

UNIT 7



Rational Explorations: Numbers and Their Opposites



Essential Question

HOW can mathematical ideas be represented?



Chapter 12

Integers and the Coordinate Plane

Integers, terminating decimals, and repeating decimals are rational numbers. In this chapter, you will compare and order rational numbers and graph points in four quadrants of the coordinate plane.

Chapter 12

Integers and the Coordinate Plane



Essential Question

HOW are integers and absolute value used in real-world situations?



Common Core GPS

Content Standards

MCC6.NS.5, MCC6.NS.6, MCC6.NS.6a, MCC6.NS.6b, MCC6.NS.6c, MCC6.NS.7, MCC6.NS.7a, MCC6.NS.7b, MCC6.NS.7c, MCC6.NS.7d, MCC6.NS.8

Mathematical Practices

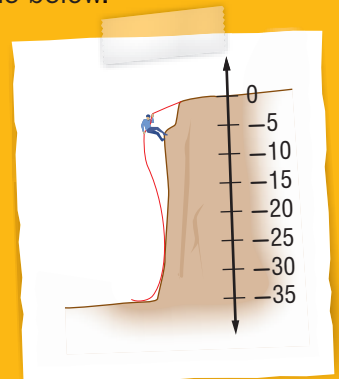
1, 2, 3, 4, 5, 7, 8



Math in the Real World

Rappelling Two friends rappel 35 feet down into a canyon. Their starting position is represented by 0 on the number line. Their ending position can be represented by -35 .

Graph -35 on the number line below.



FOLDABLES[®] Study Organizer

1

Cut out the correct Foldable from the FL pages in the back of this book.

2

Place your Foldable on the Key Concept page toward the end of this chapter.

3

Use the Foldable throughout this chapter to help you learn about integers.

What Tools Do You Need?



Vocabulary

- | | |
|------------------|---------------------|
| absolute value | positive integer |
| bar notation | quadrants |
| integer | rational number |
| negative integer | repeating decimal |
| opposites | terminating decimal |

Review Vocabulary

Using a graphic organizer can help you to remember important vocabulary terms. Fill in the graphic organizer below for the word *decimal*.

Decimal	
Definition	
Math Example	Real World Example

When Will You Use This?

Watch



Play it online!

Noah, Amanda, Luis, and Daniella in

Photo-Math

Ok. Looks like we still need to shoot a few more pictures for this week's paper.

How many pictures have we taken so far?

Well, you and I took 19 pictures during school.

Daniella and I took 24 pictures for after-school activities.

So, how much memory is left on the memory card?

I know the camera's memory card holds 64 megabytes or 65,536 kilobytes.

And each picture takes up about 760.5 kilobytes.

Ok, now my head is starting to hurt. Can anyone tell me how many more pictures we can take?

Hmm...

Your Turn!

You will solve this problem in the chapter.

Are You Ready?

Try the Quick Check below.
Or, take the Online Readiness Quiz.



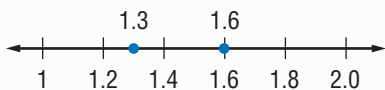
Quick Review

Common Core Review MCC4.NF.2, MCC5.NBT.3b

Example 1

Replace the \bigcirc with $<$, $>$, or $=$ to make a true statement.

$$1.6 \bigcirc 1.3$$

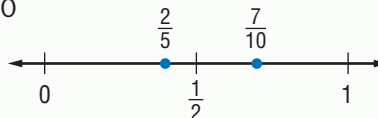


Since 1.6 is to the right of 1.3, $1.6 > 1.3$.

Example 2

Replace the \bigcirc with $<$, $>$, or $=$ to make a true statement.

$$\frac{2}{5} \bigcirc \frac{7}{10}$$



Since $\frac{2}{5}$ is less than $\frac{1}{2}$ and $\frac{7}{10}$ is greater than $\frac{1}{2}$, $\frac{2}{5} < \frac{7}{10}$.

Quick Check

Compare Decimals Replace each \bigcirc with $<$, $>$, or $=$ to make a true statement.

1. $4.8 \bigcirc 4.80$

2. $7.7 \bigcirc 7.5$

3. $1.2 \bigcirc 2.1$

Show your work.

Compare Fractions Replace each \bigcirc with $<$, $>$, or $=$ to make a true statement.

4. $\frac{2}{11} \bigcirc \frac{9}{10} =$

5. $\frac{3}{5} \bigcirc \frac{1}{4} =$

6. $\frac{2}{3} \bigcirc \frac{4}{6} =$

7. Jahan bought $\frac{2}{3}$ pound of peanuts and $\frac{1}{4}$ pound of walnuts. Did Jahan buy more peanuts or more walnuts? _____

How Did You Do?

Which problems did you answer correctly in the Quick Check?
Shade those exercise numbers below.

- 1 2 3 4 5 6 7



HOW can positive and negative values be represented?



Content Standards
MCC6.NS.5,
MCC6.NS.6,
MCC6.NS.6c

Mathematical Practices
1, 3, 4

Ecosystem In coastal regions, some animals live above sea level and other animals live in the ocean. A sea star can be found at an ocean depth of two feet. How can you represent an ocean depth of two feet?

What do you know? _____

What do you need to find? _____

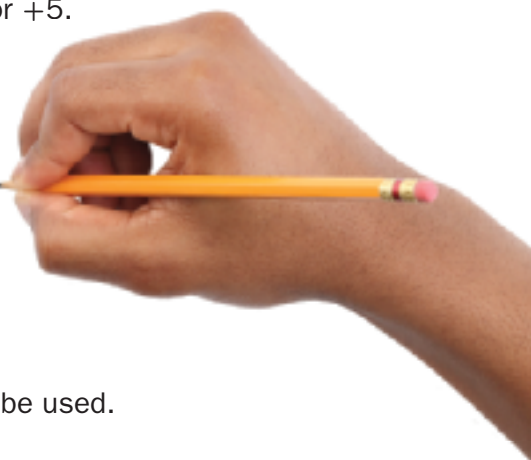
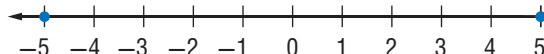


Investigation

Sea level can be represented with the number 0.

To represent a location above sea level, use a positive number. A positive number can be written with or without a positive sign, such as 5 or +5.

To represent a location below sea level, use a negative number. A negative number is written with a negative sign, such as -5.



Write a number to represent an ocean depth of two feet.

Step 1

Determine if a positive sign or a negative sign should be used.

Since the location is below, or less than sea level,
use a _____ sign.

Step 2

Determine which number to use.

Use the number to represent two feet.

So, the number represents an ocean depth of two feet.



Collaborate

Work with a partner. Write the correct number to represent each location in relationship to sea level. The first one is done for you.

Show your work.

	Animal	Elevation (ft)	Above or Below Sea Level	Number
	Fiddler Crab	3	above sea level	+3
1.	Eagle's Nest	75	above sea level	
2.	Dolphin	10	below sea level	
3.	Spider Crab	375	below sea level	
4.	Blue Heron	4	above sea level	
5.	Kelp Forest	656	below sea level	
6.	White Egret	50	above sea level	



Reflect

7. **CC.8.EE.5 Reason Inductively** What negative number is the same distance from 0 as the number +4? Explain. Graph both numbers on the number line below.



8. **CC.8.EE.5 Model with Mathematics** Write about a real world situation that can be described using the number -6 . Describe what the number 0 would represent.

9. **inquiry** HOW can positive and negative values be represented?

Integers and Graphing

What You'll Learn

Scan the lesson. List two real-world scenarios in which you would use integers.

- _____
- _____



Essential Question

HOW are integers and absolute value used in real-world situations?



Vocabulary

integer
negative integer
positive integer



Common Core GPS

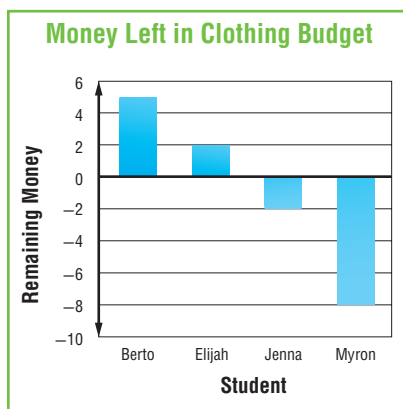
Content Standards
MCC6.NS.5, MCC6.NS.6,
MCC6.NS.6a, MCC6.NS.6c
Mathematical Practices
1, 3, 4, 5, 7



Real-World Link



Money The bar graph shows the amount of money remaining in the clothing budgets of four students at the end of one month. A value of $-\$2$ means that someone overspent the budget and owes his or her parents 2 dollars.

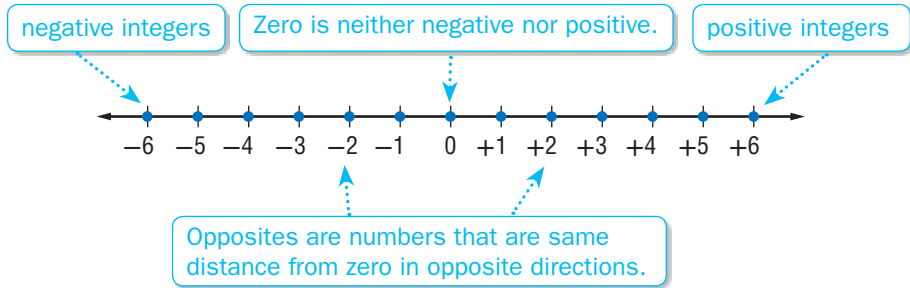


1. What number represents owing 8 dollars?
2. What number represents having 5 dollars left?
3. Who has the most money left? Who owes the most? Explain.



Use Integers to Represent Data

Positive whole numbers, their opposites, and zero are called **integers**. To represent data that are less than a 0, you can use **negative integers**. A negative integer is written with a $-$ sign. Data that are greater than zero are represented by **positive integers**.



Examples



Write an integer for each situation. Explain the meaning of zero in each situation.

1. a 10-yard loss

Because it represents a loss, the integer is -10 . In football, the integer 0 represents no yards lost or no yards gained.

2. 4 inches of rain above normal

Because it represents above, the integer is 4. In this situation, the integer 0 represents the normal amount of rain.

3. a \$48 deposit into a savings account

Because it represents an increase, the integer is .

In this situation, the integer 0 represents _____.

Got It? Do these problems to find out.

Write an integer for each situation. Explain the meaning of zero in each situation.

- a. a gain of \$2 a share
- b. 10 degrees below zero

Zero

The number zero can have different meanings based on real-world context. Sometimes zero represents an amount that does not change. Zero can also be used to represent real-world ideas, such as sea level.



a. _____

b. _____



Graph Integers

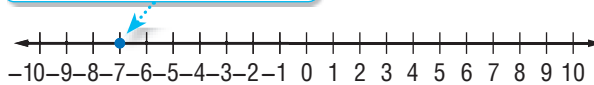
Integers and sets of integers can be graphed on a horizontal or vertical number line. To graph a point on the number line, draw a point on the number line at its location. A set of integers is written using braces, such as $\{2, -9, 0\}$.

Examples



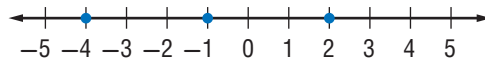
4. Graph -7 on a number line.

Draw a number line. Then draw a dot at the location that represents -7 .



5. Graph the set of integers $\{-4, 2, -1\}$ on a number line.

Draw a number line. Then draw a dot at the location of each integer.



6. Graph the set of integers $\{0, 2, -3\}$ on a number line.

Draw a number line. Then draw a dot at the location of each integer.



Got It? Do these problems to find out.

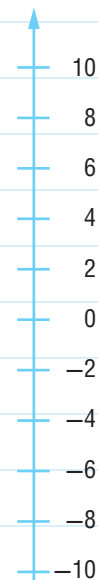
Graph each set of integers on a number line.

c. $\{-3, 0, -2, 4\}$



d. $\{8, -6, -9, 5\}$

Show your work.



d. _____



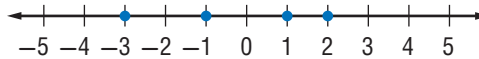
Example

Tutor



7. Alaina and her dad played golf on four different days. The data set $\{-1, +1, -3, +2\}$ shows Alaina's scores in relation to par. Graph the scores. Explain the meaning of zero in this situation.

Draw a number line. Then draw a dot at the location of each golf score.



The integer 0 represents par.

Guided Practice

Check



Write an integer for each situation. Explain the meaning of zero in each situation. (Examples 1–3)

- 15-yard gain _____
- loss of 2 hours _____

Graph each integer or set of integers on a number line. (Examples 4–6)

3. -2



4. $\{-1, 1, 0\}$



5. The data set $\{+5, 0, -15, +20\}$ shows the number of points Delaney scored on each hand of a card game. Graph the scores. Explain the meaning of zero in this situation. (Example 7)



6. **Building on the Essential Question** How can you use integers to represent data?

Rate Yourself!

How confident are you about integers and graphing? Check the box that applies.




For more help, go online to access a Personal Tutor.

Independent Practice

Go online for Step-by-Step Solutions 


Write an integer for each situation. Explain the meaning of zero in each situation. (Examples 1–3)

1. 3 miles below sea level _____
2. earning \$45 _____
- 3  moving back 5 spaces on a game board _____

Graph each integer or set of integers on a number line. (Examples 4–6)

4. -5




5  $\{2, -3, 0, 1\}$




6. The data set $\{+4, -1, -2, 0\}$ shows a change in number of state representatives for four states after the last census. Graph the change in number of representatives. Explain the meaning of zero in this situation. (Example 7)



7.  **Use Math Tools** The table shows the record low temperatures for several states. Graph the temperatures on a number line.



Record Low Temperature by State (°F)				
AL	AK	CT	NJ	VA
-27	-29	-32	-34	-30

8.  **Use Math Tools** The table shows the number of points earned for each action in a video game. While playing the video game, Kevin fell in water, jumped over a rock, touched a cactus and climbed a mountain. Graph the number of points he earned for each action on the number line.



Action	Points
fall in water	-10
walk over a bridge	+5
climb mountain	+10
jump over rock	+5
walk through quicksand	-15
touch cactus	-15

9. **CCPS Model with Mathematics** Complete the graphic organizer by writing words or symbols used to represent positive and negative integers.

Positive Integer	Negative Integer
.	.
.	.
.	.
.	.

H.O.T. Problems Higher Order Thinking

10. **CCPS Persevere with Problems** A football team receives the ball on their own 10 yard line.

- a. They make a gain of 15 yards in the first play. What yard line is the ball on? _____
- b. What represents zero in this situation? Explain.

11. **CCPS Justify Conclusions** The temperature outside is 15°F . If the temperature drops 20° , will the outside temperature be represented by a positive or negative integer? Explain your reasoning.

12. **CCPS Identify Structure** Describe the characteristics of each set of numbers that make up the set of integers.

Georgia Test Practice

13. The record low temperature for New Mexico is 50 degrees below zero Fahrenheit. The record low temperature for Hawaii is 12 degrees above zero Fahrenheit. What integer represents the record low temperature for New Mexico?

- (A) 50 (C) -38
(B) 38 (D) -50

Extra Practice

Write an integer for each situation. Explain the meaning of zero in each situation.

Homework Help

14. 13° below zero *-13; The integer 0 represents zero degrees.*

15. spending \$25 _____

16. 13-yard gain _____

Graph each integer or set of integers on a number line.

17. -8



18. {0, -3, 1, -1}



19. {-1, 1, -2}



20. {3, -5, 4, -1}



21. {4, -2, 2}



22. The data set {+3, -1, -2, +1} shows the moves a player made forward or backward in a board game. Graph the moves the player made. Explain the meaning of zero in this situation.



23. **CCPS Model with Mathematics** The table shows the overnight low temperatures for 5 days in Minneapolis. Graph the temperatures on a number line.

Overnight Low Temperatures (°F)				
1	-1	3	-6	0





Georgia Test Practice

24. The lowest elevation in Vermont is 95 feet above sea level. The lowest elevation in Louisiana is 8 feet below sea level. What integer represents the lowest elevation in Vermont?

- (A) 8
- (B) -8
- (C) 95
- (D) -95

25. **Short Response** On Monday Kennedy spent \$2 on lunch. On Tuesday she spent \$1 on a snack. On Wednesday, her sister gave her \$3. Graph the integers on the number line.



26. On Friday, a school spirit shop gave away a free T-shirt with each purchase over \$50. There were 47 purchases over \$50. Which integer represents the change in the number of free T-shirts the spirit shop had in stock at the end of the day on Friday?

- (F) -50
- (G) -47
- (H) 47
- (I) 50

27. **Short Response** Jackson owes his sister Monica \$15. Monica has a \$10 bill in her pocket. Explain the meaning of zero in this situation.



Common Core Review

Fill in each with $<$ or $>$ to make the inequality true. **MCC4.NBT.2**

28. $26 \bigcirc 22$

29. $11 \bigcirc 13$

30. $2.5 \bigcirc 3$

31. $44 \bigcirc 4.4$

32. $15 \bigcirc 6.8$

33. $1.8 \bigcirc 1.9$

34. Ally bought $\frac{1}{12}$ pound of cashews and $\frac{5}{6}$ pound of granola. Plot the fractions on the number line. Which quantity is greater? Explain. **MCC4.NF.3d**



35. The number of raffle tickets the student council sold over three days is shown in the table. How many total raffle tickets did they sell? **MCC4.NBT.4**

Day	Tickets Sold
Wednesday	35
Thursday	23
Friday	46



HOW can a number line help you find two integers that are the same distance from zero?



