6.8, Lesson 2: Practice Problems

- 3.1 Anya asked 10 students how many minutes it takes them to get to school each morning.

Which dot plot could represent the data that Anya collected?



- 3.2 Select a dot plot that could **not** represent Anya's data. Explain your thinking.

4. Order these numbers from least to greatest.

$|-17|$

$|-18|$

-18

$|19|$

20

Least

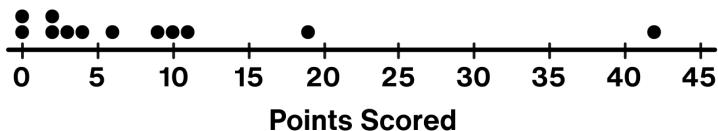
\_\_\_\_\_

Greatest

## Explore

This dot plot represents the points scored by 12 players on a basketball team during an important game.

Write a story about the basketball game.



## Reflect

1. Put a circle next to a question you are still curious about.
2. Use the space below to ask one question you have or to share something you are proud of.

**Warm-Up**

15 centimeters

15 inches

15 feet

Squirrel

Dog

Giraffe

**Practice**

1.1 Question D

1.2 Question C

1.3 Question A

1.4 Question B

2. *Explanations vary.* Questions A and C have only one correct answer. The other questions have lots of different possible answers.

3.1 B

3.2 *Responses and explanations vary.*

- Dot Plot A cannot represent Anya's data because it would not make sense for someone to take -5 minutes to get to school.
- Dot Plot C would not make sense because 300 minutes is 5 hours, which is probably too long for the time it takes for someone to get to school.

4.      **Least**            -18            |-17|            |-18|            |19|            20            **Greatest****Explore***Responses vary.*

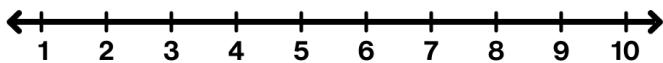
It was the championship game for the Des-Bears basketball team. They decided to try a new strategy where most of the team would pass the ball to the best shooter on the team.

Many players ended up scoring fewer than 10 points. But the best shooter on the team scored more than 40 points. It was a new school record that helped the Des-Bears win the championship game!

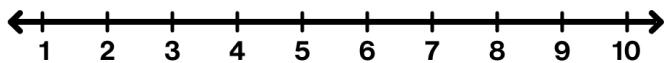
**Warm-Up**

Graph the inequalities on a number line.

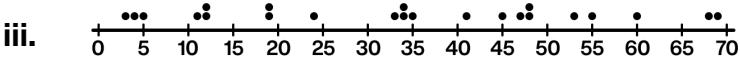
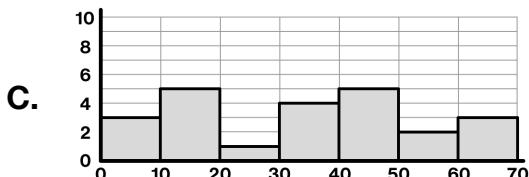
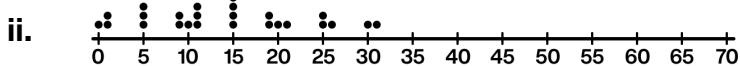
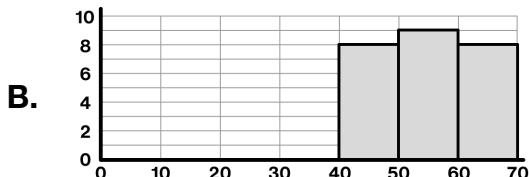
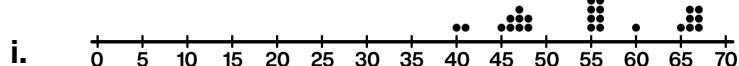
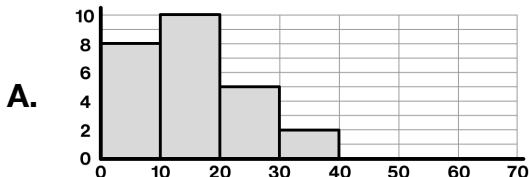
$m > 6$



$3 > n$

**Practice**

- 1.1 Draw a line to match each histogram with the dot plot that represents the same data set.



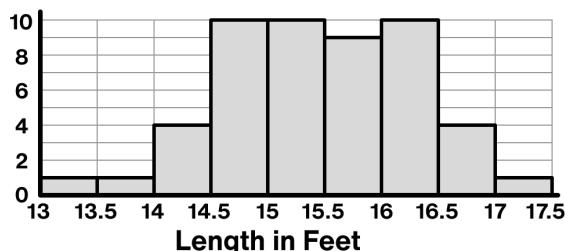
- 1.2 Ramon went to a family reunion. He made a histogram of the ages of everybody there. Which histogram above could represent this data?

Explain your thinking.

**Unit 6.8, Lesson 5: Practice Problems**

A marine biologist is studying a group of sharks. She made a histogram of the lengths of a group of adult sharks.

Determine if each statement is true or false.



- |  |      |       |
|--|------|-------|
| 2.1 A total of 9 sharks were measured.                     | True | False |
| 2.2 Two of the sharks are less than 14 feet long.          | True | False |
| 2.3 A typical shark is about 14.5 to 16.5 feet long.       | True | False |
| 2.4 The longest shark measured was 10 feet long.           | True | False |
| 2.5 Explain your thinking for one of the false statements. |      |       |

Determine the quotients.

3.1  $\frac{2}{5} \div 2$

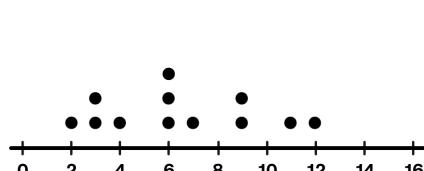
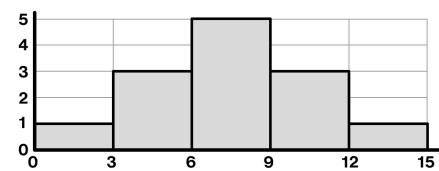
3.2  $\frac{2}{5} \div 5$

3.3  $2 \div \frac{2}{5}$

**Explore**

Here are three representations of the same data set.

2, 3, 3, 4, 6, 6, 6, 7, 9, 9, 11, 12



One representation has an error. Find what's wrong and fix it.

**Reflect**

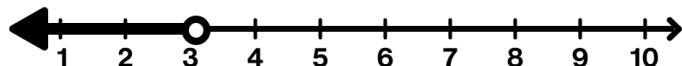
- Put a heart next to the question you are most proud of.
- Use the space below to ask one question you have or to share something you are proud of.

## Warm-Up

$$m > 6$$



$$3 > n$$



## Practice

1.1 A and ii.

B and i.

C and iii.

1.2 *Responses and explanations vary.* Histogram C has a large spread, which means a mix of old and young people. The other histograms are either just younger people or just older people, which would not be accurate for a family reunion.

2.1 False

2.2 True

2.3 True

2.4 False

2.5 *Responses vary.*

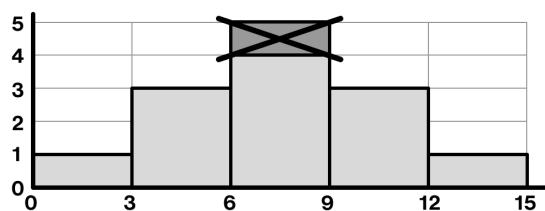
- There are 9 bins, but that does not mean 9 sharks were measured. If you add up the number of sharks in each bin, you will know the total number of sharks measured.
- The tallest bin is 10 units, but that represents how many sharks are in that bin, not the length.

3.1  $\frac{1}{5}$

3.2  $\frac{2}{25}$

3.3 5

## Explore



## Warm-Up

Select **all** of the values of  $x$  that are solutions to the inequality  $x > -3$ .

 -2  $|-4|$  -4 3.5 -3.5

## Practice

1. A preschool teacher plans to reorganize these 4 boxes of playing blocks so that each box contains an equal number of blocks.

Box 1	Box 2	Box 3	Box 4
32 blocks	18 blocks	41 blocks	9 blocks

How could they determine the number of blocks to put in each box?

2. 3 classes worked together to raise money for their classroom libraries and agreed to share the money equally. The first class raised \$25.50, the second class raised \$49.75, and the third class raised \$37.25.

What is each class's equal share? Explain or show your reasoning.

3. Kimaya guesses that 11 is the mean of this data set.

8	7	11	7	6	12
---	---	----	---	---	----

Without calculating, determine if Kimaya's guess could be correct. Explain your thinking.

**Unit 6.8, Lesson 7: Practice Problems**

For the past 12 school days, Mai has recorded how long her bus rides to school take in minutes. The times she recorded are shown in the table.

9	12	6	9	10	7	6	12	9	8	10	10
---	----	---	---	----	---	---	----	---	---	----	----

4.1 Find the mean for Mai's data. Show or explain your thinking.

4.2 What does the mean tell us about Mai's trip to school?

Evaluate the expression  $4x^3$  for each value of  $x$ .

5.1 1

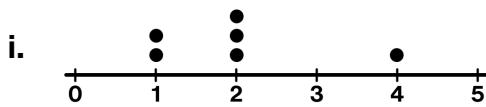
5.2 2

5.3  $\frac{1}{2}$

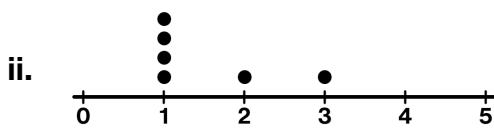
## Explore

Select the dot plot that matches each statement. You can only select a dot plot once.

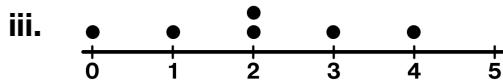
- A. The mean is 2.



- B. Only one value is greater than the mean.



- C. Two values are greater than the mean.



## Reflect

- Put a question mark next to a question you were feeling stuck on.
- Use the space below to ask one question you have or to share something you are proud of.

**Warm-Up**

✓ -2      ✓ |-4|      ✓ 3.5

**Practice**

1. The teacher could add up all of the blocks together and then divide that number by 4.

2. \$37.50

*Explanations vary.* 
$$\frac{25.50+49.75+37.25}{3} = \frac{112.50}{3}$$
 or \$37.50.