Content Standards

MCC6.NS.5,
MCC6.NS.7,
MCC6.NS.7c,
MCC6.NS.7d

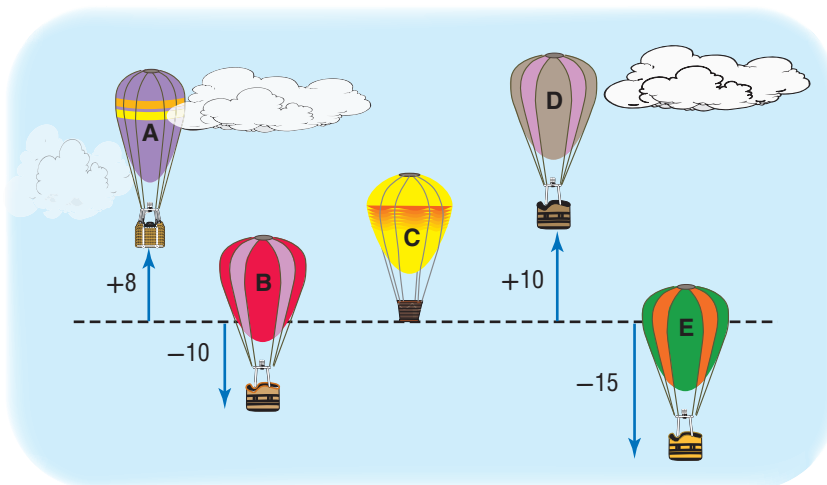
Mathematical Practices

1, 2, 3, 5

Hot Air Balloons Several hot air balloons were flying at the same height. The dashed line below represents their starting point. Which two balloons moved the same distance but in opposite directions?

Investigation

In the diagram below, +8 means Balloon A climbed 8 feet and -10 means Balloon B moved down 10 feet.



Use the diagram to compare the distance each balloon moved.

Step 1

Complete the chart to compare the distance each balloon moved from the dashed line.

Balloon	Integer	Direction	Distance Moved (ft)
C	0	none	0
D	+10		
E	-15		

Step 2

Determine which two balloons moved the same distance away from the dashed line.

So, Balloon and Balloon moved feet from the dashed line.



Collaborate

CCPS Use Math Tools Use the number line to determine the distance between each integer and zero.

Show your work.



1. -2 _____

2. $+3$ _____

Work with a partner to complete the table. The first one is done for you.

Integer	Distance Between Integer and Zero	Opposite Integer	Distance Between Opposite Integer and Zero
3	3	-3	3
3. 4			
4. 7			
5. -11			
6. -13			
7. 19			
8. -21			

9. **CCPS Reason Inductively** What can you conclude about the distance from zero for both an integer and its opposite? _____



Reflect

10. **CCPS Reason Abstractly** The movement of Balloon B in the Investigation was represented by the number -10 . What does zero represent in the Investigation? _____

11. **Inquiry** HOW can a number line help you find two integers that are the same distance from zero? _____

Absolute Value

What You'll Learn

Scan the lesson. Predict two things you will learn about absolute value.

- _____
- _____



Essential Question

HOW are integers and absolute value used in real-world situations?



Vocabulary

absolute value
opposites



Common Core GPS

Content Standards

MCC6.NS.6, MCC6.NS.6a,
MCC6.NS.7, MCC6.NS.7c,
MCC6.NS.7d

Mathematical Practices

1, 2, 3, 4

Vocabulary Start-Up



The distance between a number and 0 on the number line is called its **absolute value**.

- Each mark on the number line indicates one yard. Draw a tree three yards west of the house. Draw a mailbox three yards east of the house.



- The distance between the house and the tree is _____ the distance between the house and the mailbox.
- The tree and the mailbox are in _____ directions from the house.
- How does the number line above help you to understand absolute value? _____



Real-World Link

- Errands** Jesse leaves home and walks 4 blocks west to the grocery store to buy milk then returns home. He then walks another 4 blocks east to the Post Office. Compare the distance and the direction of Jesse's house and the Post Office from the grocery store.



Find Opposites

Positive numbers, such as 2, are graphed to the right (or above) zero on a number line. Negative numbers, such as -2 , are graphed to the left (or below) zero on a number line.

Opposites are numbers that are the same distance from zero in opposite directions. Since 0 is not negative nor positive, 0 is its own opposite. The opposite of the opposite of a number, is the number itself. For example, the opposite of the opposite of 3, $-(-3)$, is 3.

-2 is 2 units to the left of zero.



2 is 2 units to the right of zero.

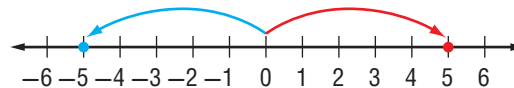
Examples



1. Find the opposite of -5 .

Method 1 Use a number line.

Draw a number line and graph -5 .



-5 is 5 units to the left of 0. The integer 5 is 5 units to the right of 0.

So, 5 is the opposite of -5 .

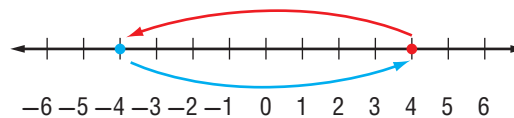
Method 2 Use symbols.

The integer -5 uses the negative symbol.

The opposite of a negative symbol is a positive symbol.

So, the opposite of -5 is $+5$, or 5.

2. Find the opposite of the opposite of 4.



The opposite of 4 is -4 .
The opposite of -4 is 4.

So, 4 is the opposite of the opposite of 4.

Got It? Do these problems to find out.

- a. What is the opposite of 3? b. What is the opposite of the opposite of -2 ?

Show your work.

a. _____

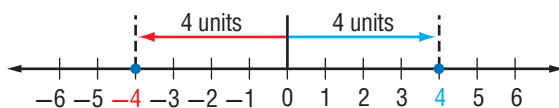
b. _____

Absolute Value

Key Concept

Words The absolute value of a number is the distance between the number and zero on a number line.

Model



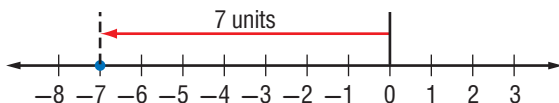
Symbols $|4| = 4$ The absolute value of 4 is 4.
 $|-4| = 4$ The absolute value of -4 is 4.

The integers -4 and 4 are each 4 units from 0, even though they are on opposite sides of 0. $|-4|$ is read *absolute value of negative four*.

Examples



3. Evaluate $|-7|$.



The graph of -7 is 7 units from 0 on the number line.

So, $|-7| = 7$.

4. Evaluate $|5| + |-6|$.

$$\begin{aligned} |5| + |-6| &= 5 + |-6| && \text{The absolute value of 5 is 5.} \\ &= 5 + 6 && \text{The absolute value of } -6 \text{ is 6.} \\ &= 11 && \text{Simplify.} \end{aligned}$$

5. Evaluate $|-7| - |3|$.

$$\begin{aligned} |-7| - |3| &= \square - \square && \text{Find the absolute value of } -7 \text{ and 3.} \\ &= \square && \text{Simplify.} \end{aligned}$$

Show your work.

Got It? Do these problems to find out.

c. $|14|$

d. $|-9| + |3|$

e. $|-8| - |-2|$

c. _____

d. _____

e. _____



Example

Tutor



- 6.** A seagull is flying 25 feet above sea level. Nevaeh is diving 15 feet below sea level. What is the distance between Nevaeh and the seagull?

The expression $|25|$ describes the seagull's distance above sea level. The expression $|-15|$ describes the Nevaeh's distance below sea level.

To find the distance, add the absolute values.

$$\begin{aligned} |25| + |-15| &= 25 + |-15| && \text{The absolute value of 25 is 25.} \\ &= 25 + 15 && \text{The absolute value of } -15 \text{ is 15.} \\ &= 40 && \text{Add.} \end{aligned}$$

So, the total distance is 40 feet.

Guided Practice

Check



1. What is the opposite of 0? (Example 1)



2. What is the opposite of the opposite of 6? (Example 2)


Evaluate each expression. (Examples 3–5)

3. $|-5| =$ _____

4. $|20| - |-3| =$ _____

5. $|-16| + |-12| =$ _____

6. A game show contestant lost 15 points. He answered another question incorrectly and lost another 15 points. How many total points has he lost? (Example 6)

7.  **Building on the Essential Question** How can absolute value help you to understand the size of a quantity? Give an example. _____

Rate Yourself!

How well do you understand opposites and absolute value? Circle the image that applies.



Clear



Somewhat Clear



Not So Clear

For more help, go online to access a Personal Tutor.

Tutor



Independent Practice

Go online for Step-by-Step Solutions

**Find the opposite of each integer.** (Example 1)

1. 6 _____

2. -3 _____

3. 0 _____

**Find the opposite of the opposite of each integer.** (Example 2)

4. 12 _____

5. -9 _____

6. -17 _____

Evaluate each expression. (Examples 3–5)

7. $|-14| =$ _____

8. $|31| - |-1| =$ _____

9. $|-15| + |-6| =$ _____

10. Jayson spent \$18 on a shirt. Then he spent \$24 on a pair of pants. What is the total amount he spent? (Example 6) _____

11. Lilly saw a jelly fish at 6 feet below sea level. She saw a bright blue fish at 10 feet below sea level. What is the distance between the blue fish and the jelly fish? (Example 6) _____

12. **STEM** The table shows the melting points of various elements. Is the absolute value of the melting point of neon greater than or less than the absolute value of the melting point of hydrogen? _____

Element	Melting Point ($^{\circ}\text{C}$)
Hydrogen	-259
Neon	-248
Oxygen	-218

13. **STEM** The surface of Jupiter is made of colorful clouds created by various chemicals in the atmosphere. The temperature at the top of the clouds is -230°F . The temperature below the clouds is 70°F . Which temperature has the lower absolute value? _____

CCPS Reason Abstractly Evaluate each expression.

14. $-|3| =$ _____

15. $|5 + 9| =$ _____

16. $|17 - 8| =$ _____



H.O.T. Problems Higher Order Thinking

17. **CCPS Find the Error** Mei is evaluating an expression using absolute value. Find her mistake and correct it.

$|-14| = -14$

18. **CCPS Which One Doesn't Belong?** Identify the phrase that *cannot* be described by the same absolute value as the other three. Explain your reasoning.

a loss of
8 pounds

8 miles above
sea level

giving
away \$8

18° below
normal

- CCPS Persevere with Problems** Determine whether each statement is *always, sometimes, or never true*. Explain.

19. The absolute value of a positive integer is a negative integer.

20. If a and b are integers and $a > b$, then $|a| > |b|$.

21. **CCPS Reason Abstractly** Explain why the absolute value of a number is never negative.

22. **CCPS Reason Abstractly** Explain why an account balance less than -40 dollars represents a debt greater than 40 dollars.



Georgia Test Practice

23. If $x = -2$ and $y = 2$, then which of the following statements is false?

(A) $|x| > 1$

(C) $|y| < 1$

(B) $|x| = |y|$

(D) $|x| = y$

Extra Practice

Find the opposite of each integer.

24. -2 ² _____

25. 15 _____

26. 42 _____



Find the opposite of the opposite of each integer.

27. 9 _____

28. 0 _____

29. -8 _____

Evaluate each expression.

30. $|18| =$ _____

31. $|0| =$ _____

32. $|25|$ _____

33. $|2| + |-13| =$ _____

34. $|-20| - |17| =$ _____

35. $|-16| - |5| =$ _____

36. The balance of Bryce's account is \$16. Jada's account is \$5 overdrawn. What is the difference between their account balances?

37. A football team lost 3 yards on their first play and 6 yards on their second play. How many total yards did they lose?

38. The table shows the lowest elevations for several states. Is the absolute value of the lowest elevation of California greater than or less than the absolute value of the lowest elevation of Illinois?

State	Lowest Elevation (ft)
Oklahoma	289
Illinois	279
Kentucky	257
California	-282

CCPS Reason Abstractly Evaluate each expression.

39. $-|-10| =$ _____

40. $|13 - 6| =$ _____

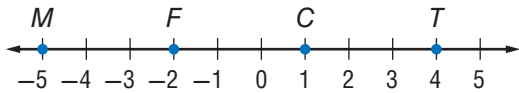


Georgia Test Practice

41. If $x = -1$ and $y = -2$, then which of the following statements is true?

- (A) $|x| > 1$
- (B) $|x| < |y|$
- (C) $|y| < 1$
- (D) $|y| < x$

42. Refer to the number line below. Which point represents the number with the greatest absolute value?



- (F) point M
- (G) point F
- (H) point C
- (I) point T

43. A video game has different point values associated with different actions. The table shows some of the actions. Which action has associated points with the greatest absolute value?

Action	Points
collect gem	+5
fall in water	-10
build bridge	+12
climb tree	-15

- (A) collect gem
- (B) fall in water
- (C) build bridge
- (D) climb tree

44. Which expression has the greatest value?

- (F) $|-25|$
- (G) $|-16|$
- (H) $|18|$
- (I) $|22|$

45. **Short Response** The table shows the freezing point of different liquids. What liquid's freezing point has the greatest absolute value?

Liquid	Freezing Point ($^{\circ}\text{F}$)
Water	32
Acetic Acid	62
Linseed Oil	-4
Acetone	-94



Common Core Review

Fill in each \bigcirc with $>$, $<$, or $=$ to make a true statement. **MCC4.NBT.2**

46. $69.23 \bigcirc 69.25$

47. $171.10 \bigcirc 171.09$

48. $47.74 \bigcirc 47.740$

49. Part of a sauce recipe is shown. If all the ingredients are mixed together, how much sauce will be made? **MCC5.NF.1**

6 teaspoons Worcestershire Sauce
 $1\frac{1}{2}$ teaspoons seasoned salt
 $\frac{1}{2}$ teaspoon onion powder
 $\frac{3}{4}$ teaspoon garlic powder

50. Caroline's soccer practice starts at quarter after 4 P.M. and ends at 5 P.M. How many minutes does her soccer practice last? **MCC4.MD.2**

Compare and Order Integers

What You'll Learn

Scan the lesson. List two real-world scenarios in which you would compare integers.

- _____
- _____
- _____



Real-World Link



Winter Fairbanks is located in interior Alaska. The average temperature for several months is shown.

1. The average temperature for December is -6.5°F and the average temperature for March is 11°F . Label December and March on the thermometer.
2. Which months have a greater average temperature than February? _____
- 3a. Which months have a lower average temperature than November? _____
- 3b. Complete the inequality to compare the temperatures of November and February.

$$3 > \square$$



Essential Question

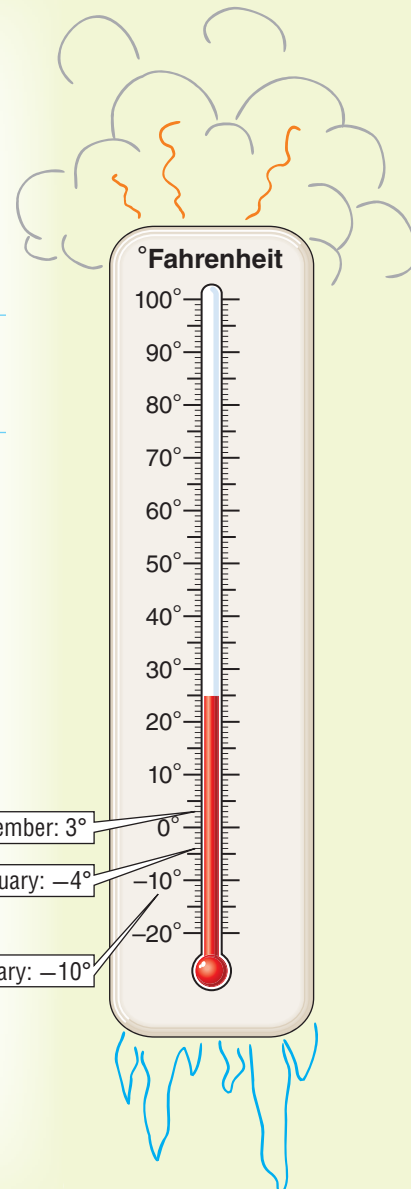
HOW are integers and absolute value used in real-world situations?



Common Core GPS

Content Standards
MCC6.NS.7, MCC6.NS.7a,
MCC6.NS.7b, MCC6.NS.7d

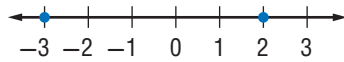
Mathematical Practices
1, 2, 3, 4, 5



Compare Integers

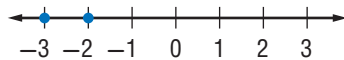
To compare integers, you can compare the signs as well as the magnitude, or size, of the numbers. Greater numbers are graphed farther to the right.

Compare the signs.



Positive numbers are greater than negative numbers.
So, $2 > -3$.

Compare the position on the number line.



Since -2 is farther to the right, $-2 > -3$.

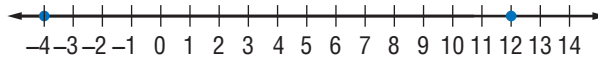
Example



Fill in the \bigcirc with $<$, $>$, or $=$ to make a true sentence.

1. $12 \bigcirc -4$

Graph 12 and -4 on a number line. Then compare.



Since 12 is to the right of -4 , $12 > -4$.

Got It? Do these problems to find out.

a. $-3 \bigcirc -5$

b. $-5 \bigcirc 0$

c. $6 \bigcirc -1$

Absolute Value

Although -5 is the least value in Example 2, it represents the greater point deficit.

$$|-5| > |-4|$$



Example



2. Justin has a score of -4 on the Trueville Trivia game. Desiree's score is -5 . Write an inequality to compare the scores. Explain the meaning of the inequality.

$$-4 > -5$$

-4 is farther to the right on a number line than -5 .

Since $-4 > -5$, Justin has a higher score than Desiree.

Got It? Do this problem to find out.

d. The temperature on Tuesday was 2°F . The temperature on Wednesday was -2°F . Write an inequality to compare the temperatures. Explain the meaning of the inequality.

d. _____

Order Integers

You can use a number line to order a set of integers. Integers can be ordered from least to greatest or from greatest to least.

Example



3. Order the set $\{-9, 6, -3, 0\}$ from least to greatest.

Method 1 Use a number line.

Graph the numbers on a number line.



The order from left to right is $-9, -3, 0,$ and $6.$

Method 2 Compare signs and values.

Compare negative numbers. Then compare positive numbers.

The negative integers are -9 and $-3.$ $-9 < -3$

The integer 0 is neither positive nor negative.

The positive integer is $6.$

So, the order from least to greatest is $-9, -3, 0,$ and $6.$

Got It? Do these problems to find out.

e. Order the set $\{-4, 3, 11, -25\}$ from greatest to least.



f. Order the set $\{-18, 30, 12, -6, 3\}$ from least to greatest.



Absolute Value

Since absolute value is always positive, it is not used to compare and order integers.

Show your work.

e. _____

f. _____

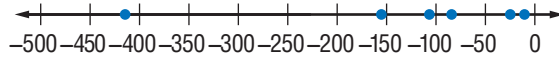


Example



4. **STEM** The table shows the lowest elevation for several continents. Order the elevations from least to greatest.

First, graph each integer. Then, write the integers as they appear on the number line from left to right.



The elevations from least to greatest are -418 , -156 , -105 , -86 , -28 , and -12 .

Continent	Lowest Elevation (m)
Africa	-156
Asia	-418
Australia	-12
Europe	-28
North America	-86
South America	-105



Guided Practice



Fill in each \bigcirc with $<$, $>$, or $=$ to make a true statement. (Example 1)

1. $17 \bigcirc 31$

2. $-6 \bigcirc -10$

3. $-83 \bigcirc -38$

4. Andrew and his father are scuba diving at -38 feet and Tackle Box Canyon has an elevation of -83 feet. Write an inequality to compare the depths. Explain the meaning of the inequality. (Example 2)

5. **STEM** The daily low temperatures in Kate's hometown last week were 2°C , -9°C , -18°C , -6°C , 3°C , 0°C , and -7°C . Order the temperatures from greatest to least. (Examples 3 and 4)

6. **Q** **Building on the Essential Question** How can symbols and absolute value help you to order sets of integers?

Rate Yourself!

How confident are you about comparing and ordering integers? Shade the ring on the target.



For more help, go online to access a Personal Tutor.



FOLDABLES Time to update your Foldable!

Independent Practice

Go online for Step-by-Step Solutions 


Fill in each \bigcirc with $<$, $>$, or $=$ to make a true statement. (Example 1)

1. $-2 \bigcirc -4$

2. $1 \bigcirc -3$

3. $5 \bigcirc 0$

4. Amy is building a house. The basement floor is at -15 feet. The roof of the house is above the ground 25 feet. Write an inequality to compare the heights. Explain the meaning of the inequality. (Example 2)

 The low temperature in Anchorage, Alaska, one day was -9°F . On the same day, the low temperature in Flagstaff, Arizona, was 26°F . Write an inequality to compare the temperatures. Explain the meaning of the inequality. (Example 2)


Order each set of integers from least to greatest. (Example 3)

6. $\{15, 17, 21, 6, 3\}$

 $\{-55, 143, 18, -79, 44, 101\}$

8. The table indicates Xavier's cell phone use over the last four months. Positive values indicate the number of minutes he went over his allotted time, and negative values indicate the number of minutes he was under. Arrange the months from least to most minutes used. (Example 4)

Month	Time (min)
February	-156
March	12
April	0
May	-45

9.  **Use Math Tools** Refer to the table and the following information. The apparent magnitude of an object measures how bright the object appears to the human eye. A negative magnitude identifies a brighter object than a positive magnitude.

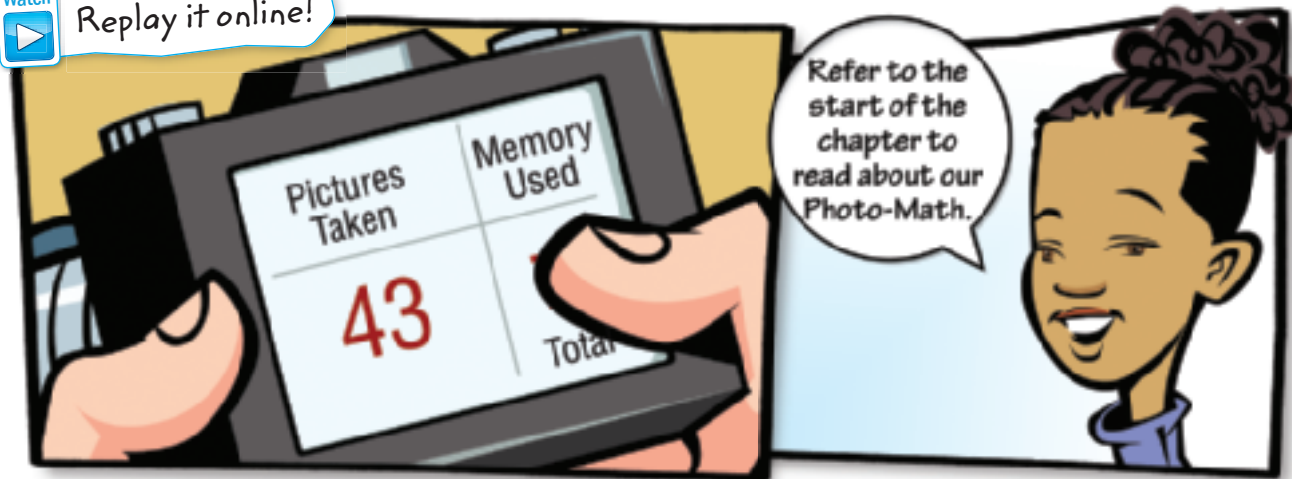
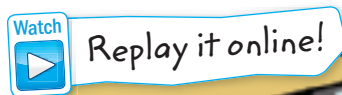
a. Which object appears the brightest to the human eye?

b. Order the objects from the brightest to the faintest.

c. Find the least apparent magnitude of this data set.

Object	Approximate Apparent Magnitude
100-Watt Bulb	-19
Alpha Centauri	4
Andromeda Galaxy	0
Full Moon	-13
Sun	-27
Venus	-5

10. **CCPS Justify Conclusions** Refer to the graphic novel frame below for exercises a–c.



- If about 32,834.5 kilobytes of memory is still available, how many more pictures can they take? _____
- Write an inequality to compare the number of pictures taken during school to the number of pictures taken after school. _____
- Explain the meaning of the inequality. _____

H.O.T. Problems Higher Order Thinking

- CCPS Model with Mathematics** Write a real-world situation to explain the inequality $-\$15 < \7 . _____

- CCPS Reason Abstractly** Explain why -11 is less than -7 , but $|-11|$ is greater than $|-7|$. _____

- CCPS Persevere with Problems** Order the fractions $-\frac{1}{2}$, $\frac{5}{2}$, $-\frac{12}{4}$, $\frac{1}{6}$, and $\frac{7}{8}$ from least to greatest. _____

Georgia Test Practice

14. Order the set $\{-5, 3, 2, -7\}$ from greatest to least.
- (A) $-7, -5, 3, 2$ (C) $2, 3, -5, -7$
 (B) $-7, -5, 2, 3$ (D) $3, 2, -5, -7$

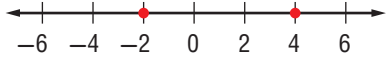
Extra Practice

Fill in each \bigcirc with $<$, $>$, or $=$ to make a true statement.

15. $-2 \bigcirc 4$

Homework Help

Since -2 is to the left of 4 , $-2 < 4$.



16. $-6 \bigcirc 3$

17. $-3 \bigcirc 2$

18. The elevation of Driskill Mountain, Louisiana, is 163 meters above sea level. Death Valley has an elevation of -86 meters. Write an inequality to compare the elevations. Explain the meaning of the inequality.

19. Yvonne owes her sister \$25. Michael's checking account balance is $-\$20$. Write an inequality to compare the amounts. Explain the meaning of the inequality.

Order each set of integers from least to greatest.

20. $\{14, 1, 6, 23, 7, 5\}$

21. $\{-221, 63, 54, -89, -71, -10\}$

22. Gary, Sindhu, and Beth are all waiting for their trains to arrive. Gary's train leaves at 5 minutes before noon, Sindhu's leaves at 25 minutes after noon, and Beth's leaves 5 minutes before Sindhu's train. Order the three by who will leave first.

23. **CCPS Use Math Tools** Use the bar graph and the information below. The bar graph gives the scores of four golfers (A, B, C, and D). The numbers indicate scores above and below par.

a. Order the scores on a number line.



b. Which player had the worst score? Explain your answer.





Georgia Test Practice

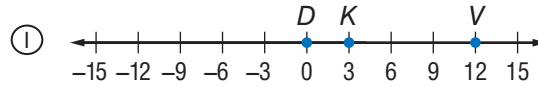
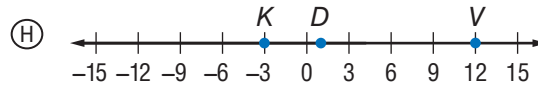
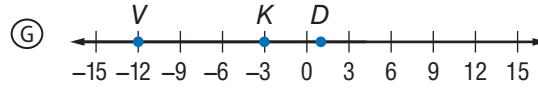
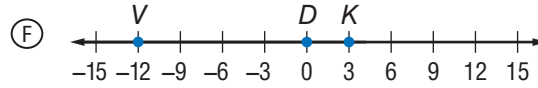
24. The table shows the temperatures for a four-day period.

Temperature (°F)	
Monday	-7
Tuesday	8
Wednesday	-2
Thursday	-1

Which list shows the temperatures from least to greatest?

- (A) 8, -2, -1, -7
- (B) 8, -1, -2, -7
- (C) -7, -2, -1, 8
- (D) -7, -1, -2, 8

25. Verónica (V) was 12 minutes early to class, Deshawn (D) was right on time, and Kendis (K) was 3 minutes late. Which time line represents the students' arrival to class?



26. **Short Response** The table shows the scores for a game of miniature golf. The integer 0 represents par. Arrange the players from least shots taken to most shots taken.

Player	Score
Cristian	-6
Bailey	2
Liam	-3
Marisol	5



Common Core Review

Write each fraction as a decimal. **MCC5.NF.5b**

27. $\frac{3}{4} =$ _____

28. $\frac{1}{5} =$ _____

29. $\frac{3}{20} =$ _____

30. The table shows the heights of Sonya's siblings. Who is taller, Frieda or Julio? Compare their heights using the symbol $>$. **MCC4.NBT.2**

Member	Height (ft)
Frieda	$5\frac{1}{4}$
Julio	$5\frac{5}{6}$

31. Kristen and Mitchell were given the same math assignment. Kristen completes 0.8 of her work in class. Mitchell completes 0.75 of his work during class. Who has more homework remaining after class? **MCC5.NBT.3**

Problem-Solving Investigation

Work Backward



Content Standards
MCC6.NS.5

Mathematical Practices
1, 3

Case #1 Hit the Slopes!

Marissa and her family are on a ski trip at Mount Washington in New Hampshire. They returned from the slopes at 6 P.M. By 9 P.M., the temperature had fallen 18° to the day's low temperature of -8°F .

What was the temperature at 6 P.M.?



1

Understand *What are the facts?*

- By 9 P.M., the temperature had fallen 18° .
- The day's low temperature was -8°F .

2

Plan *What is your strategy to solve this problem?*

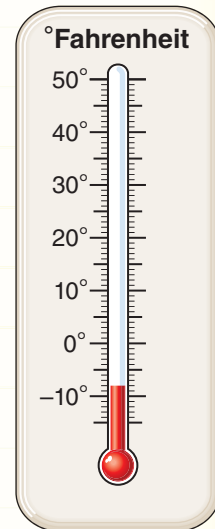
Work backward from the low temperature at 9 P.M. Use a thermometer diagram to find the temperature at 6 P.M.

3

Solve *How can you apply the strategy?*

Start at $^\circ\text{F}$. Shade the thermometer degrees to find the temperature at 6 P.M.

So, the temperature at 6 P.M. was _____.



4

Check *Does the answer make sense?*

-8°F is 8 degrees away from 0°F . $18 - 8 = 10$

So, add to to 0°F . Since $0 + \text{input} = \text{input}$, the answer is reasonable.

Analyze the Strategy



CCGPS Justify Conclusions The high temperature was 36°F . How far away from -8°F is 36°F ? Explain. _____

Case #2 Get Ready, Get Set, Go

The table shows the amount of time it takes Henry to do different activities before going to soccer practice.

If he needs to be at practice at 8:15 A.M., what time should he wake up in the morning to get to the soccer field?

Activity	Time (minutes)
Travel to field from home	15
Eating breakfast	35
Changing into uniform	10
Checking E-mail messages	20



1

Understand

Read the problem. What are you being asked to find?

I need to find _____.

Underline key words and values. What information do you need to know?

The table shows the time it takes Henry to do each activity. It takes him minutes to get to the field, minutes to eat, minutes to change for practice, and minutes to check his email.

2

Plan

Choose a problem-solving strategy.

I will use the _____ strategy.

3

Solve

Use your problem-solving strategy to solve the problem.

$$8:15 \text{ A.M.} - 20 \text{ min} = \underline{\quad\quad} \text{ A.M.} \qquad 7:45 \text{ A.M.} - 35 \text{ min} = \underline{\quad\quad} \text{ A.M.}$$

$$7:55 \text{ A.M.} - 10 \text{ min} = \underline{\quad\quad} \text{ A.M.} \qquad 7:10 \text{ A.M.} - 15 \text{ min} = \underline{\quad\quad} \text{ A.M.}$$

So, Henry should wake up at _____.

4

Check

Use information from the problem to check your answer.

Begin at _____ A.M. and add the minutes from the table.

$$\square + \square + \square + \square = \square \text{ minutes}$$

_____ A.M. plus minutes is 8:15 A.M.

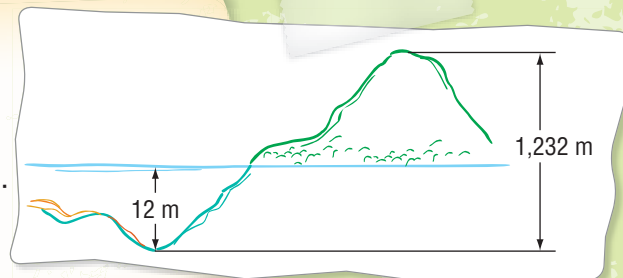


Collaborate Work with a small group to solve the following cases. Show your work on a separate piece of paper.

Case #3 Sea Level

Mr. Ignacio went diving along the coral reef in Oahu. He descended 12 meters below sea level. The difference between this point on the coral reef and the highest point on the island, Mount Ka'ala, is 1,232 meters.

How far above sea level is Mount Ka'ala?



Case #4 Cameras

Adamo saved 13 pictures on his digital camera, and deleted 32 pictures.

If there are now 108 pictures, how many pictures had he saved originally?



Case #5 Mystery Number

A number is multiplied by 4, and then 6 is added to the product. The result is 18.

What is the number?

Case #6 Ladders

You are standing on the middle rung of a ladder.

If you first climb up 3 rungs, then down 5 rungs, and then up 10 rungs to get onto the top rung, how many rungs are on the ladder?

Circle a strategy below to solve the problem.

- Make a table.
- Solve a simpler problem.
- Draw a diagram.
- Look for a pattern.

Mid-Chapter Check

Vocabulary Check



1. **CCPS Be Precise** Define *negative integer*. Give an example of a negative integer and then give its opposite. (Lesson 1)

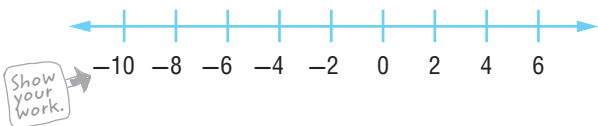
2. Fill in the blank in the sentence below with the correct term. (Lesson 2)

The _____ of the numbers -4 and 4 is 4 .

Skills Check and Problem Solving

- CCPS Model with Mathematics** Graph each set of integers on a number line. (Lesson 1)

3. $\{-4, -6, 0, 3\}$



4. $\{2, -3, 1, -1\}$



- Evaluate each expression. (Lesson 2)

5. $|-12| =$ _____ 6. $|-4| + |-10| =$ _____ 7. $|9| + |-2| =$ _____
 8. $|13| - |-5| =$ _____ 9. $|-16| - |-2| =$ _____ 10. $|-15| + |-7| =$ _____

11. Hailey, Priya, and Shetal are auditioning for the same role. Hailey auditions at 10 minutes before four, Priya auditions 30 minutes before Hailey, and Shetal auditions at 5 minutes before four. Order the three by who will audition first. (Lesson 3) _____

12. **Georgia Test Practice** The table shows the overnight low temperatures for a four-day period. (Lesson 3)

Which list shows the temperatures from least to greatest?