3. No.

*Explanations vary.* Most of the numbers are less than 11 and the only number bigger than 11 is 12. So the mean is probably less than 11.

4.1 9 minutes

*Explanations vary.* 
$$\frac{9+12+6+9+10+7+6+12+9+8+10+10}{12} = \frac{108}{12}$$
 or 9.

4.2 *Responses vary.* The mean tells us that it takes Mai 9 minutes to get to school on most days.

5.1 4

5.2 32

5.3  $\frac{1}{2}$

**Explore**

**A.** and **iii.**

**B.** and **i.**

**C.** and **ii.**

**Warm-Up**

Select **all** the expressions that are equivalent to  $2(6 + 3x)$ .

- $8 + 5x$       $12x + 6$       $12 + 6x$       $6(2 + x)$       $2(9x)$

**Practice**

This table shows the amount of time it takes 6 students to get to school. They have a mean travel time of 22 minutes.

- 1.1 Calculate the absolute deviation of each value from the mean.

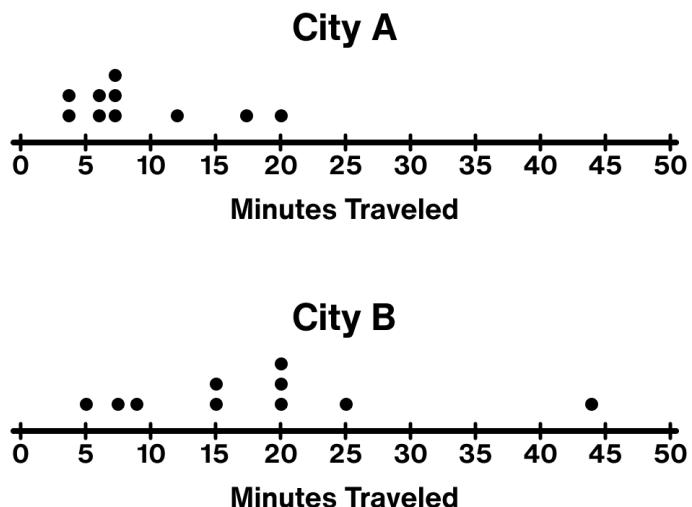
Time (minutes)	10	10	18	20	30	44
Absolute Deviation (distance from 22)						

- 1.2 Calculate the *mean absolute deviation (MAD)* of this data set.

These dot plots show the travel times for 10 students from two cities.

- 2.1 The MADs have been calculated for you. Match each MAD to the correct data set.

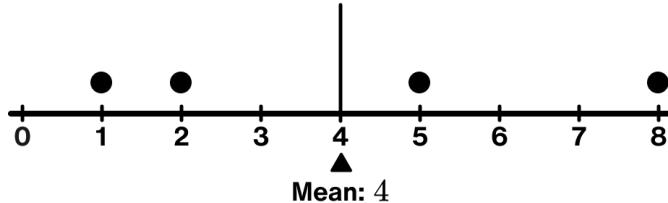
MAD	City
4.4	
7.8	



- 2.2 Without calculating, explain how you matched the MADs to the data sets.

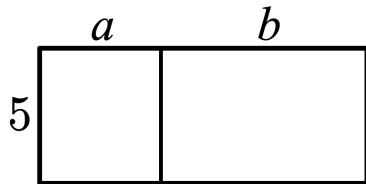
**Unit 6.8, Lesson 9: Practice Problems**

3. Calculate the MAD of this data set. Use the table if it helps with your thinking.



Data Point				
Absolute Deviation (distance from 4)				

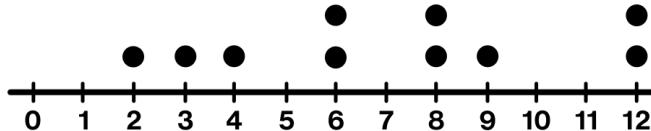
4. Select **all** the expressions that represent the total area of the rectangle.



- $5(a + b)$       $5 + ab$       $5a + 5b$       $2(5 + a + b)$       $5ab$

**Explore**

Remove points from this dot plot so that the mean is 8. For an additional challenge, remove as few dots as possible.

**Reflect**

1. Put a circle next to a question you are still curious about.
2. Use the space below to ask one question you have or to share something you are proud of.

## Warm-Up

✓  $12 + 6x$       ✓  $6(2 + x)$

## Practice

1.1

Time (minutes)	10	10	18	20	30	44
Absolute Deviation (distance from 22)	12	12	4	2	8	22

1.2

$$\frac{12+12+4+2+8+22}{6} = \frac{60}{6} \text{ or } 10$$

2.1

MAD	City
4.4	A
7.8	B

- 2.2 *Explanations vary.* I knew the larger MAD had to go with City B because the data is more spread out than City A.

3.

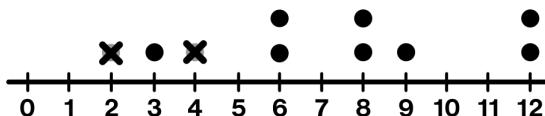
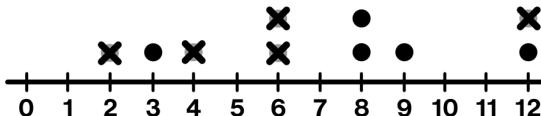
Data Point	1	2	5	8
Absolute Deviation (distance from 4)	3	2	1	4

$$\frac{3+2+1+4}{4} = \frac{10}{4} \text{ or } 2.5$$

4. ✓  $5(a + b)$       ✓  $5a + 5b$

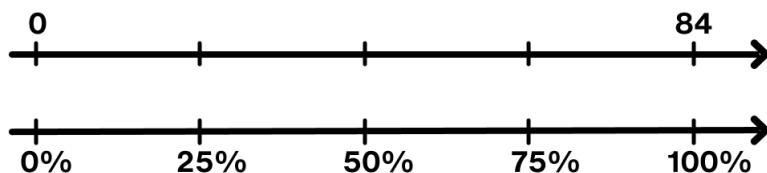
## Explore

Responses vary.



## Warm-Up

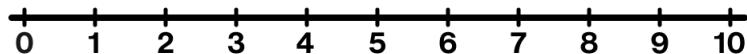
Use this double number line to determine 25%, 50%, and 75% of 84.



## Practice

- 1.1 Make a dot plot of this data.

1	6	7	6	2	9	3
---	---	---	---	---	---	---

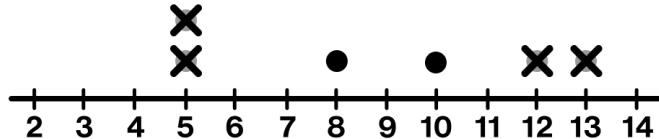


- 1.2 Determine the median of the data.

Kayla wants to determine the median of the data in this dot plot.

She started solving the problem but wasn't sure what to do next.

- 2.1 What advice would you give Kayla?



- 2.2 What is the median of this data?

3. Pilar recorded the number of points she scored in her last 7 basketball games.

She says that the median score was 8 points.

Is Pilar correct? Explain your thinking.

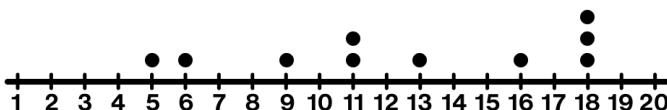


## Unit 6.8, Lesson 11: Practice Problems

4. Match each dot plot with its median.

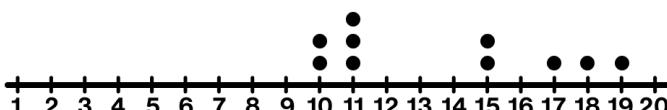
A. Median: 15

i.



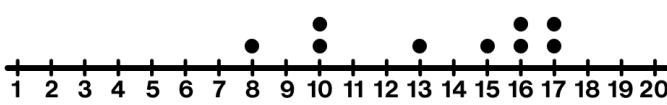
B. Median: 12

ii.



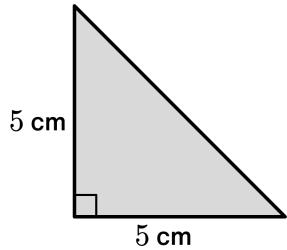
C. Median: 13

iii.

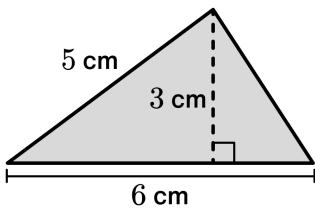


Find the area of each triangle.

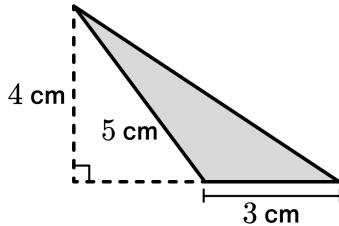
5.1



5.2

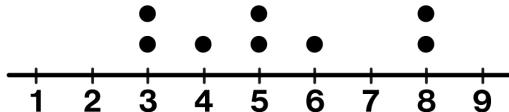


5.3

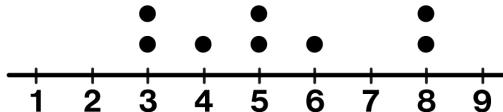


## Explore

Add points to this dot plot such that the median is 4.

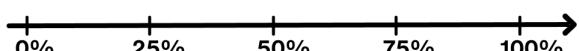
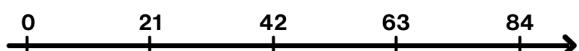


Remove points from this dot plot such that the median is 4.

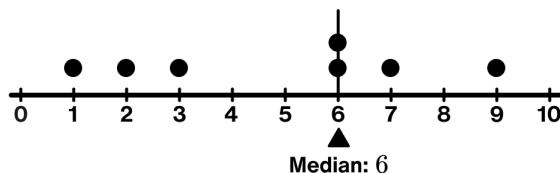


## Reflect

- Put a heart next to the question you are most proud of.
- Use the space below to ask one question you have or to share something you are proud of.

**Warm-Up****Practice**

1.1



1.2 6

2.1 I would tell Kayla that the median is the middle value of a data set. Since there are an even number of points, Kayla should find the middle value between 8 and 10.