- (A) $-8, -11, 7, 18$ (C) $-11, -8, 7, 18$
 (B) $7, -8, -11, 18$ (D) $-11, 7, -8, 18$

Temperature ($^{\circ}\text{F}$)	
Thursday	-8
Friday	7
Saturday	18
Sunday	-11



HOW can you use a number line to model and compare positive and negative rational numbers?



Content Standards
MCC6.NS.6,
MCC6.NS.6c,
MCC6.NS.7

Mathematical Practices
1, 3, 4

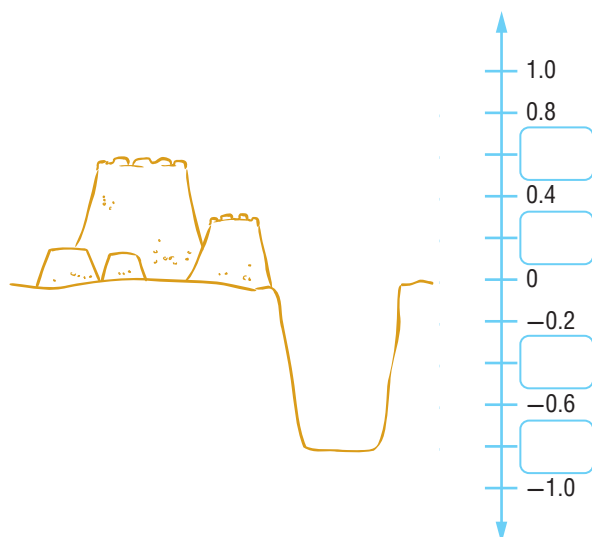
Beach Marcus and Silvio are at the beach. Marcus builds a sandcastle 0.6 meter high. Silvio digs a hole in the sand 0.8 meter deep.

Investigation 1

Just as you can graph integers on a number line, you can graph positive and negative fractions and decimals. Recall that positive numbers are to the right of zero on the number line and negative numbers are to the left of zero.



Step 1 Complete the number line from -1 to 1 , with increments of 0.2 .



Step 2 The sandcastle is above sea level. Its height is *greater than zero* on the number line, so draw a dot at to represent the sandcastle.

Step 3 The hole is below sea level. Its depth is *less than zero* on the number line. So draw a dot at to represent the hole.



Collaborate

CCPS Model with Mathematics Work with a partner. Graph each number on a number line.

1. -2.4

Show your work.



2. 0.1



3. -4.5



4. -6.8

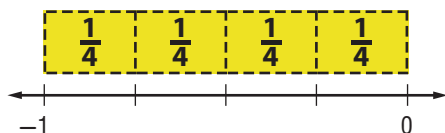


Investigation 2



Graph $-\frac{3}{4}$ on a number line.

Step 1 Model $-\frac{3}{4}$ using fraction tiles. Draw a number line from -1 to 0 . Since the denominator of the fraction is , divide your number line into equal parts.



Step 2 Each mark on the number line represents $\frac{\text{input}}{\text{input}}$. Label the number line with $-\frac{3}{4}$, $-\frac{2}{4}$, and $-\frac{1}{4}$.



Step 3 Draw a dot to graph $-\frac{3}{4}$ on the number line above.



Collaborate

CCSS Model with Mathematics Work with a partner. Graph each number on a number line.

5. $-\frac{4}{5}$

Show your work.



6. -5.75



7. $\frac{7}{10}$



8. $-\frac{3}{8}$



9. 8.75



10. $-\frac{3}{10}$



11. $-\frac{5}{12}$





Analyze

Work with a partner to complete the table. The first one is done for you.

	Number	Positive or Negative	Greater Than or Less Than Zero	Left or Right of 0 on the Number Line
	-3.5	negative	<	left
12.	$+\frac{4}{5}$			
13.	$-\frac{1}{3}$			
14.	+0.3			



15. **CCPS Reason Inductively** Which number is greater, 0.3 or -0.7 ? Explain.

16. **CCPS Reason Inductively** Jacyn thinks that $-\frac{1}{2}$ is greater than $\frac{1}{4}$ because it is farther from zero on the number line. Is her thinking correct? Explain.



Reflect

17. **CCPS Model with Mathematics** Write a real-world problem that involves a positive and a negative value. Then graph the values used in the problem on a number line. Compare the values.



18. **inquiry** HOW can you use a number line to model and compare positive and negative rational numbers?

Terminating and Repeating Decimals

What You'll Learn

Scan the lesson. Predict two things you will learn about terminating and repeating decimals.

- _____
- _____



Essential Question

HOW are integers and absolute value used in real-world situations?



Vocabulary

terminating decimal
repeating decimal
bar notation
rational number



Common Core GPS

Content Standards
Preparation for MCC6.NS.6c
and MCC6.NS.7a
Mathematical Practices
1, 2, 3, 4, 7, 8

Vocabulary Start-Up



Any number that can be written as a fraction is called a **rational number**. Every rational number can be written as either a **terminating decimal** or a **repeating decimal**.

Draw lines from each word to its matching statement.

terminating decimal

the decimal form of
a rational number;
0.33333...

repeating decimal

the decimal form of a
rational number which
has a repeating digit of
zero; 06.25



Real-World Link

Party Favors Jude is buying fruit snacks for party favors. He asks the cashier for a half pound of fruit snacks.

- Express one half as a fraction.

- Write the decimal that represents half a pound.

- Suppose Jude wanted to buy one third of a pound. What decimal would the scale show?



Key Concept

Rational Numbers

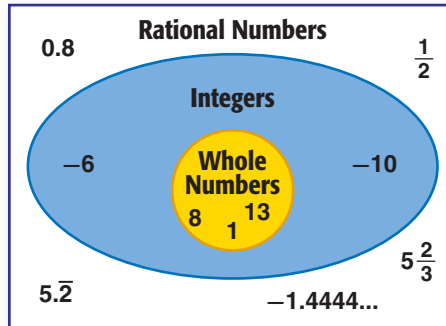


Work Zone

Words Rational numbers can be written as fractions.

Algebra $\frac{a}{b}$, where a and b are integers and $b \neq 0$.

Model



Fractions, terminating and repeating decimals, percents, and integers are all rational numbers. Every rational number can be expressed as a decimal by dividing the numerator by the denominator.

Rational Number	Repeating Decimal	Terminating Decimal
$\frac{3}{10}$	0.300...	0.3
$\frac{4}{5}$	0.800...	0.8
$\frac{5}{6}$	0.833...	does not terminate

To indicate the number pattern that repeats indefinitely, use bar notation. **Bar notation** is a bar placed over the digits that repeat.

$$0.545454... = 0.5\overline{4}$$

$$0.583333... = 0.58\overline{3}$$

Example



1. Write $\frac{5}{12}$ as a decimal.

$$\begin{array}{r}
 0.4166 \\
 12 \overline{)5.000} \\
 \underline{-48} \\
 20 \\
 \underline{-12} \\
 80 \\
 \underline{-72} \\
 80 \\
 \underline{-72} \\
 8
 \end{array}$$

Divide 5 by 12.

The remainder will never be zero.

So, $\frac{5}{12} = 0.4166... \text{ or } 0.41\overline{6}$.

Got It? Do these problems to find out.

Write each fraction as a decimal. Use bar notation if necessary.

a. $\frac{1}{6}$

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

c. $\frac{2}{11}$

Show your work.

a. _____

b. _____

c. _____

Write a Negative Fraction as a Decimal

When writing negative fractions as decimals, the process is the same. Divide as with positive fractions. Write the negative sign in front of the decimal.

Examples



2. Write $-\frac{2}{9}$ as a decimal.

$$\begin{array}{r} 0.222 \\ 9 \overline{)2.000} \\ \underline{-18} \\ 20 \\ \underline{-18} \\ 20 \\ \underline{-18} \\ 2 \end{array}$$

Divide 2 by 9.

The remainder will never be zero.

So, $-\frac{2}{9} = -0.222\dots$ or $-0.\overline{2}$.

Repeating Decimals

When dividing, it is sometimes helpful to divide until the repeated pattern is shown at least three times.

3. Write $-2\frac{2}{3}$ as a decimal.

$-2\frac{2}{3}$ can be rewritten as $-\frac{8}{3}$.

The mixed number $-2\frac{2}{3}$ can be written as $-2.\overline{6}$.

$$\begin{array}{r} 2.6\dots \\ 3 \overline{)8.0} \\ \underline{-6} \\ 20 \\ \underline{-18} \\ 2 \end{array}$$

d. _____

e. _____

f. _____

Got It? Do these problems to find out.

Write each fraction as a decimal. Use bar notation if necessary.

d. $-\frac{1}{4}$

e. $-\frac{5}{6}$

f. $-2\frac{1}{6}$



Example

Tutor



4. Frankie made 34 out of 44 free throws this season. To the nearest thousandth, what is his free-throw average?

Using a calculator, divide 34 by 44.

$$34 \div 44 \text{ [ENTER]} 0.77272727$$

To the nearest thousandth, his free-throw average is 0.773.

Got It? Do this problem to find out.

- g. Of nine students surveyed, four said they prefer exercising in the morning rather than in the evening. Express this fraction as a decimal. Use bar notation if necessary.

9. _____

Show your work.

Guided Practice

Check



Write each fraction as a decimal. Use bar notation if necessary. (Examples 1–3)

1. $\frac{7}{9} =$ _____

2. $-\frac{1}{33} =$ _____


3. $-2\frac{5}{6} =$ _____

4. $\frac{10}{15} =$ _____

5. $-\frac{4}{5} =$ _____

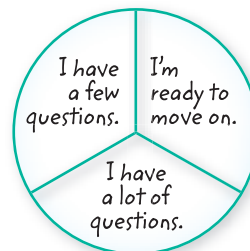
6. $1\frac{5}{9} =$ _____

7. Dana bought $\frac{2}{3}$ yard of fabric to make a new purse. Write the amount of fabric she used as a decimal. (Example 4)

8.  **Building on the Essential Question** How are repeating decimals used in real-world situations?

Rate Yourself!

Are you ready to move on?
Shade the section that applies.



For more help, go online to access a Personal Tutor.

Tutor



Independent Practice

Go online for Step-by-Step Solutions

**Write each fraction as a decimal. Use bar notation if necessary.**

(Examples 1–3)

1 $\frac{7}{15} =$ _____

2. $\frac{8}{18} =$ _____

3. $-\frac{8}{12} =$ _____

Show
your
work. →

4. $-\frac{6}{7} =$ _____

5. $3\frac{15}{44} =$ _____

6. $-2\frac{5}{22} =$ _____

7. Sarafina had 34 out of 99 hits when she was at bat during the softball season. What was her batting average? (Example 4)
- _____

8. Shiv and his friends ate $3\frac{1}{6}$ pizzas. Write this amount as a decimal. (Example 4)
- _____

Write each decimal as a fraction or mixed number in simplest form.

9. $-0.9 =$ _____

10. $-0.85 =$ _____

11. $-3.8 =$ _____

Evaluate each expression.

12. $|-2.3| =$ _____


13. $|\frac{4}{13}| =$ _____

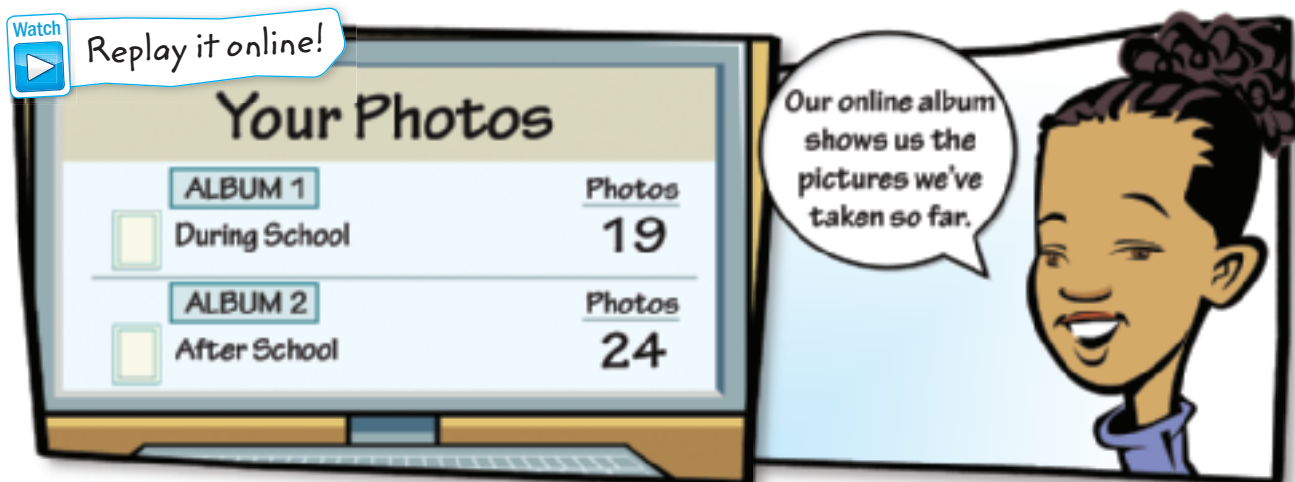
14. $|-8\frac{7}{11}| =$ _____



- 15 **STEM** There are over 2,700 species of snakes in the world. Over 600 species are venomous. Write the fraction of species that are *not* venomous as a decimal. _____

16. **CCPS Justify Conclusions** The ratio of the circumference of a circle to its diameter is represented by the number π . The number π is a decimal that does not repeat. The fraction $\frac{22}{7}$ is sometimes used as an estimate of π . Is $\frac{22}{7}$ a repeating decimal? Explain.
- _____

17. **CCPS Reason Abstractly** Refer to the graphic novel frame below for Exercises a–b.

Watch  Replay it online!



Your Photos		Photos
ALBUM 1		
	During School	19
ALBUM 2		Photos
	After School	24

- a. How many total photos were taken? _____
- b. What fraction of the photos were taken after school? Write this fraction as a decimal. Round to the nearest thousandth. _____

H.O.T. Problems Higher Order Thinking

18. **CCPS Identify Structure** Write a fraction and an equivalent terminating decimal between 0.2 and 0.6. _____
19. **CCPS Persevere with Problems** Predict whether or not the decimal equivalent to $\frac{17}{36}$ is terminating. Explain your reasoning. Check your prediction with a calculator. _____
20. **CCPS Which One Doesn't Belong?** Identify the decimal equivalent that does *not* have the same characteristic as the other three. Explain.

$$\frac{1}{12}$$

$$\frac{2}{12}$$

$$\frac{3}{12}$$

$$\frac{4}{12}$$

Georgia Test Practice

21. Which decimal represents the shaded portion of the figure below?

(A) 0.4

(C) 0.5



(B) $0.\bar{4}$

(D) $0.\bar{5}$

Extra Practice

Write each fraction as a decimal. Use bar notation if necessary.

22. $\frac{32}{75} = 0.42\overline{6}$

Homework Help →

$$\begin{array}{r} 0.42\overline{6} \\ 75 \overline{) 32.000} \\ \underline{-300} \\ 200 \\ \underline{-150} \\ 500 \\ \underline{-450} \\ 50 \end{array}$$

23. $\frac{3}{11} =$ _____

24. $-\frac{5}{8} =$ _____

25. $-\frac{7}{10} =$ _____

26. $2\frac{5}{7} =$ _____

27. $-1\frac{80}{99} =$ _____

28. Cris answered 61 out of 66 questions correctly on a test. What is his test average to the nearest thousandth? _____

Write each decimal as a fraction or mixed number in simplest form.

29. $-0.15 =$ _____

30. $-7.75 =$ _____

31. $-12.54 =$ _____

32. **CCPS Identify Repeated Reasoning** The table shows the decimal equivalent to fractions with a denominator of 7.

a. What do you notice about the pattern of the six repeated numbers?

b. Using the decimals, add the first half of each pattern to the numbers in the last half. For example, $\frac{1}{7} = 0.\overline{142857}$, so add $142 + 857$.

What pattern do you notice? _____

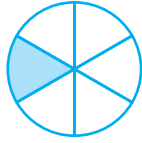
c. Using a calculator, try the same experiment with $\frac{5}{13}$. Is the result the same? Justify your reasoning. _____

Fraction	Decimal	Fraction	Decimal
$\frac{1}{7}$	$0.\overline{142857}$	$\frac{4}{7}$	$0.\overline{571428}$
$\frac{2}{7}$	$0.\overline{285714}$	$\frac{5}{7}$	$0.\overline{714285}$
$\frac{3}{7}$	$0.\overline{428571}$	$\frac{6}{7}$	$0.\overline{857142}$



Georgia Test Practice

33. Which decimal represents the shaded portion of the figure below?



- (A) 0.16
- (B) $0.1\bar{6}$
- (C) 0.17
- (D) 1.6

34. Which of the following is *not* equivalent to $0.\bar{3}$?

- (F) $\frac{1}{3}$
- (G) $\frac{3}{9}$
- (H) $\frac{3}{10}$
- (I) $\frac{11}{33}$

35. **Short Response** Write -1.25 as a fraction.



Common Core Review

Fill in each with $<$ or $>$ to make a true statement. **MCC4.NBT.2**

36. $4,556$ $4,565$

37. $8,698$ $8,689$

38. $47,872$ $47,871$

39. $26,525$ $26,522$

40. $1,123,004$ $1,123,040$

41. $5,776,050$ $5,775,005$

42. The table shows the number of miles Katie walked for two weeks. Compare the distances using the $<$ symbol. **MCC5.NBT.3b**

Week	Number of Miles
1	5.78
2	5.691

43. The table shows the amount of different colored paints in a bin in art class. Compare the amount of blue and orange paint using the $>$ symbol. **MCC5.NBT.3**

Color	Number of Ounces
Blue	47.362
Green	47.637
Orange	47.394
Yellow	47.583

Compare and Order Rational Numbers

What You'll Learn

Scan the lesson. List two headings you would use to make an outline of the lesson.

- _____
- _____



Essential Question

HOW are integers and absolute value used in real-world situations?



Common Core GPS

Content Standards
MCC6.NS.6, MCC6.NS.6c,
MCC6.NS.7, MCC6.NS.7a,
MCC6.NS.7b

Mathematical Practices
1, 2, 3, 4, 5, 7

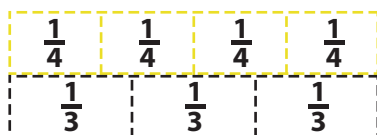


Real-World Link

Insects The lengths of several common types of insects are shown in the table.

- Which of the insects is the longest?

- Shade each fraction strip to represent the lengths of a fire ant and a housefly. Which is longer, the fire ant or housefly?



Insect	Length (in.)
Green June Beetle	$\frac{3}{4}$
Cricket	$\frac{1}{1}$
Fire ant	$\frac{1}{3}$
Firefly	$\frac{3}{4}$
Housefly	$\frac{1}{4}$
Japanese beetle	$\frac{1}{2}$
Mosquito	$\frac{5}{8}$

- How many of the insects are longer than 0.5 inch?

- Order the lengths of a housefly, a Green June beetle, and a fire ant from the shortest to longest.

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Compare Decimals and Fractions

Positive and negative rational numbers can be represented on a number line. You can use a number line to help you compare and order rational numbers.

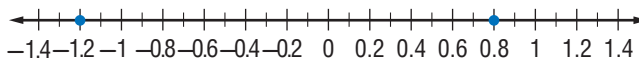
Examples



Fill in each \bigcirc with $<$, $>$, or $=$ to make a true statement.

1. $-1.2 \bigcirc 0.8$

Graph the decimals on a number line.

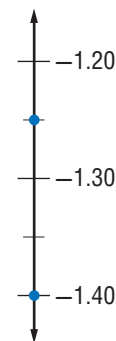


Since -1.2 is to the left of 0.8 , $-1.2 < 0.8$.

2. $-1.40 \bigcirc -1.25$

Graph the decimals on a number line.

Since -1.40 is below -1.25 , $-1.40 < -1.25$.

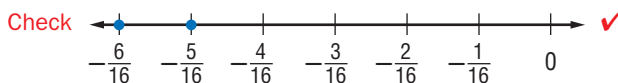


3. $-\frac{3}{8} \bigcirc -\frac{5}{16}$

Rename the fractions using the least common denominator.

$$-\frac{3}{8} = -\frac{3 \times 2}{8 \times 2} = -\frac{6}{16} \qquad -\frac{5}{16} = -\frac{5 \times 1}{16 \times 1} = -\frac{5}{16}$$

Since $-6 < -5$, $-\frac{6}{16} < -\frac{5}{16}$ and $-\frac{3}{8} < -\frac{5}{16}$.



Least Common Multiple (LCM)

Find the LCM of 8 and 16.

8: 8, 16, 24

16: 16, 32, 48

The LCM is 16.

Got It? Do these problems to find out.

a. $3.1 \bigcirc -3.7$

b. $-4.5 \bigcirc -4.49$

c. $\frac{9}{16} \bigcirc \frac{12}{16}$

d. $-\frac{7}{10} \bigcirc -\frac{4}{5}$

Compare and Order Rational Numbers

To compare and order rational numbers, first write them in the same form.

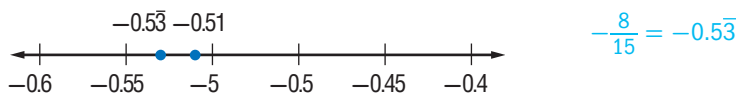
Examples



Fill in each with $<$, $>$, or $=$ to make a true statement.

4. -0.51 $-\frac{8}{15}$

Rename $-\frac{8}{15}$ as a decimal. Then graph both decimals on a number line.

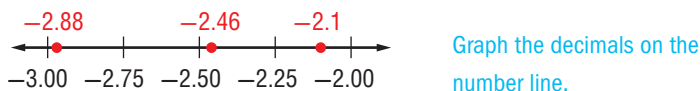


Since -0.51 is to the right of $-0.5\bar{3}$ on the number line,
 $-0.51 > -\frac{8}{15}$.

5. Order the set $\{-2.46, -2\frac{22}{25}, -2\frac{1}{10}\}$ from least to greatest.

Write $-2\frac{22}{25}$ and $-2\frac{1}{10}$ as decimals to the hundredths place.

$$-2\frac{22}{25} = -2.88 \quad -2\frac{1}{10} = -2.1$$



From least to greatest, the order is $-2\frac{22}{25}$, -2.46 , and $-2\frac{1}{10}$.

Got It? Do these problems to find out.

Fill in each with $<$, $>$, or $=$ to make a true statement.

e. $-3\frac{5}{8}$ -3.625

f. $\frac{3}{7}$ 0.413

g. Order the set $\{-7\frac{13}{20}, -7.78, -7\frac{17}{100}\}$ from greatest to least.

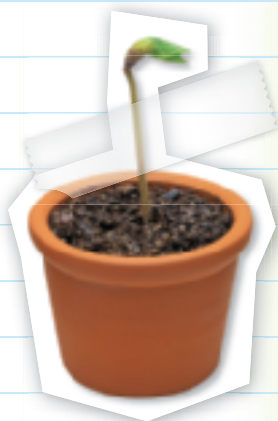
9. _____

STOP and Reflect
 How could you represent that -8.3 feet is deeper than -5.7 feet? Explain.

Show your work.



Example



- 6.** Mr. Plum's science class is growing plants under different conditions. The table shows the difference from the average for some students' plants. Order the differences from least to greatest.

Student	Difference (in.)
Ricky	$3\frac{1}{4}$
Debbie	-2.2
Suni	1.7
Leonora	$-1\frac{7}{10}$

Express each number as a decimal.

Ricky's plant: $3\frac{1}{4} = 3.25$

Debbie's plant: -2.2

Suni's plant: 1.7

Leonora's plant: $-1\frac{7}{10} = -1.7$

From least to greatest, the differences are -2.2, $-1\frac{7}{10}$, 1.7, and $3\frac{1}{4}$.

Guided Practice



Fill in each \bigcirc with $<$, $>$, or $=$ to make a true statement. (Examples 1-4)

1. $9.7 \bigcirc -10.3$

2. $\frac{5}{8} \bigcirc -\frac{3}{8}$

3. $-6.7 \bigcirc -6\frac{7}{10}$

4. $-\frac{5}{6} \bigcirc -0.94$



Order the following sets of numbers from least to greatest. (Example 5)

5. $\{-3\frac{1}{3}, 3.3, -3\frac{3}{4}, 3.5\}$ _____

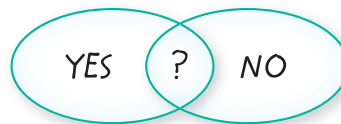
6. $\{2.\bar{1}, -2.1, 2\frac{1}{11}, -2\}$ _____

- 7. Financial Literacy** Steve recorded these amounts in his checkbook: -\$6.50, \$7.00, -\$6.75, and \$7.25. Order these amounts from least to greatest. (Example 6)

- 8. Building on the Essential Question** How can a number line help in ordering rational numbers?

Rate Yourself!

Are you ready to move on?
Shade the section that applies.



For more help, go online to access a Personal Tutor.



FOLDABLES Time to update your Foldable!

Independent Practice

Go online for Step-by-Step Solutions 

Fill in each \bigcirc with $<$, $>$, or $=$ to make a true statement. (Examples 1–4)

1. $\frac{5}{4} \bigcirc -\frac{1}{4}$

Show your work. 

2. $-6\frac{1}{3} \bigcirc -6.375$

3. $-\frac{3}{5} \bigcirc -0.6$

4. $-9\frac{2}{7} \bigcirc -9.3$

Order each set of numbers from least to greatest. (Example 5)

5. $\left\{2.8, -2\frac{3}{4}, 3\frac{1}{8}, -2.\bar{2}\right\}$ _____

6. $\left\{\frac{2}{3}, -0.6, 0.65, \frac{4}{5}\right\}$ _____

7. **Financial Literacy** The change in four stocks during a day are: $-4\frac{1}{2}$, 5.6, $-2\frac{3}{8}$, and 1.35.

Order the changes from least to greatest. (Example 6)

8. **CCPS Multiple Representations** Consider the inequality $-3.5 < -1.5$.

a. **Words** Write a real-world problem that could be represented by the inequality.

b. **Number Line** Graph -3.5 and -1.5 on the number line.

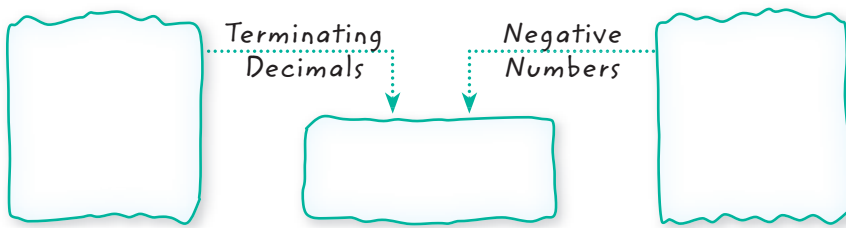


c. **Symbols** Use the symbol $>$ to compare -3.5 and -1.5 .

9. For a STEM competition, Julianne constructed a model rocket. The rocket can reach an average height of 545 feet. Find the differences between the average height and the actual heights reached. Then write them as positive and negative rational numbers. Order the differences from least to greatest.

Trials	Actual Height (ft)
1	534.2
2	556.4
3	554.0
4	535.3

10. **CCPS Identify Structure** Fill in the diagram with appropriate numbers.



H.O.T. Problems Higher Order Thinking

11. **CCPS Reason Inductively** Determine whether the following statement is always, sometimes, or never true. Give examples to justify your answer.
If x and y are both greater than zero and $x > y$, then $-x < -y$.

12. **CCPS Justify Conclusions** Determine whether the fractions $-\frac{4}{5}$, $-\frac{4}{6}$, $-\frac{4}{7}$, and $-\frac{4}{8}$ are arranged in order from least to greatest. Explain.

13. **CCPS Reason Abstractly** Explain why -0.33 is greater than $-0.\overline{33}$.

14. **CCPS Persevere with Problems** Compare the set $\{-0.\overline{7}, -0.\overline{67}, -\frac{7}{9}, -\frac{2}{3}\}$. Explain your answer.

Georgia Test Practice

15. Which of the following numbers is less than $-\frac{2}{3}$?

- (A) 0.6 (C) $0.\overline{6}$
(B) $\frac{1}{3}$ (D) $-\frac{5}{6}$

Extra Practice

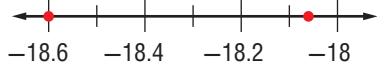
Fill in each \bigcirc with $<$, $>$, or $=$ to make a true statement.

16. $-18.6 < -18.06$

17. $-4.08 \bigcirc -4.7$

18. $-\frac{3}{7} \bigcirc -\frac{2}{5}$

Homework Help



19. $-3.375 \bigcirc -3\frac{4}{10}$

20. $-5\frac{1}{5} \bigcirc -5.2$

21. $-8\frac{2}{5} \bigcirc -8.3$

Order the following sets of numbers from least to greatest.

22. $\left\{ \frac{1}{8}, -0.02\bar{5}, 0.2, -\frac{1}{7} \right\}$ _____

23. $\left\{ 1.25, 1\frac{3}{4}, 1.2\bar{5}, 1\frac{1}{5} \right\}$ _____

24. **CCPS Reason Inductively** The average amount of time Brent spent in-line skating for one week was 34 minutes. During the next week, the difference between the average time and actual time spent skating was 4.2 minutes, $-5\frac{1}{3}$ minutes, $-2\frac{1}{2}$ minutes, and 3.75 minutes.

Order these differences from least to greatest. _____



Fill in each \bigcirc with $<$, $>$, or $=$ to make a true statement.

25. $-4\frac{4}{5} \bigcirc -4.\bar{7}$

26. $-3.2\bar{5} \bigcirc -3.\bar{2}$

27. $-5.\overline{31} \bigcirc -5.\overline{313}$

28. The table shows the profit or loss of the after-school snack stand.

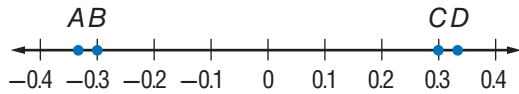
- a. Write each profit as a positive number and each loss as a negative number. _____
- b. Order the numbers from least to greatest. _____

Day	Profit or Loss	(\$)
1	Profit	7.50
2	Loss	3.50
3	Loss	6.00
4	Profit	4.50



Georgia Test Practice

29. Which point shows the approximate location of $-\frac{1}{3}$?

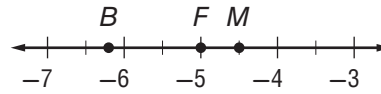


- (A) point A (B) point B (C) point C (D) point D

30. Which number has the least value?

- (F) $-2\frac{3}{10}$ (G) -2.47 (H) -3.62 (I) $-3\frac{17}{20}$

31. Refer to the number line. Which inequality is true?



- (A) point B > point M (B) point F < point B (C) point M < point F (D) point F < point M

32. Which of the following numbers is the greatest?

- (F) -0.73 (G) 0.32 (H) -0.21 (I) 0.19

33. Short Response Student Council's goal was to raise \$50 each week for 4 weeks to have enough money for the school dance. The table shows the difference between the goal and the actual amount raised. Order these amounts from least to greatest.

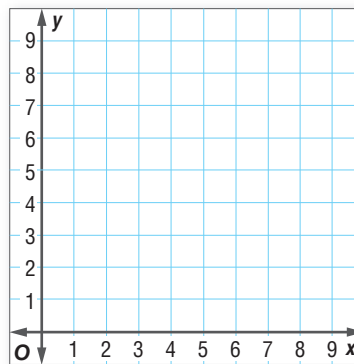
Week	1	2	3	4
Difference (\$)	5.50	-6.25	7.80	-2.45



Common Core Review

Graph the points on the coordinate plane. MCC5.G.1

- 34. H(1, 6) 35. M(7, 0)
- 36. I(5, 8) 37. N(4, 9)
- 38. J(6, 3) 39. O(7, 5)
- 40. L(3, 1) 41. P(2, 2)



42. Graph the point on the number line that represents $\frac{3}{10}$ and label it A. MCC4.NF.6



The Coordinate Plane

What You'll Learn

Scan the lesson. List two real-world scenarios where you would use the coordinate plane.

- _____
- _____



Essential Question

HOW are integers and absolute value used in real-world situations?



Vocabulary

quadrants



Common Core GPS

Content Standards
 MCC6.NS.6, MCC6.NS.6b,
 MCC6.NS.6c

Mathematical Practices
 1, 3, 4, 5, 7

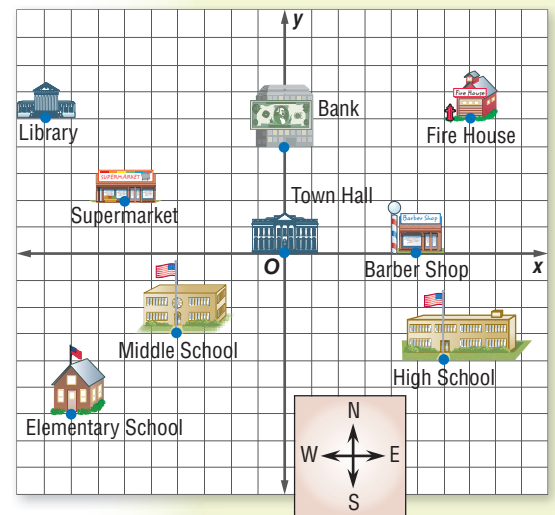


Real-World Link



Maps The map shows the layout of a small town. The locations of buildings are described in respect to the town hall. Each unit on the grid represents one block.

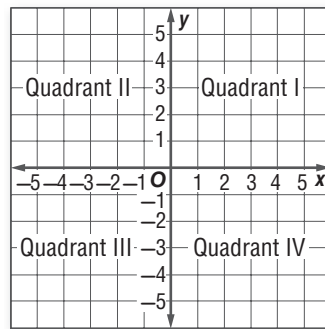
- Describe the location of the barber shop in relation to the town hall. _____
- What building is located 7 blocks east and 5 blocks north of the town hall? _____
- Violeta is at the library. Describe how many blocks and in what direction she should travel to get to the supermarket. _____
- Town Hall and the bank are both located on the same vertical number line. The number 0 represents the location of Town Hall on the number line. What number represents the location of the bank?



Identify Points and Ordered Pairs

A coordinate plane is formed when the x -axis and y -axis intersect at their zero points. The axes separate the coordinate plane into four regions called **quadrants**.

You can use the location on the plane or use the x -coordinates and y -coordinates to identify the quadrant in which a point is located.



Quadrant	x -coordinate	y -coordinate	Example
I	positive	positive	(2, 5)
II	negative	positive	(-2, 5)
III	negative	negative	(-2, -5)
IV	positive	negative	(2, -5)

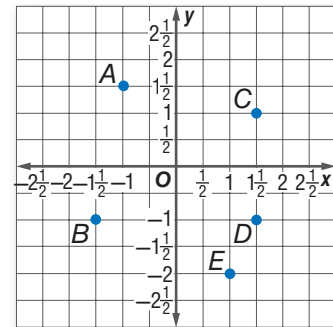
Ordered Pairs

A point located on the x -axis will have a y -coordinate of 0. A point located on the y -axis will have an x -coordinate of 0. Points located on an axis are not in any quadrant.