2.2 The median is 9.

3. I disagree with Pilar because 8 is not the middle value, it is just the middle of this list. To find the middle value of those numbers, she should rewrite the numbers in order from smallest to largest first.

4. **A and iii**  
**B and i**  
**C and ii**

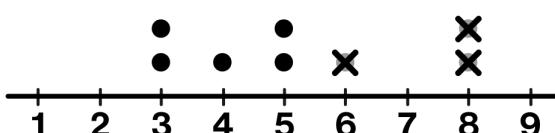
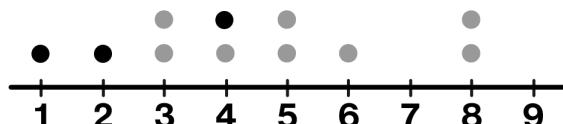
5.1 12.5 sq. cm

5.2 9 sq. cm

5.3 6 sq. cm

**Explore**

Responses vary.



## Warm-Up

Complete each statement.

25% of 40 is \_\_\_\_\_.

25% of 120 is \_\_\_\_\_.

25% of 90 is \_\_\_\_\_.

## Practice

Here are the ages of 20 people at a family reunion, ordered from youngest to oldest.

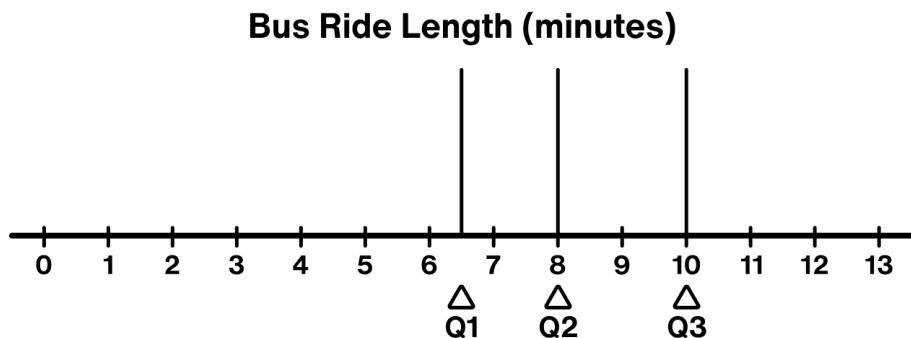
3	8	9	10	11	11	12	18	18	28	30	35	37	40	53	54	58	65	70	72
---	---	---	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----

- 1.1 The value of quartile 2 (Q2) is 29. Explain what the number 29 tells us about the people at the family reunion.
  
- 1.2 Determine the value of quartile 1 (Q1) and quartile 3 (Q3).

Quartile 1 (Q1): \_\_\_\_\_

Quartile 3 (Q3): \_\_\_\_\_

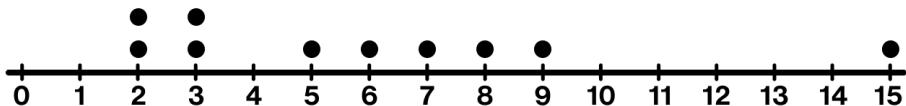
Haru recorded how long his bus ride to school took for 16 days. Here are the values of the quartiles.



- 2.1 **About how many** rides would you expect to be **less** than 6.5 minutes long?
  
- 2.2 **About how many** rides would you expect to be **less** than 10 minutes long?
  
- 2.3 **About what percent** of the rides would you expect to be between 6.5 minutes and 10 minutes long?

**Unit 6.8, Lesson 13: Practice Problems**

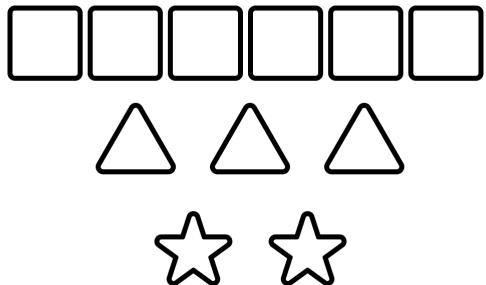
3. Here is a dot plot with 10 points. Use this dot plot to complete the table below.



Median	Q1	Q3

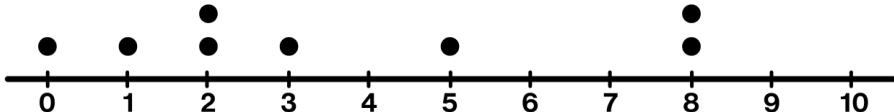
Answer the questions based on this picture.

- 4.1 The ratio of squares to stars is \_\_\_\_ to \_\_\_\_.
- 4.2 The ratio of stars to triangles is \_\_\_\_ : \_\_\_\_.
- 4.3 For every 2 triangles, there are \_\_\_\_\_ squares.



## Explore

Add 5 points to the dot plot without changing the interquartile range (IQR).



## Reflect

1. Put a star next to a question you are still curious about.
2. Use the space below to ask one question you have or to share something you are proud of.

**Warm-Up**

25% of 40 is 10.

25% of 120 is 30.

25% of 90 is 22.5.

**Practice**

1.1 29 years is the value of quartile 2, which means that about half of the people at the family reunion are younger than 29 and about half are older than 29.

1.2 Quartile 1 (Q1): 11      Quartile 3 (Q3): 53.5

2.1 About 4 bus rides

2.2 About 12 bus rides

2.3 About 50% of the rides

3.

Median	Q1	Q3
5.5	3	8

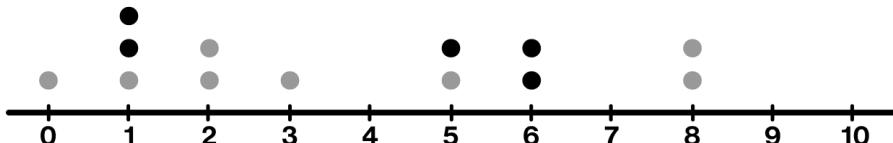
4.1 3 to 1 (or equivalent)

4.2 2 to 3

4.3 4 squares

**Explore**

Responses vary.



## Warm-Up

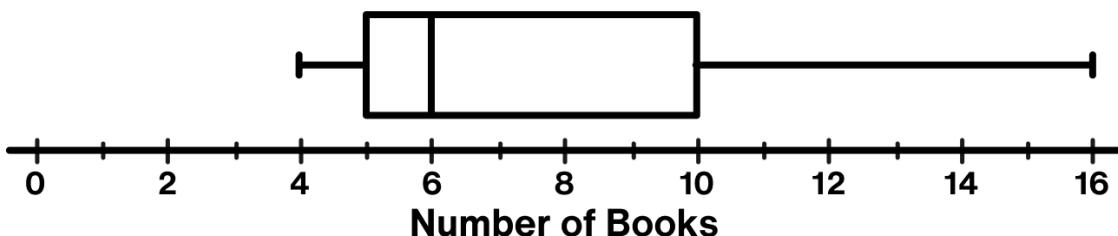
Which has the largest value?

- A. 25% of 80      B. 100% of 60      C. 75% of 100      D. 50% of 120

## Practice

Each student in a class recorded how many books they read in a school year.

Here is a box plot that summarizes their data.



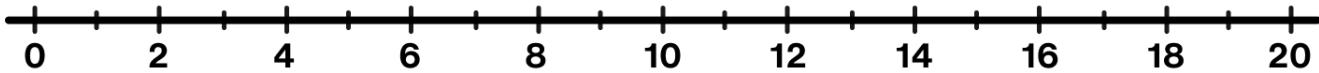
1.1 What is the greatest number of books that a student read this year? \_\_\_\_\_

1.2 What is the median of this data? \_\_\_\_\_

1.3 What is the range of this data? \_\_\_\_\_

2.1 Sketch a box plot that meets this description.

Minimum: 4	Q1: 6	Median: 9	Q3: 13	Maximum: 19
------------	-------	-----------	--------	-------------



2.2 What is the interquartile range (IQR) of this data? \_\_\_\_\_

**Unit 6.8, Lesson 14: Practice Problems**

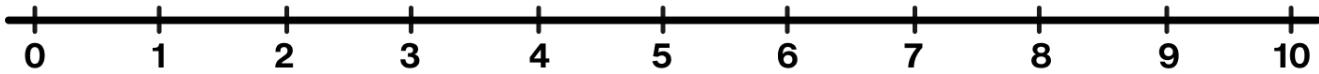
A group of seventh-grade students recorded the number of hours they spent doing homework in one week. Here is the data listed from least to greatest.

3	4	5	5	6	7	7	9	9	10
---	---	---	---	---	---	---	---	---	----

- 3.1 Complete the table based on this data.

Minimum	Q1	Median	Q3	Maximum

- 3.2 Sketch a box plot of this data.



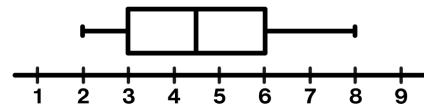
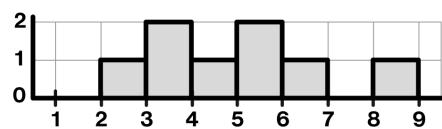
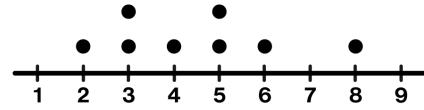
4. Select all of the values of  $m$  that are solutions to the inequality  $m > -4$ .

- 4.5       -8       3       -4.5       -2

## Explore

Here are three representations of the same data set. One representation has a mistake.

Determine the incorrect representation and fix the mistake.



## Reflect

- Circle the question you feel most confident about.
- Use the space below to ask one question you have or to share something you are proud of.