Examples



- Identify the ordered pair that names point C. Then identify the quadrant in which it is located.



Step 1 Start at the origin. Move right on the x -axis. The x -coordinate of point C is $1\frac{1}{2}$.

Step 2 Move up the y -axis. The y -coordinate is 1.

Point C is located at $(1\frac{1}{2}, 1)$. Both coordinates are positive. So, point C is in Quadrant I.

- Identify the point located at $(-1\frac{1}{2}, -1)$. Then identify the quadrant in which it is located.

Step 1 Start at the origin. Move left on the x -axis. The x -coordinate is $-1\frac{1}{2}$.

Step 2 Move down the y -axis. The y -coordinate is -1 .

Point B is located at $(-1\frac{1}{2}, -1)$. Both coordinates are negative. So, point B is in Quadrant III.

Got It? Do these problems to find out.

- Identify the ordered pair that names point A. Then identify the quadrant in which it is located.
- Identify the point located at $(1, -2)$. Then identify the quadrant in which it is located.

Show your work. →

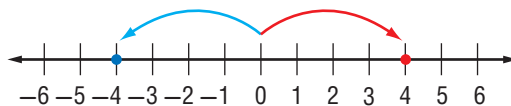
a. _____

b. _____

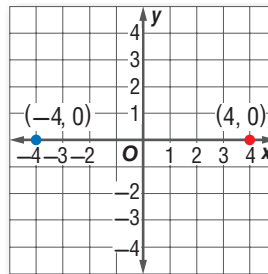
Reflections on the Coordinate Plane

You can use what you know about number lines and opposites to compare locations on the coordinate plane. Consider the number line and coordinate plane below.

The number line shows that -4 and 4 are opposites.



The coordinate plane shows that the points $(-4, 0)$ and $(4, 0)$ are the same distance from the y -axis in opposite directions. So, they are *reflected* across the y -axis. Notice that the y -coordinates did not change and that the x -coordinates are opposites.



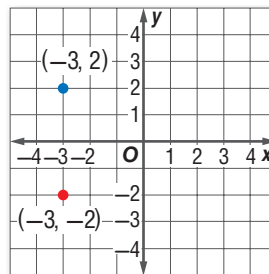
Example



- Name the ordered pair that is a reflection of $(-3, 2)$ across the x -axis.

To reflect across the x -axis, keep the same x -coordinate, -3 , and take the opposite of the y -coordinate. The opposite of $+2$ is -2 .

So, $(-3, 2)$ reflected across the x -axis is located at $(-3, -2)$.



c. _____

d. _____

e. _____

Got It? Do these problems to find out.

Name the ordered pair that is a reflection of each point across the x -axis.

c. $(1, -4)$

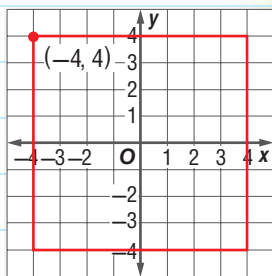
d. $(-2, 5)$

e. $(-3, -1)$



Example

Tutor



- 4.** Kendall is building a square fence. She places fence posts at the locations indicated on the grid. What is the location of the post that reflects $(-4, 4)$ across the y -axis?

To reflect across the y -axis, keep the same y -coordinate, 4.

The opposite of the x -coordinate, -4 , is 4.

So, $(-4, 4)$ reflected across the y -axis is $(4, 4)$.

Got It? Do this problem to find out.

f. _____

Show your work.

- f. Kendall also placed a fence post at $(-4, -4)$. What is the location of the post that reflects $(-4, -4)$ across the y -axis?

Guided Practice

Check

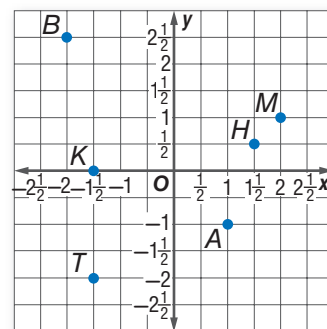


Identify the ordered pair that names each point or the name of each point. Then identify the quadrant in which it is located. (Examples 1 and 2)

1. T

2. $(-1\frac{1}{2}, 0)$

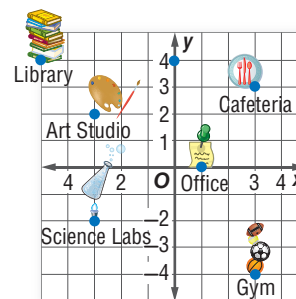
3. $(-2, 2\frac{1}{2})$



- 4.** Refer to the diagram of a school. (Examples 3 and 4)

a. What is located at the reflection of $(-3, -4)$ across the y -axis. What are the coordinates of this location?

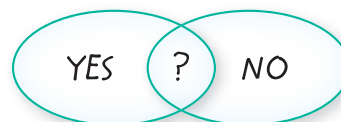
b. What is located at the reflection of the science labs across the x -axis? What are the coordinates of this location?



- 5.** **Building on the Essential Question** How are number lines and the coordinate plane related?

Rate Yourself!

Are you ready to move on?
Shade the section that applies.



For more help, go online to access a Personal Tutor.

Tutor

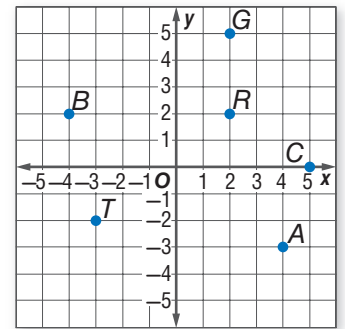


Independent Practice

Go online for Step-by-Step Solutions



Identify the ordered pair that names each point. Then identify the quadrant in which it is located. (Example 1)



1. *R*

2. *G*

3. *B*

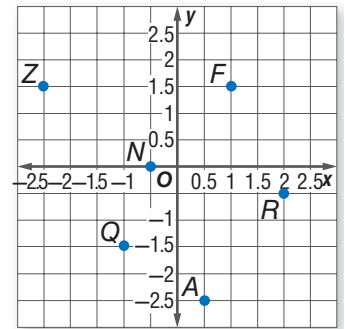
Show your work.

4. *T*

5. *C*

6. *A*

Identify the name of each point. Then identify the quadrant in which it is located. (Example 2)



7. $(-2.5, 1.5)$

8. $(1, 1.5)$

9. $(0.5, -2.5)$

10. $(2, -0.5)$

11. $(-0.5, 0)$

12. $(-1, -1.5)$

13. **CCPS Use Math Tools** Refer to the map of Wonderland Park. (Examples 3 and 4)

a. What is located closest to the origin?

b. Liza is standing at $(2, 4)$. What is located at the reflection of $(2, 4)$ across the x -axis? What are the coordinates of this location?

c. What is located at the reflection of $(3, 1)$ across the y -axis? What are the coordinates of this location?

d. The Pipeline Plunge is reflected across the x -axis. What are the coordinates of its new location?



14. **CCPS Identify Structure** Fill in the graphic organizer below. Consider the point $(-3, 2)$.

Action	Result
opposite of -3	
point $(-3, 2)$ reflected across the y -axis	
point $(-3, 2)$ reflected across the x -axis	

H.O.T. Problems Higher Order Thinking

CCPS Persevere with Problems Without graphing, identify the quadrant(s) for which each of the following statements is true for any point (x, y) . Justify your response.

15. The x - and y -coordinates have the same sign.

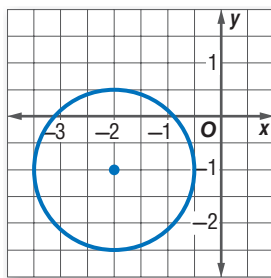
16. The x - and y -coordinates have opposite signs.

17. **CCPS Reason Inductively** Does the order of the numbers in an ordered pair matter when naming a point? Can that point be represented by more than one ordered pair?

Georgia Test Practice

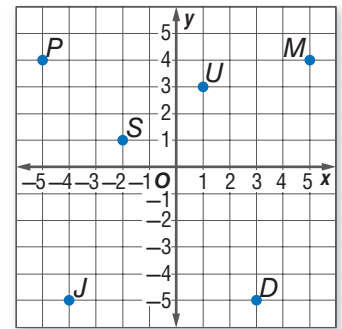
18. Which of the following coordinates lie within the circle graphed below?

- (A) $(-1, 1.5)$ (C) $(-0.5, 1)$
 (B) $(-1.5, -2)$ (D) $(-1.5, 2)$



Extra Practice

Identify the ordered pair that names each point. Then identify the quadrant in which it is located.



19. *U*

Homework Help

$(1, 3); I$

Both numbers are positive so it is in the first quadrant.

20. *D*

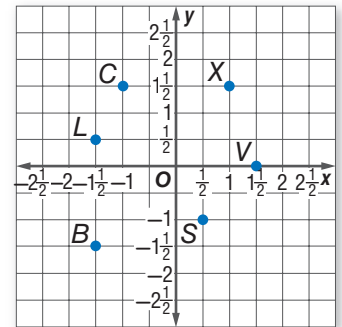
21. *S*

22. *P*

23. *J*

24. *M*

Identify the name of each point. Then identify the quadrant in which it is located.



25. $(-1\frac{1}{2}, \frac{1}{2})$

26. $(1, 1\frac{1}{2})$

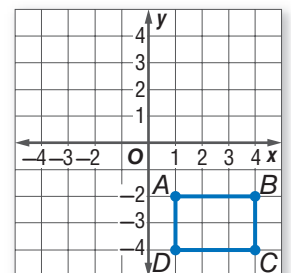
27. $(\frac{1}{2}, -1)$

28. $(1\frac{1}{2}, 0)$

29. $(-1\frac{1}{2}, -1\frac{1}{2})$

30. $(-1, 1\frac{1}{2})$

31. **CCPS Model with Mathematics** Luke is making a model of a park. He has the basketball court drawn on his model.



a. The swing set is located at the reflection of point *B* across the *x*-axis. What ordered pair describes the location of the swing set?

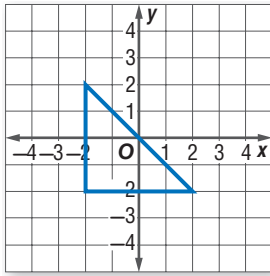
b. The slide is located at the reflection of point *C* across the *x*-axis. What ordered pair describes the location of the slide?

c. A water fountain is located at the reflection of point *D* across the *y*-axis. What ordered pair describes the location of the water fountain?



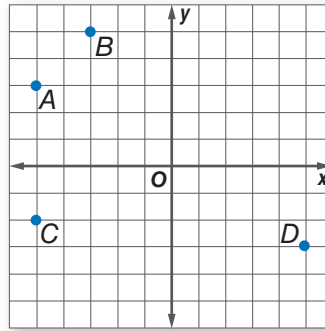
Georgia Test Practice

32. Which of the following coordinates lie within the triangle graphed below?



- (A) (1, 0)
- (B) (-2, -3)
- (C) (-1, 2)
- (D) (-1, -1)

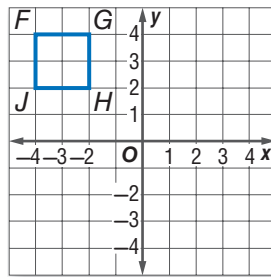
33. Identify the point for the ordered pair (-3, 5).



- (F) Point A
- (G) Point B
- (H) Point C
- (I) Point D

34. Which ordered pair represents the reflection of point J across the y-axis?

- (A) (-4, -2)
- (B) (4, 4)
- (C) (4, 2)
- (D) (2, 2)



Common Core Review

Represent the set of numbers as decimals on the number line. **MCC4.NF.6**

35. $\left\{3\frac{1}{10}, 2\frac{7}{10}, 2\frac{9}{10}\right\}$



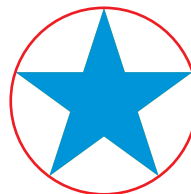
36. $\left\{5\frac{3}{10}, 5\frac{1}{10}, 5\right\}$



37. The table shows how many magazines three co-workers sold in one month. How many magazines did they sell in total? **MCC4.NBT.4**

Name	Number of Magazines
Julie	12
Dion	0
Calvin	7

38. Draw a line of symmetry on the figure shown. **MCC4.G.3**



Graph on the Coordinate Plane

What You'll Learn

Scan the lesson. Predict two things you will learn about graphing on the coordinate plane.

- _____
- _____



Essential Question

HOW are integers and absolute value used in real-world situations?



Common Core GPS

Content Standards
MCC6.NS.6, MCC6.NS.6b,
MCC6.NS.6c, MCC6.NS.8

Mathematical Practices
1, 2, 3, 4, 7



Real-World Link

Scavenger Hunt Maria hid the clues to a scavenger hunt for her hiking club. Use the map to show where she hid the clues. Identify the location of each clue.

- The first clue is hidden near a tree. What ordered pair describes its location?

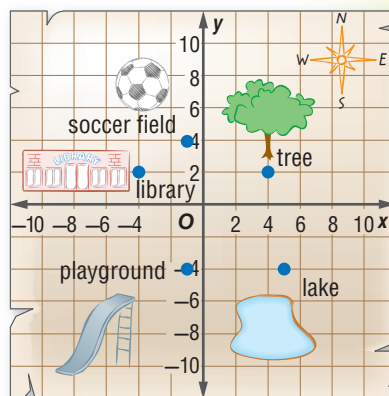
- Maria hid the next clue at a location reflected across the y -axis. Where is it hidden?

- She walks 3 blocks east and 2 blocks north to place the next clue. Where is it hidden?

- The next clue is at a location reflected across the x -axis. Where is it hidden?

- Maria hid the next clue under a rock by the lake. How many blocks east did she walk to the lake?

- The final clue tells the hikers to walk 5 blocks north and three blocks east to find the prize. What ordered pair describes the location of the prize?



Graph Ordered Pairs

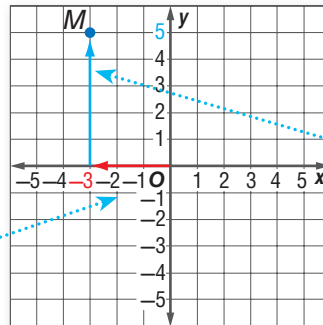
To graph an ordered pair, draw a dot at the point that corresponds to the coordinates.

Examples



1. Graph point M at $(-3, 5)$.

Start at the origin. The x-coordinate is -3 . So, move 3 units to the left.

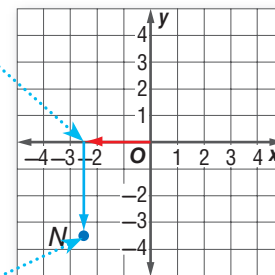


Next, since the y-coordinate is 5, move 5 units up. Draw a dot.

2. Graph point N at $(-2\frac{1}{2}, -3\frac{1}{2})$.

The x-coordinate $-2\frac{1}{2}$ is between -2 and -3 .

Start at the origin and move $2\frac{1}{2}$ units left.



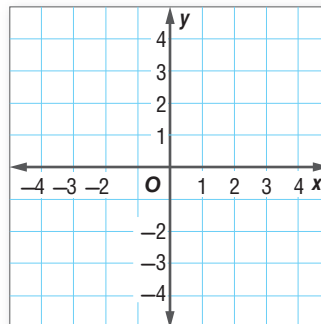
The y-coordinate $-3\frac{1}{2}$ is between -3 and -4 .

Next, move $3\frac{1}{2}$ units down. Draw a dot.

Got It? Do these problems to find out.

Graph and label each point on the coordinate plane below.

- a. $P(-2, 4)$
- b. $Q(0, -4)$
- c. $R(-\frac{1}{2}, -2\frac{1}{2})$
- d. $S(4.5, 1)$



Graph Reflections on the Coordinate Plane

You can graph points that are reflected across the x - and y -axes. Remember that points reflected across the x -axis will have the same x -coordinates and their y -coordinates will be opposites. Points reflected across the y -axis will have the same y -coordinates and their x -coordinates will be opposites.

Symbols

Use the notation A' to label the reflection of a point A .

Examples



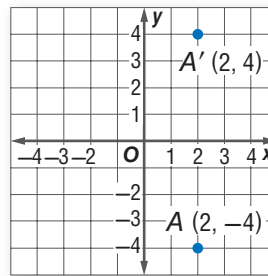
3. Graph $A(2, -4)$. Then graph its reflection across the x -axis.

Graph point A .

To reflect across the x -axis, keep the same x -coordinate, 2, and take the opposite of the y -coordinate.

The opposite of -4 is 4.

So, point A reflected across the x -axis is located at point $A'(2, 4)$. Graph point A' .



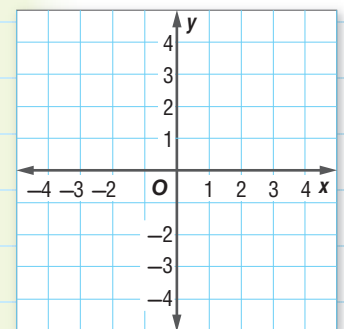
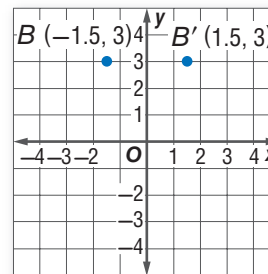
4. Graph $B(-1.5, 3)$. Then graph its reflection across the y -axis.

Graph point B .

To reflect across the y -axis, keep the same y -coordinate and take the opposite of the x -coordinate.