**Warm-Up**

C. 75% of 100

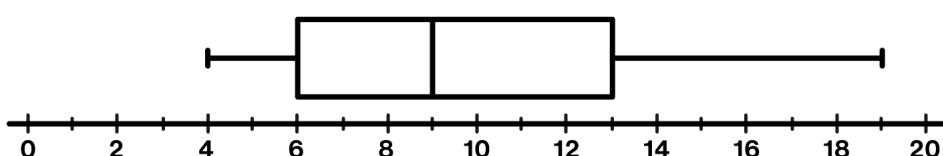
**Practice**

1.1 16 books

1.2 6 books

1.3 12 books

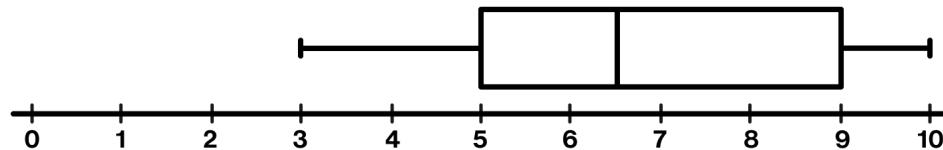
2.1



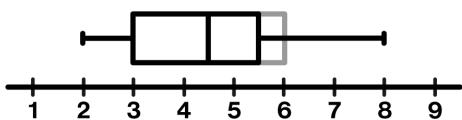
2.2 IQR: 7

3.1	Minimum	Q1	Median	Q3	Maximum
	3	5	6.5	9	10

3.2



4.  $\sqrt{4.5}$        $\sqrt{3}$        $\sqrt{-2}$

**Explore**

## Warm-Up

Calculate the mean of each data set.

8, 9, 9, 9, 10

2, 6, 12, 16

5, 6, 12, 13

## Practice

1. Select **all** the measures of center.

Mean     IQR  
(interquartile range)     MAD  
(mean absolute deviation)     Median     Range

You wonder: *How much time do seventh graders at my school spend outdoors on a typical day?*

- 2.1 What is the **population** for your question?

- 2.2 Select all possible **samples** that are part of the population for your question.

- A. The 20 students in a seventh grade math class
- B. The first 20 people to arrive at your middle school on a particular day
- C. The seventh graders participating in a science fair with students from four middle schools
- D. The 10 seventh graders on the school soccer team
- E. The students on the high school debate team

- 2.3 Select two samples from above and list **another possible population** each sample could belong to.

Sample:

Possible population:

Sample:

Possible population:

**Unit 7.8, Lesson 10: Practice Problems**

3. There are 50 marbles in a bag. Students picked a marble, recorded its color, and put it back in. Each student separately carried out a different number of experiments. Here are their results:

- **Student 1:** In 4 experiments, they picked a green marble 1 time.
- **Student 2:** In 12 experiments, they picked a green marble 5 times.
- **Student 3:** In 9 experiments, they picked a green marble 3 times.

Estimate the probability of getting a green marble from this bag. Explain your reasoning.

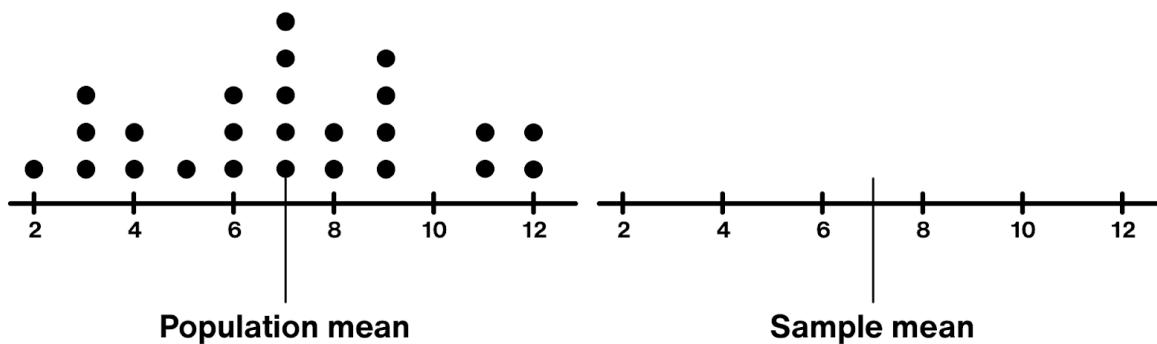
A bookstore has discounted the price for all books by 15%.

- 4.1 How much is the discount on a book that normally costs \$18?
- 4.2 After the discount, how much would the book cost?

## Explore

Create a dot plot of a sample of the population whose mean is the same as the population mean.

Your sample should have more than six, but fewer than 20 data points.



## Reflect

1. Circle one problem, word, or concept you want to know more about.
2. Use the space below to ask one question you have or to share something you are proud of.

**Warm-Up**

9, 9, 9

**Practice**

1. ✓ Mean  
✓ Median

2.1 Seventh graders at my school

2.2 ✓ A. The 20 students in a seventh grade math class  
✓ D. The 10 seventh graders on the school soccer team

2.3 *Responses vary.*

Sample: A

Possible population: All of the students in all math classes

Sample: B

Possible population: All of the people who visit the middle school

3. *Responses vary.*

$$\frac{9}{25}$$

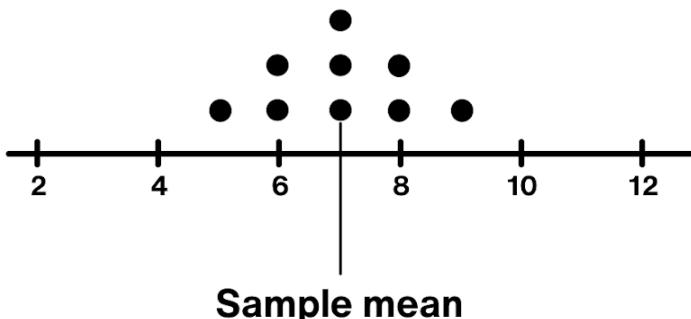
In a total of 25 experiments, the students picked a green marble 9 times.

4.1 \$2.70

4.2 \$15.30

**Explore**

*Responses vary.*



## Warm-Up

Determine the value of each quotient.

$$34\,000 \div 10$$

$$340 \div 100$$

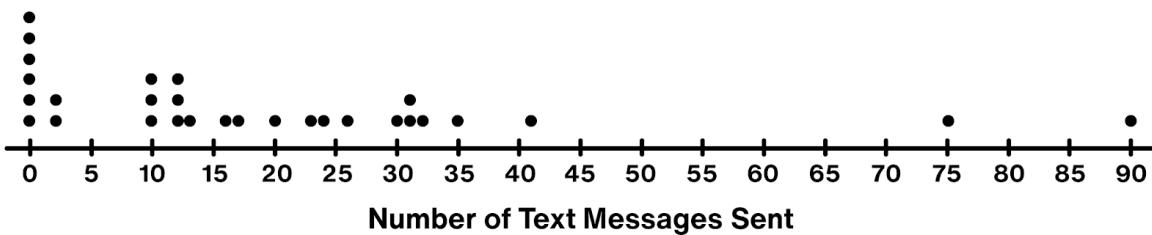
$$34 \div 10$$

$$3.4 \div 100$$

## Practice

1. Select **all** the reasons why random samples tend to produce a more representative sample.
  - You can determine how many people you want in the sample.
  - It is the easiest way to select a sample from a population.
  - It avoids the bias that can occur with other sampling methods.
  - Each person in the population has an equal chance of being selected.
  - The sample mean will always be the same as the population mean.
  
2. Jada wants to learn about the percentage of students who like the food in the cafeteria. Jada asks the first 25 students who purchase lunch at the cafeteria if they like the food.  
Is Jada's method likely to produce a representative sample? Explain your reasoning.

This is a dot plot of the number of text messages sent on one day for a sample of students at a high school. 30 random students were sampled.



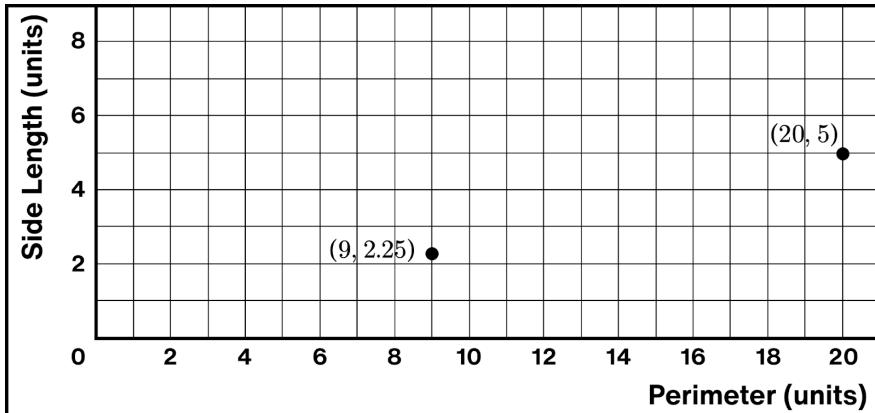
- 3.1 What do the six dots at 0 on the dot plot represent?
  
- 3.2 Since this sample is representative of the population, describe what a dot plot for the entire high school might look like.



## Unit 7.8, Lesson 11: Practice Problems

This graph shows the side length of a square vs. its perimeter. A couple of points are plotted.

- 4.1 Plot and label at least two more points on the graph.



- 4.2 Is there a proportional relationship between the perimeter and side length? Explain how you know.

## Explore

Write a question you're interested in finding the answer to.

What is the population for your question?

Describe a strategy to get an **unfair sample** to answer your question.

Describe a strategy to get a **random sample** to answer your question.

## Reflect

1. Put a heart next to the question you are most proud of.
2. Use the space below to ask one question you have or to share something you are proud of.

**Warm-Up**

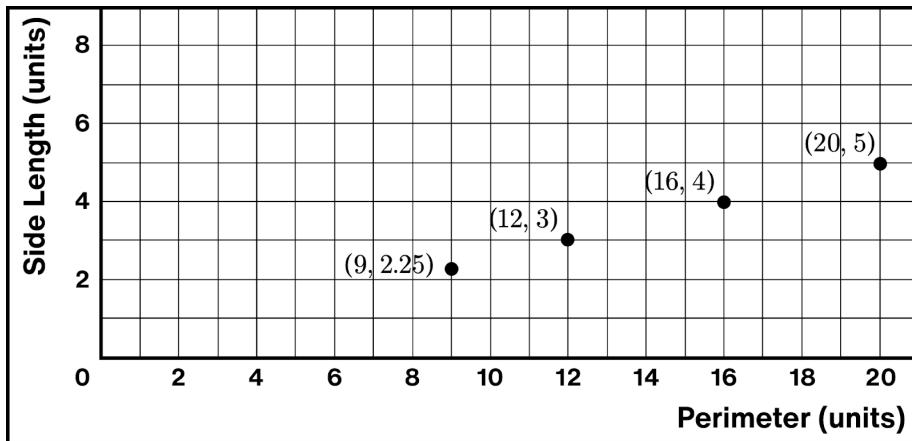
3400 , 3.4 , 3.4 , 0.034

**Practice**

1. ✓ It avoids the bias that can occur with other sampling methods.  
✓ Each person in the population has an equal chance of being selected.
2. No.

*Explanations vary.* It is likely that the first 25 students like the food at the cafeteria and are an unfair representation of the population. Jada is also not asking any students who have decided not to purchase lunch from the cafeteria.

- 3.1 Students who did not send any text messages on one day.
- 3.2 *Responses vary.* The dot plot would have a similar shape to the sample except with many more points. There would be many students sending fewer than 15 text messages and a small number of students sending more than 35 text messages.
- 4.1 *Responses vary.*



- 4.2 Yes.

*Responses vary.* The side length of a square is always one-quarter the length of its perimeter.

**Explore***Responses vary.*

Question: What do people prefer as a pet: cats or dogs?

Population: My neighborhood

Unfair sample: People at a dog park

Random sample: One house on each block in my neighborhood

## Warm-Up

Complete the table so that each column has the same value.

Fraction	$\frac{2}{5}$		$\frac{3}{10}$	
Decimal		0.75		0.125
Percent	40%	75%		

## Practice

Faaria and Ariel wondered what proportion of students at school would dye their hair blue. They each surveyed a different random sample of the students at school.

- 1.1 Faaria asked 10 students, and 2 of them said they would. Based on Faaria's sample, what proportion of the students would dye their hair blue?
  
- 1.2 Ariel asked 100 students, and 17 of them said they would. Based on Ariel's sample, what proportion of the students would dye their hair blue?
  
- 1.3 Whose proportion is likely to be closest to the proportion of all the students?  
Explain how you know.

In a school of 580 students, one class was asked which hand they write with. “L” means they use their left hand, and “R” means they use their right hand.

Here are the results: L, R, R, R, R, R, R, R, R, L, R, R, R, R, R.

- 2.1 Based on this sample, estimate the **proportion** of students at the school who write with their left hand.
  
- 2.2 Estimate the **number** of students at the school who write with their left hand.

**Unit 7.8, Lesson 12: Practice Problems**

- 2.3 A different class of 18 students is surveyed. Estimate how many write with their left hand.

Match each expression in the first list with an equivalent expression from the second list.

3.1  $(8x + 6y) - (2x + 4y)$       a.  $10x - 10y$

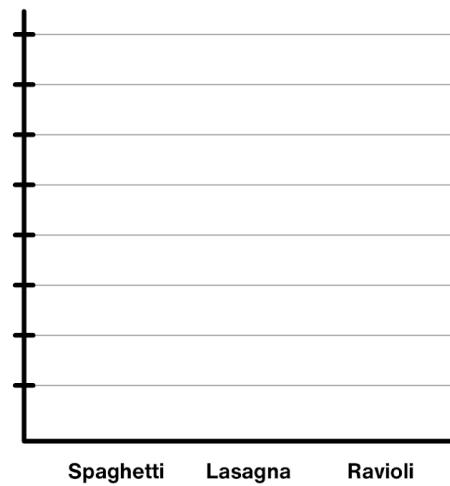
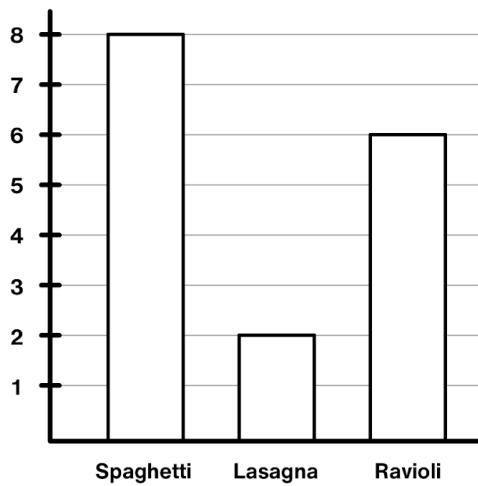
3.2  $(8x + 6y) - (2x - 4y)$       b.  $10x - 2y$

3.3  $8x - 6y - (-2x + 4y)$       c.  $6x + 2y$

3.4  $8x - 6y - (-2x - 4y)$       d.  $6x + 10y$

## Explore

16 students at a school were asked about their favorite pasta dish. Create a bar graph showing the possible results for all 400 students in the school. Be sure to label the vertical axes.



## Reflect

1. Put a smiley face next to the question you are most confident about.
2. Use the space below to ask one question you have or to share something you are proud of.

## Warm-Up

<b>Fraction</b>	$\frac{2}{5}$	$\frac{3}{4} *$	$\frac{3}{10}$	$\frac{1}{8} *$
<b>Decimal</b>	0.4	0.75	0.3	0.125
<b>Percent</b>	40%	75%	30%	12.5%

\* (or equivalent)

## Practice

1.1 20%

1.2 17%

1.3 Ariel

*Explanations vary.* Ariel's sample is much larger than Faaria's. The larger the random sample, the closer it usually represents the actual population.

2.1 About 13.3%

2.2 77 students

2.3 2 students

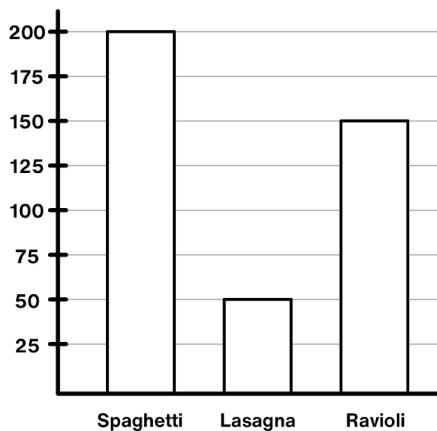
3.1 c.  $6x + 2y$

3.2 d.  $6x + 10y$

3.3 a.  $10x - 10y$

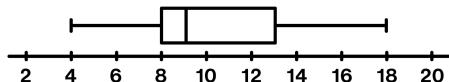
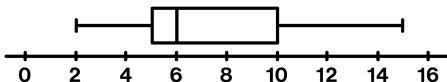
3.4 b.  $10x - 2y$

## Explore



## Warm-Up

Determine the IQR (interquartile range) for each box plot.



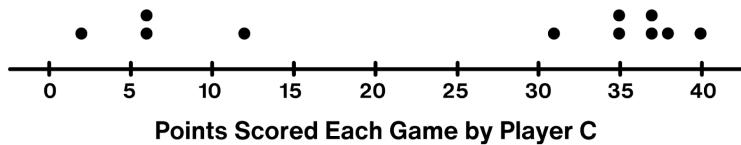
## Practice

A basketball coach is trying to determine the Most Valuable Player.

The points scored in each game for two of the players he is considering is below:

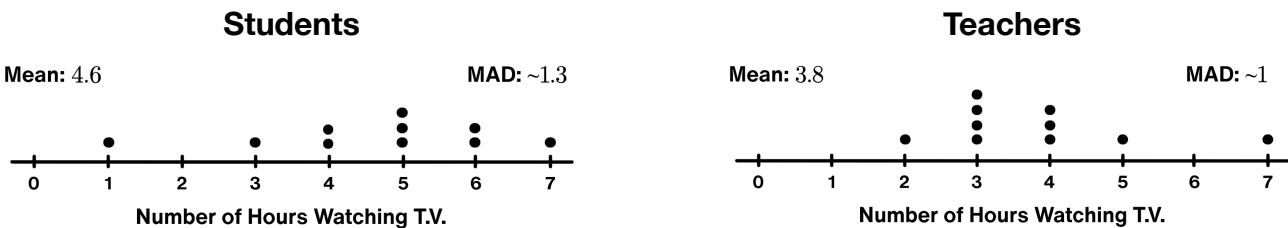
	Points Scored Each Game
Player A	18, 21, 22, 22, 23, 23, 23, 23, 24, 24, 30
Player B	14, 20, 20, 21, 23, 23, 23, 23, 24, 27, 35

- 1.1 Which player has the higher median?
  - 1.2 Determine the IQR of each player's scores.
  - 1.3 Between these two players, which player should receive the award? Use at least one piece of evidence to support your claim.



**Unit 7.8, Lesson 14: Practice Problems**

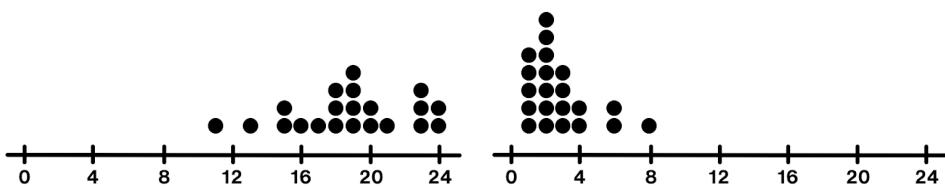
Abdullah compared the time spent watching T.V. by students and teachers over the weekend. He took a random sample of 10 students and 10 teachers and plotted their responses.



- 2.1 Is there a big difference between students' data and teacher's data? Use at least one piece of evidence to support your claim.
  
  
  
  
  
- 2.2 Abdullah took a random sample of 10 parents and found that they watched a mean of 2.5 hours of T.V. with a MAD of 1 hour. Is there a big difference between how much T.V. parents watch and students watch? Use at least one piece of evidence to support your claim.
  
  
  
  
  
3. Sora says that 0.77 is a **repeating decimal** because both digits are the same. Is she correct? Explain your thinking.

**Explore**

Use the two data sets to create your own scenario. Label the axes and write a headline.

**Reflect**

1. Put a heart next to the question you enjoyed doing the most.
2. Use the space below to ask one question you have or to share something you are proud of.

**Warm-Up**

6, 5, 5

**Practice**

1.1 They both have a median of 23 points.

1.2 Player A: 2 points

Player B: 4 points

1.3 Player A

*Explanations vary.* Player A should win the award because they were more consistent than Player B.