The opposite of -1.5 is 1.5.

So, point B reflected across the y -axis is point $B'(1.5, 3)$.



Got It? Do these problems to find out.

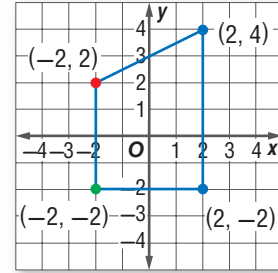
- Graph $C(-1, -5)$. Then graph its reflection across the x -axis.
- Graph $D(2, 3\frac{1}{2})$. Then graph its reflection across the y -axis.



Example



5. Mr. Martin is using a coordinate plane to design a logo. He graphs points at $(2, 4)$ and $(2, -2)$. He reflects $(2, -2)$ across the y -axis. Then he reflects the new point across the x -axis. What figure is Mr. Martin using for his logo?



Graph $(2, 4)$ and $(2, -2)$. $(2, -2)$ reflected across the y -axis is $(-2, -2)$.
Graph $(-2, -2)$. $(-2, -2)$ reflected across the x -axis is $(-2, 2)$.
Graph $(-2, 2)$.

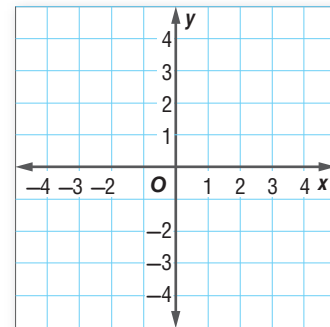
So, the figure is a trapezoid.

Show your work.

9. _____

Got It? Do this problem to find out.

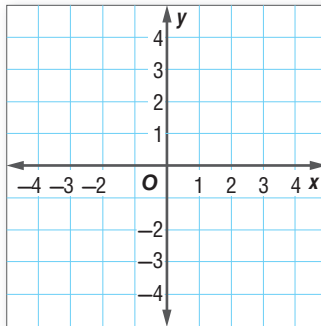
- g. Ms. Shaull is drawing a map of the school. Her room is at $(-3, 4)$ and the gym is at $(3, 4)$. The library is a reflection of $(3, 4)$ across the x -axis. This point is reflected across the y -axis to graph the office. What figure is graphed on the map?



Guided Practice



1. Use a coordinate plane to represent Jasmine's stone garden. Graph points $E(-1, -4)$ and $F(-3\frac{1}{2}, 4)$. Then reflect point E across the y -axis and point F across the x -axis. What is the shape of her stone garden? (Examples 1–5)



Show your work.

2. **Building on the Essential Question** How can the coordinate plane be used to represent geometric figures?

Rate Yourself!

How confident are you about graphing on the coordinate plane? Check the box that applies.



For more help, go online to access a Personal Tutor.



Independent Practice

Go online for Step-by-Step Solutions 

Graph and label each point on the coordinate plane to the right.


(Examples 1 and 2)

1. $T(0, 0)$

2. $D(2, 1)$

3. $K(-3.25, 3)$

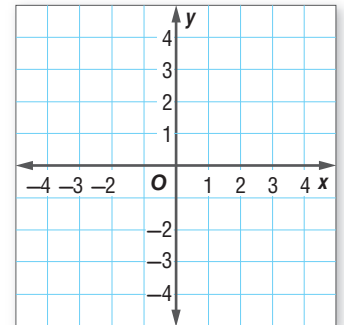
4. $N\left(0, -1\frac{1}{2}\right)$


 5. $F(-4.5, 0)$

6. $A\left(-3\frac{1}{2}, -3\right)$

7. $L(2.5, -3.5)$

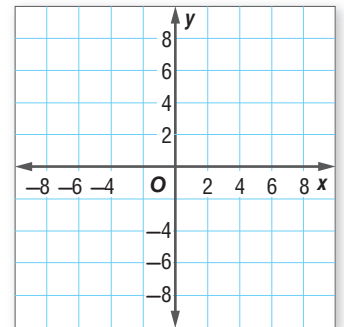
8. $S\left(4, 2\frac{1}{2}\right)$



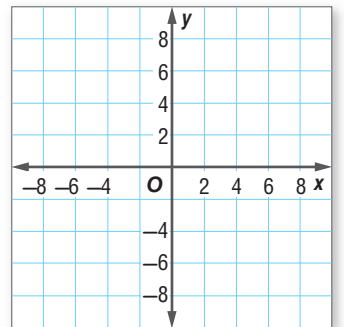
 9. Graph $U(3.5, -3)$ on the coordinate plane to the right. Then graph its reflection across the x-axis. (Example 3)

10. Graph $B(-7, 6)$ on the coordinate plane on the right. Then graph its reflection across the x-axis. (Example 3)


11. Graph $R(-2, 5)$ on the coordinate plane to the right. Then graph its reflection across the y-axis. (Example 4)



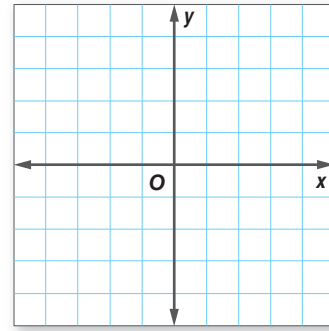
12. Amelia is drawing a map of the park. She graphs the entrance at $(2, -3)$. She reflects $(2, -3)$ across the y-axis. Then Amelia reflects the new point across the x-axis. What figure is graphed on the map? (Example 5)



13. A point is reflected across the y-axis. The new point is located at $(-4.25, -1.75)$. Write the ordered pair that represents the original point. _____

14.  **Model with Mathematics** A point is reflected across the x-axis. The new point is $(-7.5, 6)$. What is the distance between the two points?

- 15** On a coordinate plane, draw triangle ABC with vertices $A(-1, -1)$, $B(3, -1)$, and $C(-1, 2)$. Find the area of the triangle in square units.
-



- 16.** The points $(4, 3)$ and $(-4, 0)$ are graphed on a coordinate plane. The point $(4, 3)$ is reflected across the x - and y -axes. If all four points are connected, what figure is graphed?
-



H.O.T. Problems Higher Order Thinking

- 17. CCPS Identify Structure** Three vertices of a quadrilateral are $(-1, -1)$, $(1, 2)$, and $(5, -1)$. What are the coordinates of two vertices that will form two different parallelograms? _____

CCPS Persevere with Problems Determine whether each statement is *sometimes*, *always*, or *never* true. Give an example or a counterexample.

- 18.** When a point is reflected across the y -axis, the new point has a negative x -coordinate. _____
-

- 19.** The point (x, y) is reflected across the x -axis. Then the new point is reflected across the y -axis. The location of the point after both reflections is $(-x, -y)$. _____
-



Georgia Test Practice

- 20.** What are the coordinates of Y' after $Y(-3.5, 5)$ is reflected across the x -axis?
- (A) $(3.5, -5)$ (C) $(5, -3.5)$
(B) $(-3.5, -5)$ (D) $(3.5, 5)$

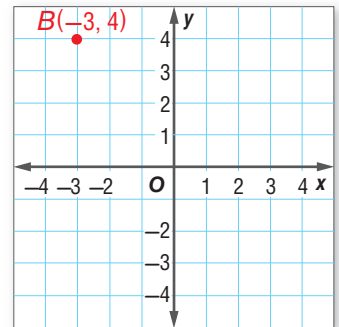
Extra Practice

Graph and label each point on the coordinate plane to the right.

21. $B(-3, 4)$ *The x-coordinate* 22. $D(-1.5, 2.5)$

Homework Help

→ *is -3. The y-coordinate is 4.*



23. $A(4\frac{3}{4}, -1\frac{1}{4})$

24. $J(2\frac{1}{2}, -2\frac{1}{2})$

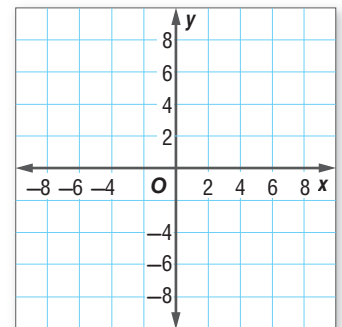
25. $C(1, 4.5)$

26. $F(-4, -3.5)$

27. $G(3\frac{1}{2}, 3)$

28. $H(-3, -1\frac{1}{2})$

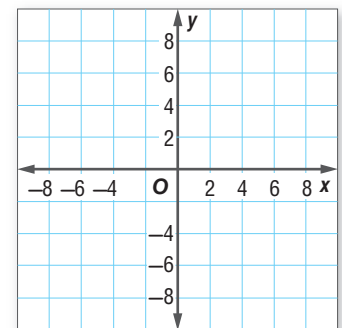
29. Graph $N(1, -3)$ on the coordinate plane to the right. Then graph its reflection across the y-axis.



30. Graph $H(7, 8)$ on the coordinate plane on the right. Then graph its reflection across the x-axis.

31. Graph $F(-6, 5.5)$ on the coordinate plane to the right. Then graph its reflection across the x-axis.

32. Marcus is drawing a plan for his vegetable garden. He graphs one corner at $(-7.5, 2)$ and one corner at $(7.5, 2)$. He reflects $(-7.5, 2)$ across the x-axis. Then Marcus reflects the new point across the y-axis. What shape is the vegetable garden?



33. A point is reflected across the x-axis. The new point is located at $(4.75, -2.25)$. Write the ordered pair that represents the original point.

34. **CCPS Model with Mathematics** A point is reflected across the x-axis. The new point is $(5, -3.5)$. What is the distance between the two points?



Georgia Test Practice

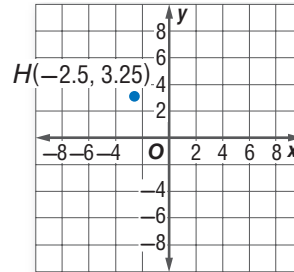
35. What are the coordinates of $B(-0.5, 2)$ after it is reflected across the y -axis?

- (A) $(0.5, -2)$
- (B) $(-0.5, -2)$
- (C) $(2, -0.5)$
- (D) $(0.5, 2)$

36. What figure is made when the points $(-1, 2)$, $(2, 2)$, $(2, -1)$, and $(-1, -1)$ are connected?

- (F) triangle
- (G) rectangle
- (H) trapezoid
- (I) square

37. **Short Response** What are the coordinates of point H after it is reflected across the x -axis, and then reflected across the y -axis? _____



Common Core Review

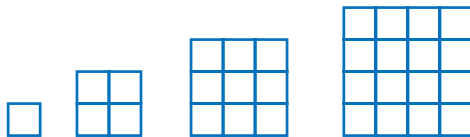
Multiply. MCC4.NBT.5

38. $1 \times 1 \times 1 =$ _____

39. $3 \times 3 \times 3 =$ _____

40. $6 \times 6 \times 6 =$ _____

41. Use the geometric pattern below to find the number of squares in the next figure. MCC4.OA.5



42. Alexa saved a total of \$210. Each week she saved the same amount of money. She has been saving for 7 weeks. How much money did Alexa save each week? MCC5.NBT.6



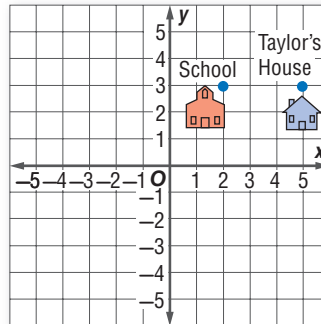
WHAT is the relationship between coordinates and distance?



Content Standards
MCC6.NS.8

Mathematical Practices
1, 3, 4

Maps Taylor's house and school are each shown on the map. What is the distance between the two points?



What do you know? _____

What do you need to find? _____

Investigation 1

Find the distance between Taylor's house and the school.

Step 1 Find the coordinates of Taylor's house.

Step 2 Find the coordinates of the school.

Step 3 Draw a line between the points. The line is horizontal, so the y-coordinates are the same.

Step 4 To find the distance, count the number of units between the x-coordinates.

Location	x-coordinate
house	
school	

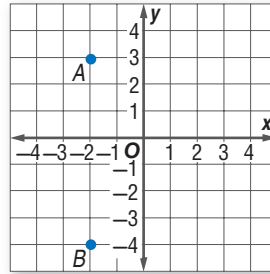


So, there are units between Taylor's house and the school.

Investigation 2

Find the distance between point **A** and point **B** on the coordinate plane.

Step 1 Determine the coordinates for point **A**.



Step 2 Determine the coordinates for point **B**.

Step 3 Draw a line between the points. The line is vertical, so the x-coordinates are the same.

Step 4 Count the number of units between each y-coordinate and the x-axis.

Point	y-coordinate	Distance from x-axis
A		
B		



Step 5 To find the distance between the two points, add the distance from the x-axis to each point.

$$\square + \square = \square$$

So, the distance between point **A** and point **B** is \square units.



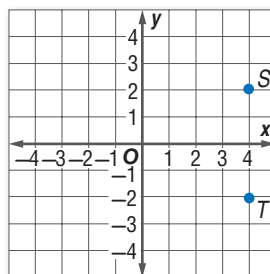
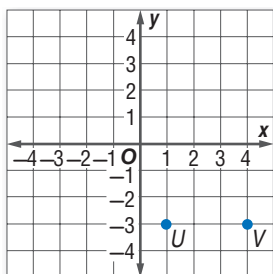
Collaborate

CCPS Model with Mathematics Work with a partner. Draw a line between each pair of points. Find the distance between each pair of points.

1. _____

2. _____

Show your work.



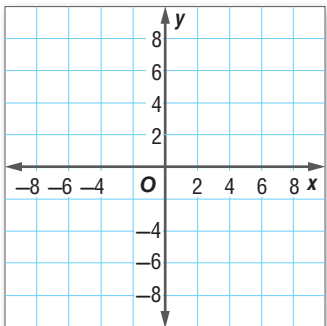


Collaborate

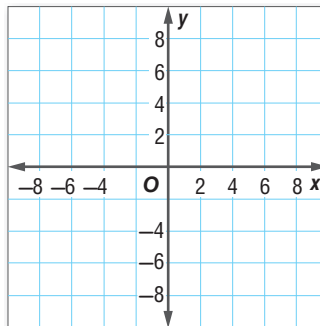
CCSS Model with Mathematics Work with a partner. Plot each pair of points on the coordinate plane. Find the distance between each pair of points.

3. $C(-3, -6), D(-3, -1)$ _____

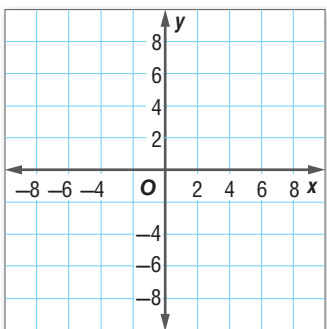
Show your work.



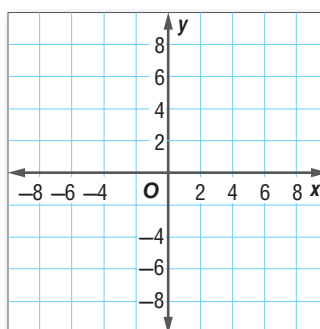
4. $E(-6, -2), F(1, -2)$ _____



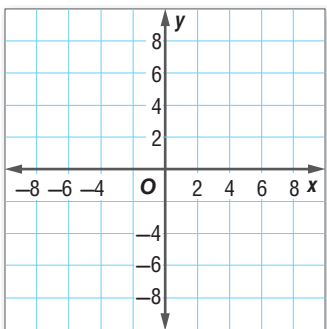
5. $G(1, -4), H(4, -4)$ _____



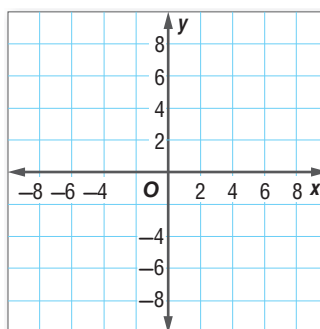
6. $K(3, -4), L(3, 2)$ _____



7. $M(5, 1), N(-1, 1)$ _____



8. $O(5\frac{1}{2}, 6), P(5\frac{1}{2}, 2)$ _____





Analyze

With a partner to complete the table below. Use your answers from Exercises 3–6. The first one is done for you.

Exercise	Coordinates Used	Horizontal or Vertical Line?	Same or Different Quadrant?	Line Length
	2 and -2	horizontal	different	4 units
9.	3 and			
10.	4 and			
11.	5 and			
12.	6 and			

13. Compare your answers from Exercises 11 and 12. What is the relationship between the coordinates used and the length of each line?

14. Name the coordinates of two points that have the same x-coordinates and are 8 units apart. _____

15. **CCPS Reason Inductively** Use absolute value to write a rule for determining the distance between two points on a coordinate plane that have the same x-coordinate. _____



Reflect

16. **CCPS Model with Mathematics** Write and solve a real-world problem that involves determining distance on a coordinate plane. _____

17. **Inquiry** WHAT is the relationship between coordinates and distance?

Polygons on the Coordinate Plane

What You'll Learn

Scan the rest of the lesson. List two headings you would use to make an outline of the lesson.

- _____
- _____



Essential Question

HOW does measurement help you solve problems in everyday life?



Common Core GPS

Content Standards
MCC6.G.1, MCC6.G.3,
MCC6.NS.8

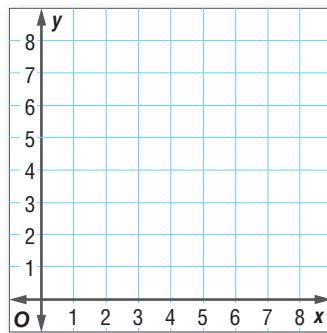
Mathematical Practices
1, 2, 3, 4, 5, 7



Real-World Link

Maps Graph points on a coordinate plane to draw a map of an outdoor stadium. Complete the table to identify each shape.