1.4 *Responses and explanations vary.*

- Yes, Player C should win because when they scored well, they were better than Player A and B. The other players were more consistent, but Player C scored more points.
- No, Player C should not win because they are not consistent at all. In 4 out of the 11 data points, Player C scored fewer points than any of Player A or B's data points.

2.1 No. *Explanations vary.* Teachers do watch less T.V. than students, but the difference in their means (0.8 hours) is less than one MAD (About 1 hour).2.2 Yes. *Explanations vary.* There is a big difference in how long parents and students spend watching T.V. because the difference in the means was 2.1 hours, which is way more than one MAD.3. Disagree. *Explanations vary.* Even though both digits in 0.77 are the same, it is not a repeating decimal because it stops. Repeating decimals have a pattern, but they are called repeating because they go on forever.**Explore***Responses vary.*

“Cats Spend More Time Outside Than Dogs!”

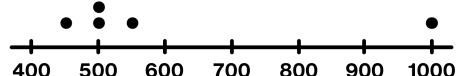


## Warm-Up

Calculate the mean for each set of data.

$$5, 8, 8, 10, 11, 13, 15$$

$$7, 7.2, 7.4, 7.6, 7.8$$



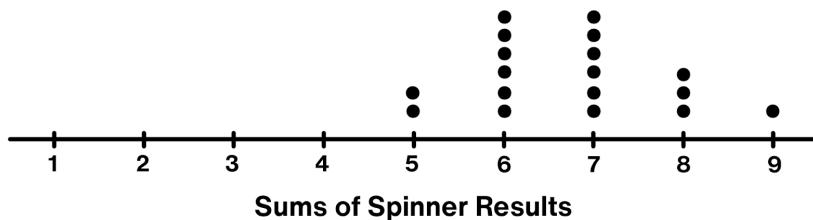
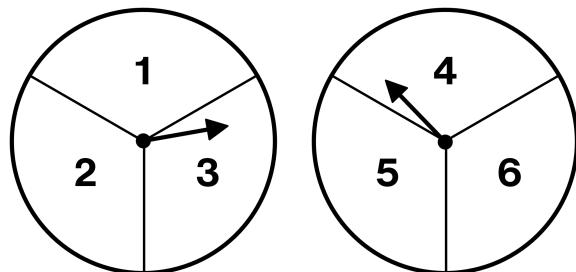
## Practice

Two spinners with three equal sections are spun. Each spinner is spun at the same time and their results are added together.

One is labeled with the numbers 1, 2, and 3.

The other is labeled with the numbers 4, 5, and 6.

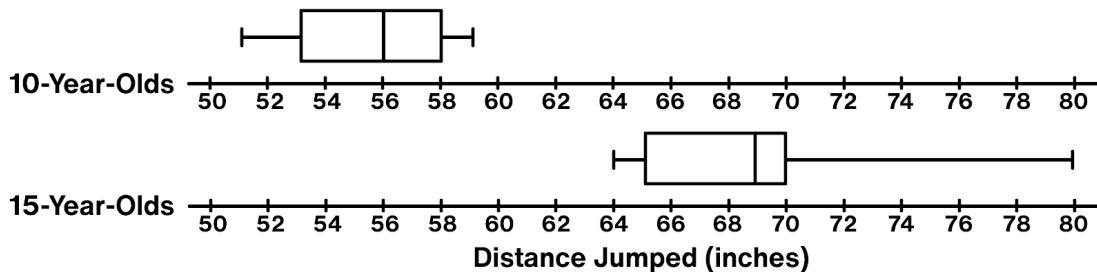
Here are the results of 18 spins.



- 1.1 Based on these results, which sums are most likely?
- 1.2 Based on these results, which sums are least likely?
- 1.3 About how many times would you expect to spin a sum of 7 out of 100 spins?
- 1.4 Make a probability tree or a table to represent the sample space.
- 1.5 What is the probability of getting a sum of 6?

**Unit 7.8, Lesson 15: Practice Problems**

These two box plots show the distances of a standing jump, in inches, for a random sample of 10 -year-olds and a random sample of 15 -year-olds at a school.

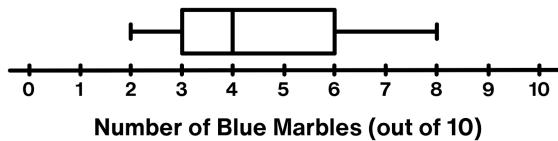


- 2.1 Do you think the distances jumped by 10 - and 15 -year olds is very different? Explain how you know.
  
- 2.2 Do all 15 -year-olds jump further than all 10 -year-olds at the school? Explain your reasoning.

## Explore

Marc is trying to determine how many blue marbles are in a bag of 100 marbles. He can only fit 10 marbles in his hand at a time.

He takes 11 samples of 10 marbles, returning the marbles to the bag each time.



Based on these results, how many of the 100 marbles do you expect are blue?

## Reflect

1. Put a star next to the question that you thought was the most important.
2. Use the space below to ask one question you have or to share something you are proud of.

**Warm-Up**

10, 7.4, 600

**Practice**

- 1.1 6 and 7  
1.2 9 (the least likely but still possible result)  
1.3 About 33 times.  
1.4 *Responses vary.*

	1	2	3
4	5	6	7
5	6	7	8
6	7	8	9

1.5  $\frac{2}{9}$  (or equivalent)

2.1 Yes.

*Explanations vary.* The difference in medians is 13 inches. This difference is more than 2 IQRs (the IQR is 5 and  $13 \div 5 = 2.6$ ), so there is a big difference in the median distances between 10-year-olds and 15-year-olds.

2.2 Not enough information.

*Explanations vary.* The box plots only represent a sample of the students at the school. There may be a 10-year-old that can jump as far as a 15-year-old, but they weren't sampled.

**Explore***Responses vary.*

About 45 marbles.

## Warm-Up

Order these probabilities from least to greatest.

60%

8 out of 10

0.37

20%

 $\frac{5}{6}$ **Least**

---

**Greatest**

## Practice

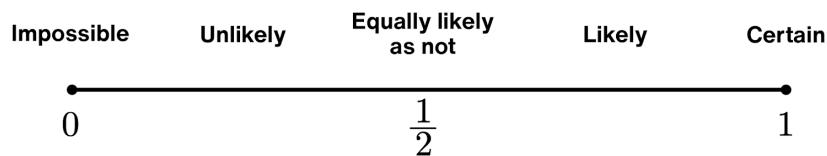
List the sample space for each chance experiment.

(For example, the sample space of flipping one fair coin is heads or tails.)

- 1.1 Selecting a random season of the year.      1.2 Selecting a random day of the week.      1.3 Selecting a random block out of a bag with 2 green blocks and 3 blue blocks.

Estimate or calculate the probability of each event. Use the probability scale if it helps you with your thinking.

- 2.1 You read this sentence. \_\_\_\_\_
- 2.2 A fair coin lands on heads when flipped. \_\_\_\_\_
- 2.3 A weekend day is selected randomly from the days of the week. \_\_\_\_\_
- 2.4 You see a live unicorn outside today. \_\_\_\_\_
- 2.5 A spinner with equal parts red, yellow, and green lands on green on the next spin. \_\_\_\_\_
- 2.6 You pick a green block when you randomly pick one block from a bag with 7 green blocks and 3 blue blocks. \_\_\_\_\_



A computer randomly selects a letter from the alphabet.

- 3.1 How many different outcomes are possible?      3.2 What is the probability the computer selects the first letter of your first name?      3.3 What is the probability the computer selects a vowel (A, E, I, O, or U)?

**Unit 7.8, Lesson 2: Practice Problems**

$E$  represents an object's weight on Earth and  $M$  represents that same object's weight on the Moon. The equation  $M = \frac{1}{6} E$  represents the relationship between these quantities.

- 4.1 What does the  $\frac{1}{6}$  represent in this situation?

- 4.2 If a person weighs 24 pounds on the Moon, how many pounds would they weigh on Earth?

**Explore**

Fill the blanks using each of the digits 0 to 9 without repeating.

← Unlikely

Likely →

%

0.

%

**Reflect**

1. Put a heart next to the question you are most proud of.
2. Use the space below to ask one question you have or to share something you are proud of.

## Warm-Up

**Least likely to most likely:** 20% , 0.37 , 60% , 8 out of 10 ,  $\frac{5}{6}$

## Practice

- 1.1 Winter, spring, summer, fall
  - 1.2 Sunday, Monday, Tuesday, Wednesday, Thursday, Friday, Saturday
  - 1.3 Green, green, blue, blue, blue
  - 2.1 1 (or equivalent)
  - 2.2  $\frac{1}{2}$  (or equivalent)
  - 2.3  $\frac{2}{7}$  (or equivalent)
  - 2.4 0 (or equivalent)
  - 2.5  $\frac{1}{3}$  (or equivalent)
  - 2.6  $\frac{7}{10}$  (or equivalent)
  - 3.1 26 outcomes are possible.
  - 3.2  $\frac{1}{26}$  (or equivalent)
  - 3.3  $\frac{5}{26}$  (or equivalent)
  - 4.1 Responses vary.  $\frac{1}{6}$  is the constant of proportionality from an object's weight on Earth to its weight on the Moon. Something that weighs 1 pound on Earth weighs  $\frac{1}{6}$  pound on the Moon.
  - 4.2 144 pounds

# Explore

*Responses vary.*

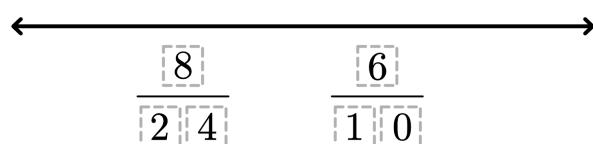
**← Unlikely**      **Likely →**

Likely →

3%

0.5

97%



## Warm-Up

For each word, determine the probability of selecting the letter “A” at random.

LAMB

SAFETY

ALABAMA

## Practice

- What is the probability of selecting a random month of the year and getting a month that starts with the letter “J”?  
If you get stuck, consider listing the sample space.

- A bag has 6 blocks in it. Joel picks a block out of the bag 60 times. He gets a green block 43 times.

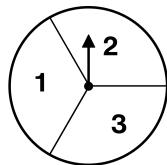


Based on these results, how many blocks do you expect to be green? Explain your reasoning.

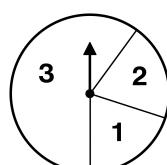
- Miko spun a spinner with numbered sections 15 times and recorded the results:

3, 3, 3, 1, 3, 2, 2, 3, 3, 1, 3, 1, 3, 3, 2

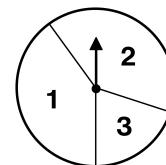
Spinner A



Spinner B



Spinner C



Which spinner is most likely the one he used? \_\_\_\_\_

Explain your reasoning.

A textbook has 428 numbered pages, starting with 1. You are equally likely to stop on any of the pages if you flip through the book randomly.

- 4.1 What is the probability that you turn to page 45?

- 4.2 What is the probability that you turn to an even-numbered page?

- 4.3 If you repeat this experiment 50 times, about how many times do you expect to turn to an even-numbered page?

**Unit 7.8, Lesson 3: Practice Problems**

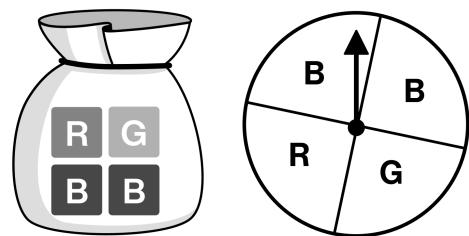
5. Select **all** of the situations in which the surface area would be useful to know.

- Ordering tiles to replace the roof of a house.
- Estimating how long it will take to clean the windows of a greenhouse.
- Deciding whether leftover soup will fit in a container.
- Estimating how long it will take to fill a swimming pool with a garden hose.
- Buying fabric to sew a couch cover.
- Deciding whether one muffin pan is enough to bake a muffin recipe.

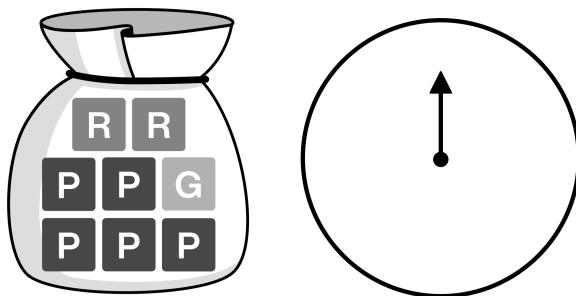
## Explore

Here is a spinner and a bag of blocks.

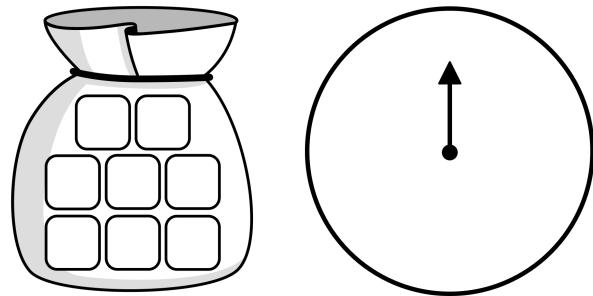
The spinner and the bag have the same probabilities of getting “R”, “G”, or “B”.



Create a spinner to match the probabilities of picking blocks from the bag.



Create your own set of blocks and a spinner with matching probabilities.



## Reflect

1. Star a question you are still wondering about.
2. Use the space below to ask one question you have or to share something you are proud of.

**Warm-Up**

$$\frac{1}{4}, \frac{1}{6}, \frac{4}{7}$$

**Practice**

1.  $\frac{1}{4}$  (or equivalent)

2. 4 blocks

*Explanations vary.* Joel picked a green block about 72% of the time since  $\frac{43}{60} \approx 0.7167$ . If the proportion of green blocks in the bag matched this, there would be 4.3 green blocks. Since 4.3 is closer to 4 than 5, it's likely that there are 4 green blocks in the bag.

3. Spinner B

*Explanations vary.* Miko spun a 3 nine times, which is three times as many times that they spun a 1 or 2. Since Spinner B has a large section for 3 and smaller equal sections for 1 and 2, this spinner seems to match Miko's results more than the other two spinners.

4.1  $\frac{1}{428}$  (or equivalent)

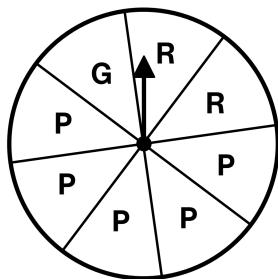
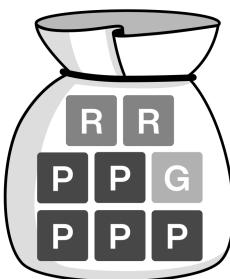
4.2  $\frac{1}{2}$  (or equivalent)

4.3 About 25 times.

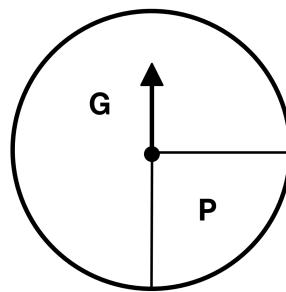
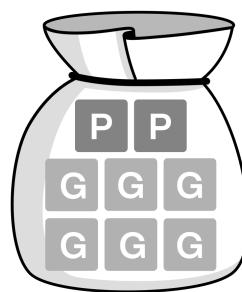
5. ✓ Ordering tiles to replace the roof of a house.  
 ✓ Estimating how long it will take to clean the windows of a greenhouse.  
 ✓ Buying fabric to sew a couch cover.

**Explore**

Responses vary.



Responses vary.



## Warm-Up

If you select a random letter from the word PINEAPPLE, what is the probability that . . .

. . . you select a “P”?

. . . you select a vowel  
(A, E, I, O, U)?

. . . you select a letter that  
appears in APPLE?

## Practice

Deja has a six-sided number cube.

1.1 If this were a standard number cube, what would be the probability that the cube lands on a five?

1.2 Deja suspects the six-side number cube is not so standard.

- Deja rolled a five 40 times out of 100.
- Manuel rolled a five 21 times out of 50.
- Santino rolled a five 11 times out of 30.

Based on these results, what would you say is the probability of landing on a five?

1.3 Is it likely this is a standard number cube? Explain your reasoning.

2.1 Santino wants to know if his quarter is fair, so he flips it 10 times. It lands on heads 3 times and on tails 7 times. Are these results enough to determine if the coin is fair??

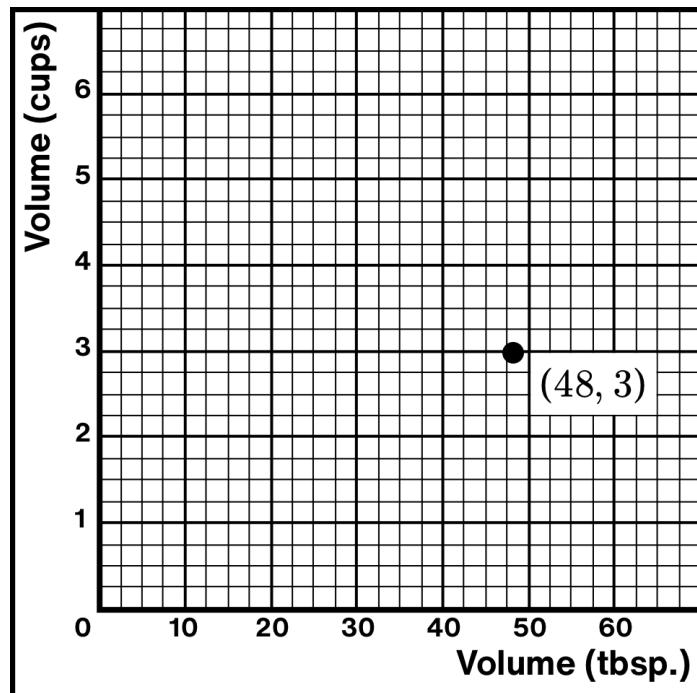
Explain your reasoning.

2.2 What could Santino do to be more sure of his results?

**Unit 7.8, Lesson 5: Practice Problems**

There is a proportional relationship between sugar measured in cups and sugar measured in tablespoons. For example, 48 tablespoons of sugar is equivalent to 3 cups of sugar.

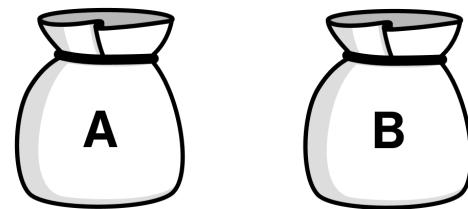
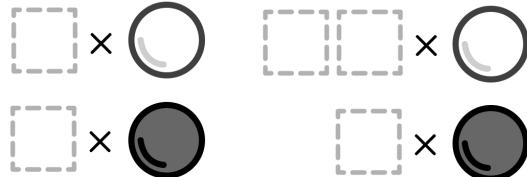
- 3.1 Plot and label at least two more points that represent the relationship.
- 3.2 Draw a line that represents the relationship.
- 3.3 What is a constant of proportionality for this relationship?
- 3.4 Write an equation representing this relationship. Use  $c$  for cups and  $t$  for tablespoons.



## Explore

Here are two bags, each with a different mixture of black and white marbles.

Fill in each blank using the digits 1 to 9 without repeating such that the probability of drawing a black marble from either bag is the same.



## Reflect

1. Circle the question you spent the most time on.
2. Use the space below to ask one question you have or to share something you are proud of.

**Warm-Up**

$\frac{3}{9}$ ,  $\frac{4}{9}$ ,  $\frac{7}{9}$  (or equivalent)

**Practice**

1.1  $\frac{1}{6}$  (or equivalent)

1.2 40% (or equivalent)

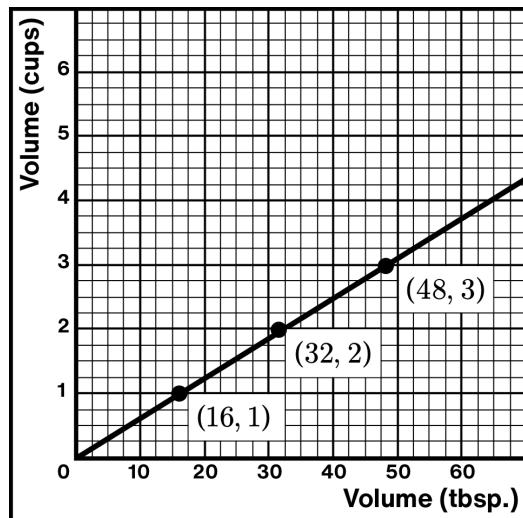
1.3 No. *Explanations vary.* A standard number cube should land on five  $\frac{1}{6}$  of the time. After 100 rolls, it should land on five about 16 or 17 times. All three people had it land on five more than twice as often. With this many rolls, there is strong evidence that this cube is not standard.

2.1 No. *Explanations vary.* The actual results from experiments may only get close to the expected probability if they are done many, many times. 10 flips may not be enough to get close to the expected  $\frac{1}{2}$  probability.

2.2 Santino should flip the quarter many more times.

3.1 Responses vary. Any points where the  $y$ -coordinate is  $\frac{1}{16}$  of the  $x$ -coordinate.

3.2



3.3  $\frac{1}{16}$  or 16

3.4  $c = \frac{1}{16}t$  or  $t = 16c$

**Explore**

Responses vary.

[9]  $\times$  

[3]  $\times$  

[2][1]  $\times$  

[7]  $\times$  



## Warm-Up

Select all of the true equations.

$8 = (8 + 8 + 8 + 8) \div 3$

$(10 + 10 + 10 + 10 + 10) \div 5 = 10$

$(6 + 4 + 6 + 4 + 6 + 4) \div 6 = 5$

## Practice

Farah made a tree to help her choose a theme, location, and day of the week for her birthday party.

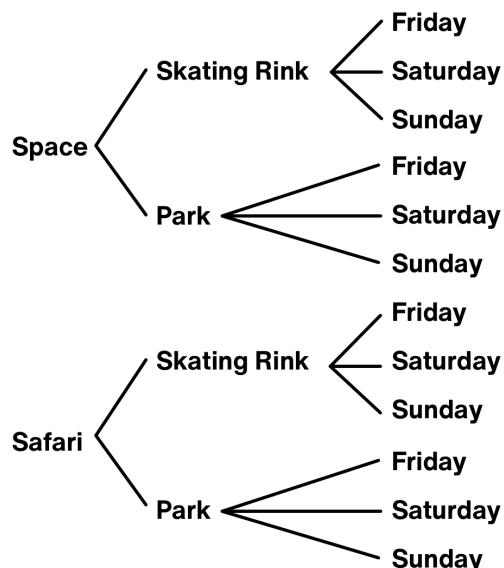
1.1 How many themes is Farah considering? \_\_\_\_\_

1.2 How many locations is Farah considering? \_\_\_\_\_

1.3 How many days is Farah considering? \_\_\_\_\_

1.4 One party Farah is considering is a space theme at the skating rink on Sunday.

Write two other possible parties Farah could have.



1.5 If Farah lets her brother choose a theme, location, and day at random, what is the probability that Farah's birthday will be a safari at the park on Saturday?

Explain your reasoning.

Juan and Neo are playing rock-paper-scissors. They each choose one of the three items.

2.1 Create a list, table, or tree to represent all the possible combinations of choices.

2.2 What is the probability that they both choose the same object?



## Unit 7.8, Lesson 6: Practice Problems

Isabella selects one type of lettuce and one dressing to make a salad.

- **Lettuce types:** iceberg, romaine
- **Dressings:** ranch, Italian, Caesar

- 3.1 Create a list, table, or tree to represent all the possible combinations of choices.
- 3.2 If Isabella picks a type of lettuce and dressing out of the fridge at random, is it more likely that she will get iceberg lettuce or Caesar dressing?

Explain your reasoning.

$\frac{1}{3}$  produces a fraction that repeats every one digit. Find a fraction that produces each of the following.

- 4.1 A decimal that **repeats** every two digits.      |      4.2 A decimal that **terminates** after two digits.

## Explore

Twelve toy turtles run a race. Each turtle is numbered from 1 to 12. A turtle can move forward one step whenever their number is rolled from the sum of two six-sided number cubes.

Who do you think is most likely to win the race?

Make an argument to justify your choice.

## Reflect

1. Star a question you think you should practice more.
2. Use the space below to ask one question you have or to share something you are proud of.

**Warm-Up**

✓  $(10 + 10 + 10 + 10 + 10) \div 5 = 10$  ✓  $(6 + 4 + 6 + 4 + 6 + 4) \div 6 = 5$

**Practice**

1.1 2 themes

1.2 2 locations

1.3 3 days

1.4 *Responses vary.* Two other possible parties Farah is considering are the safari theme at the skating rink on Friday, and the space theme at the park on Saturday.

1.5  $\frac{1}{12}$ . There are 12 possible parties in the sample space.

2.1 There are 9 possible outcomes: rr, rp, rs, pr, pp, ps, sr, sp, ss.

2.2  $\frac{3}{9}$  (or equivalent)

3.1 6 possible outcomes: iceberg and ranch, iceberg and Italian, iceberg and Caesar, romaine and ranch, romaine and Italian, romaine and Caesar.

3.2 It is more likely that she will get iceberg lettuce. The probability of picking iceberg lettuce is  $\frac{1}{2}$  and the probability of picking Caesar dressing is  $\frac{1}{3}$ .

4.1 *Responses vary.*

4.2 *Responses vary.*

$$\frac{1}{11} = 0.\overline{09}$$

$$\frac{6}{22} = 0.\overline{27}$$

$$\frac{1}{4} = 0.25$$

$$\frac{4}{25} = 0.16$$

**Explore**

Turtle 7

*Explanations vary.* There are 36 possible outcomes that can be rolled from the sum of two six-sided number cubes and 6 possible ways to roll a 7, which is more than any other sum. There are 5 possible ways to roll a 6 or an 8, so over a short track it may be a close race, but over a really long track, it is more likely that Turtle 7 would win.

## Warm-Up

Write each fraction as a percent.

$\frac{3}{5}$

$\frac{1}{50}$

$\frac{9}{10}$

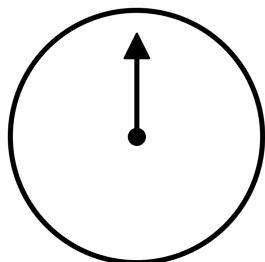
$\frac{9}{5}$

$\frac{18}{60}$

## Practice

The weather forecast says there is a 75% chance it will rain today.

- 1.1 Draw a spinner you could use to simulate a 75% chance of rain.



- 1.2 Explain why using a number cube to simulate this probability may be less useful than using a spinner.

- 1.3 Describe or draw a different way you could simulate this probability.

Esteban has 3 kittens. According to the vet, each kitten is born with blue eyes and there is a 50% chance of it changing color once they reach three months. Esteban decides to run a simulation using 3 coins, where heads represent the eyes changing color. Here are the results of his simulation.

Experiments with . . .	Count
No blue-eyed kittens	11
One blue-eyed kitten	32
Two blue-eyed kittens	43
Three blue-eyed kittens	14

2. Estimate the probability that at least one of Esteban's kittens will still have blue eyes at three months old.

Explain or show your thinking.

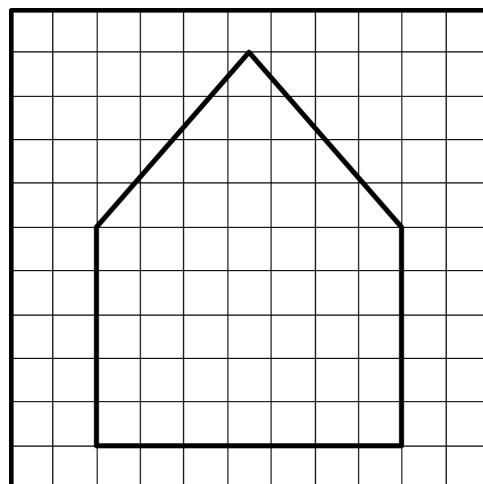
**Unit 7.8, Lesson 7: Practice Problems**

3. Kayla and Riya are playing a game where they roll a number cube and flip a coin. List or show the sample space of the possible outcomes for this game.

Here is a diagram of the base of a bird feeder. Each square on the grid represents 1 square inch.

- 4.1 What is the area of the base of the bird feeder?

- 4.2 The distance between the two bases is 8 inches.  
What is the volume of the bird feeder?



## Explore

Melanie and Alexis use the following method to decide who will pay the bill for lunch:

- They roll two number cubes.
- If the sum of the two numbers is even, Melanie pays.
- If it is odd, Alexis pays.

Who is more likely to pay the bill? Show your thinking.

## Reflect

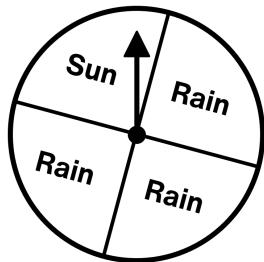
1. Circle the question that you are least confident about.
2. Use the space below to ask one question you have or to share something you are proud of.

**Warm-Up**

60%, 2%, 90%, 180%, 30%

**Practice**

- 1.1
- Responses vary.*



- 1.2 *Responses vary.* 75% corresponds to a probability of  $\frac{3}{4}$ . Number cubes have 6 possible outcomes making it hard to separate into fourths.
- 1.3 *Responses vary.* I could put 4 blocks in a bag (3 that represent rain and 1 that represents sun) and then randomly draw a block from the bag.

- 2.
- $\frac{89}{100}$
- (or equivalent)

*Explanations vary.* Out of 100 experiments, 89 resulted in at least one kitten with blue eyes.

3. The coin is listed first, followed by the number cube:

H 1, H 2, H 3, H 4, H 5, H 6  
T 1, T 2, T 3, T 4, T 5, T 6

- 4.1 49 square inches

- 4.2 392 cubic inches

**Explore**

They are both equally likely.

*Explanations vary.* The sample space has 18 possible sums that are even and 18 possible sums that are odd.