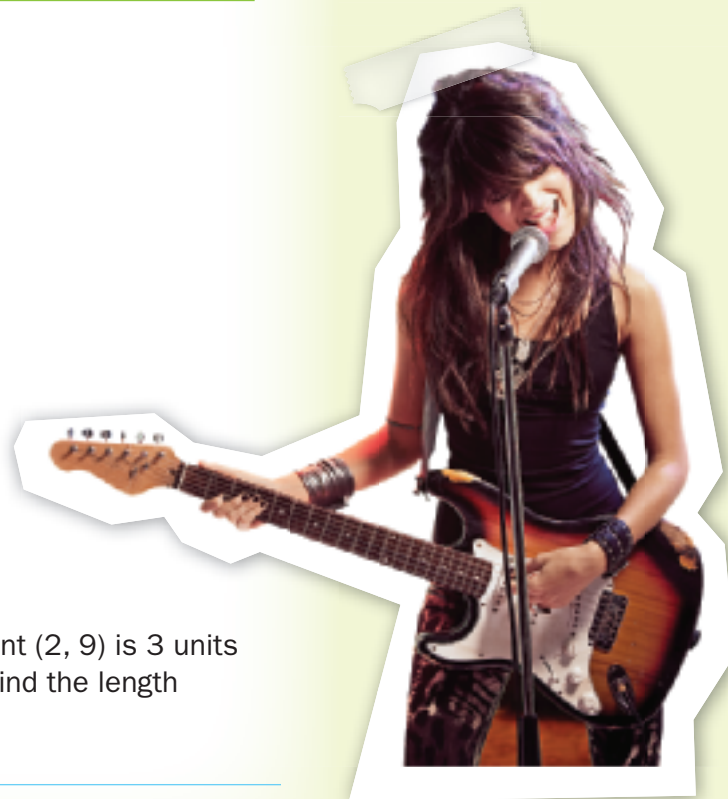
Location	Vertices	Shape
Stage	(2, 6), (2, 9), (6, 9), (6, 6), (5, 5), (3, 5)	
Bleachers	(7, 5), (7, 9), (9, 9), (9, 5)	
Concession Stand	(5, 2), (5, 4), (7, 4), (7, 2)	



- Find the dimensions of the bleachers.

Length: _____ Height: _____

- The length of the line from point (2, 6) to point (2, 9) is 3 units long. How can you use the y-coordinates to find the length of the line?



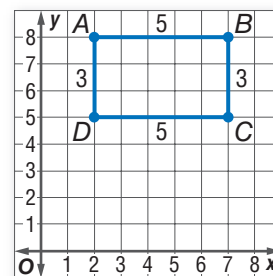
Find Perimeter

You can use the coordinates of a figure to find its dimensions by finding the distance between two points. To find the distance between two points with the same x-coordinates, subtract their y-coordinates. To find the distance between two points with the same y-coordinates, subtract their x-coordinates.

Examples



- 1. A rectangle has vertices $A(2, 8)$, $B(7, 8)$, $C(7, 5)$, and $D(2, 5)$. Use the coordinates to find the length of each side. Then find the perimeter of the rectangle.**



Width: Find the length of the horizontal lines.

$$\overline{AB} \text{ is 5 units long. } \quad \overline{CD} \text{ is 5 units long.}$$

Length: Find the length of the vertical lines.

$$\overline{BC} \text{ is 3 units long. } \quad \overline{DA} \text{ is 3 units long.}$$

Add the lengths of each side to find the perimeter.

$$5 + 5 + 3 + 3 = 16 \text{ units}$$

So, rectangle $ABCD$ has a perimeter of 16 units.

- 2. Rectangle $ABCD$ has vertices $A(2, 1)$, $B(2, 5)$, $C(4, 5)$, and $D(4, 1)$. Use the coordinates to find the length of each side. Then find the perimeter of the rectangle.**

Width: Subtract y-coordinates.

$$AB: 5 - 1 = 4 \text{ units} \quad CD: 5 - 1 = 4 \text{ units}$$

Length: Subtract x-coordinates.

$$AD: 4 - 2 = 2 \text{ units} \quad BC: 4 - 2 = 2 \text{ units}$$

Add the lengths of each side to find the perimeter.

$$4 + 2 + 4 + 2 = 12 \text{ units}$$

Got It? Do these problems to find out.

Use the coordinates to find the length of each side. Then find the perimeter of the rectangle.

a. $E(3, 6)$, $F(3, 8)$, $G(7, 8)$, $H(7, 6)$

b. $I(1, 4)$, $J(1, 9)$, $K(8, 9)$, $L(8, 4)$

Perimeter and Area

Remember that perimeter is the distance around a closed figure. Area is the number of square units needed to cover the surface enclosed by a geometric figure.



a. _____

b. _____

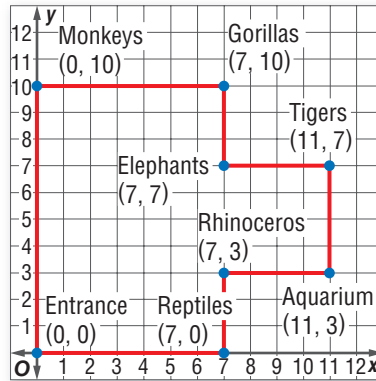


Example



- 3. Each grid square on the zoo map has a length of 200 feet. Find the total distance, in feet, around the zoo.**

When x-coordinates are the same, subtract the y-coordinates. When y-coordinates are the same, subtract the x-coordinates.



$$10 + 7 + 3 + 4 + 4 + 4 + 3 + 7 = 42 \text{ units}$$

Multiply by 200 feet to find the total distance.

$$42 \times 200 = 8,400 \text{ feet. The total distance is 8,400 feet.}$$

Got It? Do this problem to find out.

- c. The coordinates of the vertices of a garden are (0, 1), (0, 4), (8, 4), and (8, 1). If each unit represents 12 inches, find the perimeter in inches of the garden.

Show your work.

c. _____

Find Area

You can find the area of a figure that has been drawn grid paper or graphed on the coordinate plane.

Example



- 4. Find the area of the figure in square units.**

The figure can be separated into a rectangle and a trapezoid.

Area of rectangle

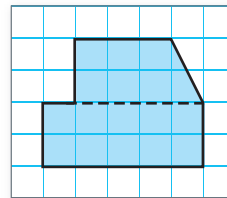
$$A = \ell \times w$$

$$A = 5 \times 2 \text{ or } 10$$

Area of trapezoid

$$A = \frac{1}{2}h(b_1 + b_2)$$

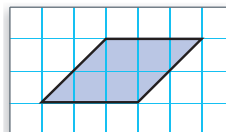
$$A = \frac{1}{2}(2)(3 + 4) \text{ or } 7$$



So, the area of the figure is $10 + 7$ or 17 square units.

Got It? Do this problem to find out.

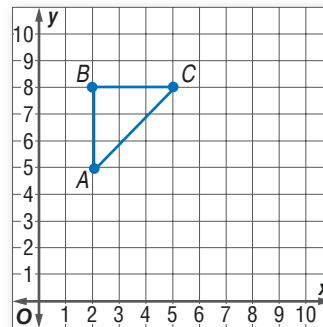
- d. Find the area, in square units, of the figure at the right.



d. _____

**Example**

5. A figure has vertices $A(2, 5)$, $B(2, 8)$, and $C(5, 8)$. Graph the figure and classify it. Then find the area.



Plot the points. Connect the vertices. The figure is a right triangle.

The height from point A to point B is 3 units. The base from point B to point C is 3 units.

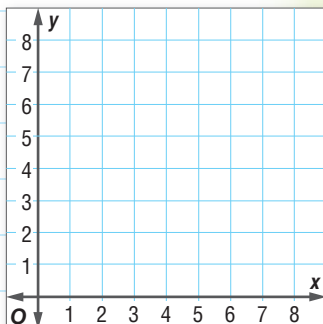
$$A = \frac{1}{2}bh \quad \text{Area formula of a triangle}$$

$$A = \frac{1}{2}(3)(3) \quad \text{Replace } b \text{ with 3 and } h \text{ with 3.}$$

$$A = 4.5 \quad \text{Multiply.}$$

Triangle ABC has an area of 4.5 square units.

Show your work.



e. _____

Got It? Do this problem to find out.

Graph the figure and classify it. Then find the area.

- e. $A(3, 3)$, $B(3, 6)$, $C(5, 6)$, $D(8, 3)$

Guided Practice

Use the coordinates to find the length of each side of the rectangle.

Then find the perimeter. (Examples 1 and 2)

1. $L(3, 3)$, $M(3, 5)$, $N(7, 5)$, $P(7, 3)$

2. $P(3, 0)$, $Q(6, 0)$, $R(6, 7)$, $S(3, 7)$

Show your work.

3. Mrs. Piel is building a fence around the perimeter of her yard for her dog. The coordinates of the vertices of the yard are $(0, 0)$, $(0, 10)$, $(5, 10)$, and $(5, 0)$. If each grid square has a length of 100 feet, find the amount of wire, in feet, needed for the fence. What is the shape

of her yard? (Example 3) _____

4. **Building on the Essential Question** How can coordinates help you to find the area of figures on the coordinate plane? _____

Rate Yourself!

How well do you understand polygons on the coordinate plane? Circle the image that applies.



Clear



Somewhat Clear



Not So Clear


For more help, go online to access a Personal Tutor.



Independent Practice

Use the coordinates to find the length of each side of the rectangle.

Then find the perimeter. (Examples 1 and 2)

1  $D(1, 2), E(1, 7), F(4, 7), G(4, 2)$

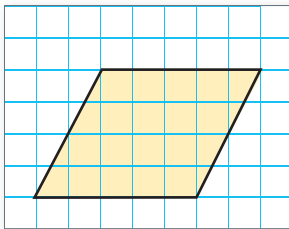
Show your work.

2. $Q(0, 0), R(4, 0), S(4, 4), T(0, 4)$

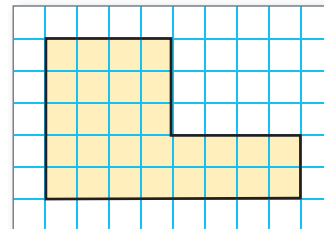
3. Natasha is building a rectangular picture frame for her favorite photo. The coordinates of the vertices of the frame are $(0, 0), (0, 8), (12, 8)$, and $(12, 0)$. Each grid square has a length of 3 centimeters. Find the amount of wood, in centimeters, needed for the perimeter. (Example 3)

Find the area of each figure in square units. (Example 4)

4. _____

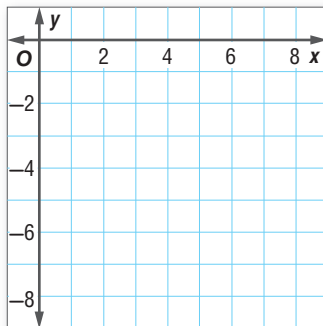



5. _____

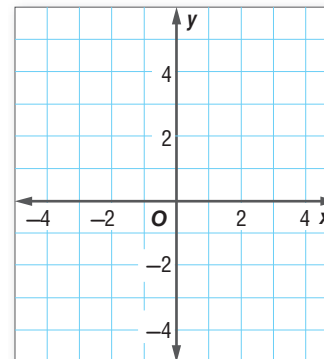


Graph each figure and classify it. Then find the area. (Example 5)

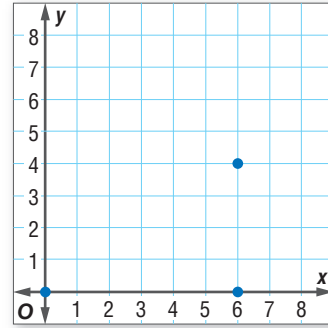
6. $R(3, -2), S(7, -2), T(8, -6), V(1, -6)$



7  $A(-3, -4), B(-3, 5), C(2, 5), D(2, -4)$



8. **CCPS Use Math Tools** A rectangle has a perimeter of 20 units. The coordinates of three of the vertices are $(0, 0)$, $(6, 0)$, and $(6, 4)$ as shown on the graph.



- a. What is the coordinate of the missing vertex?

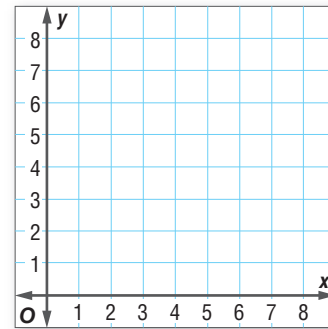
- b. Plot points $(6, 6)$ and $(2, 4)$. Connect these points to create a composite figure.
- c. What is the area of the composite figure? _____



H.O.T. Problems Higher Order Thinking

9. **CCPS Use Math Tools** Draw a rectangle on a coordinate plane that has a perimeter of 16 units. Label all of the vertices with the coordinates. Then find the area of the rectangle. _____

10. **CCPS Persevere with Problems** A certain rectangle has a perimeter of 22 units and an area of 30 square units. Two of the vertices have coordinates at $(2, 2)$ and $(2, 7)$. Find the two missing coordinates. Use the coordinate plane to support your answer.



11. **CCPS Identify Structure** Explain the steps you would use to find the perimeter of a rectangle using the coordinates of the vertices.



Georgia Test Practice

12. Rectangle $QRST$ has vertices $Q(3, 2)$, $R(3, 8)$, $S(7, 8)$, and $T(7, 2)$. What is the perimeter of rectangle $QRST$?
- (A) 14 units
(B) 15 units
(C) 18 units
(D) 20 units

Extra Practice

Use the coordinates to find the length of each side of the rectangle. Then find the perimeter.

13. $A(5, 2), B(5, 4), C(2, 4), D(2, 2)$

Homework Help

$AB = 2$ units, $BC = 3$ units, $CD = 2$ units, $DA = 3$ units; 10 units

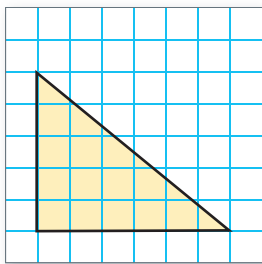
14. $M(1, 1), N(1, 9), P(7, 9), Q(7, 1)$

15. **CCSS Reason Abstractly** Andre is creating a border around his rectangular patio with paver bricks. The coordinates of the vertices of the patio are $(1, 5), (6, 5), (6, 1),$ and $(1, 1)$. Each grid square has a length of 3 feet.

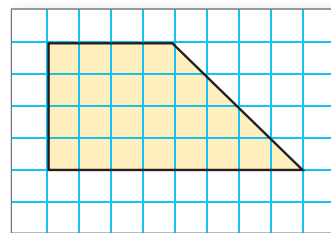
Find the amount of brick, in feet, needed for the perimeter. _____

Find the area of each figure in square units.

16. _____

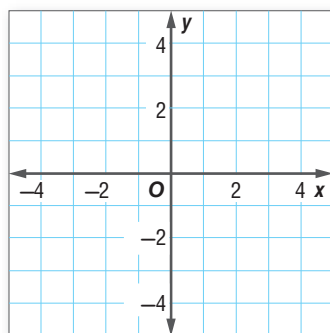


17. _____

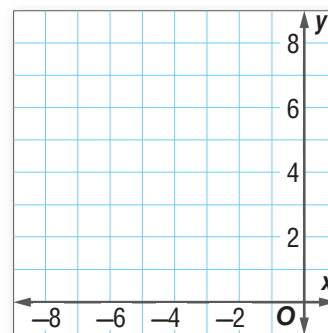


Graph each figure and classify it. Then find the area.

18. $G(-4, 1), H(4, 1), I(3, -3), J(-1, -3)$



19. $X(-7, 2), Y(-7, 6), Z(-4, 2)$



Copy and Solve Graph each figure and classify it. Then find the area.

20. $K(-2, 2), L(3, 2), M(2, -2), N(-3, -2)$

21. $Q(-2, 4), R(0, -2), S(-4, -2)$

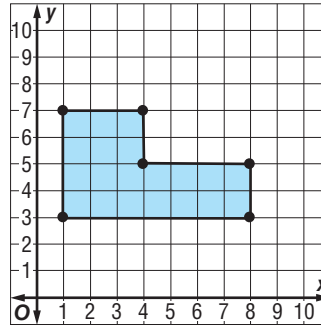


Georgia Test Practice

22. Which is *not* a characteristic of the figure with vertices at coordinates $A(8, 5)$, $B(7, 2)$, $C(4, 2)$, and $D(2, 5)$?
- (A) one set of parallel sides
 - (B) four vertices
 - (C) two sets of parallel sides
 - (D) two acute angles

23. **Short Response** A triangle on a coordinate plane has vertices with coordinates of $(2, 2)$, $(8, 2)$, and $(8, 9)$. Each grid square has a length of one foot. Find the area of the triangle in square feet.
-

24. **Short Response** Each grid square represents one square centimeter.



Use the coordinates of the vertices to find the area of the figure.



Common Core Review

Graph the opposite of each number on a number line. **MCC6.NS.6a**

25. 0



26. -7



27. 5



28. Graph 2 and 9. Then use the number line to find the distance between 9 and 2. **MCC6.NS.8, MCC6.NS.5** _____



29. John and his dad are playing catch on the football field. John is standing on the 10-yard line. His dad is standing on the 25-yard line. How far is John from his dad? If his dad moves to the 20-yard line, what is the distance between them now? **MCC4.OA.3**
-

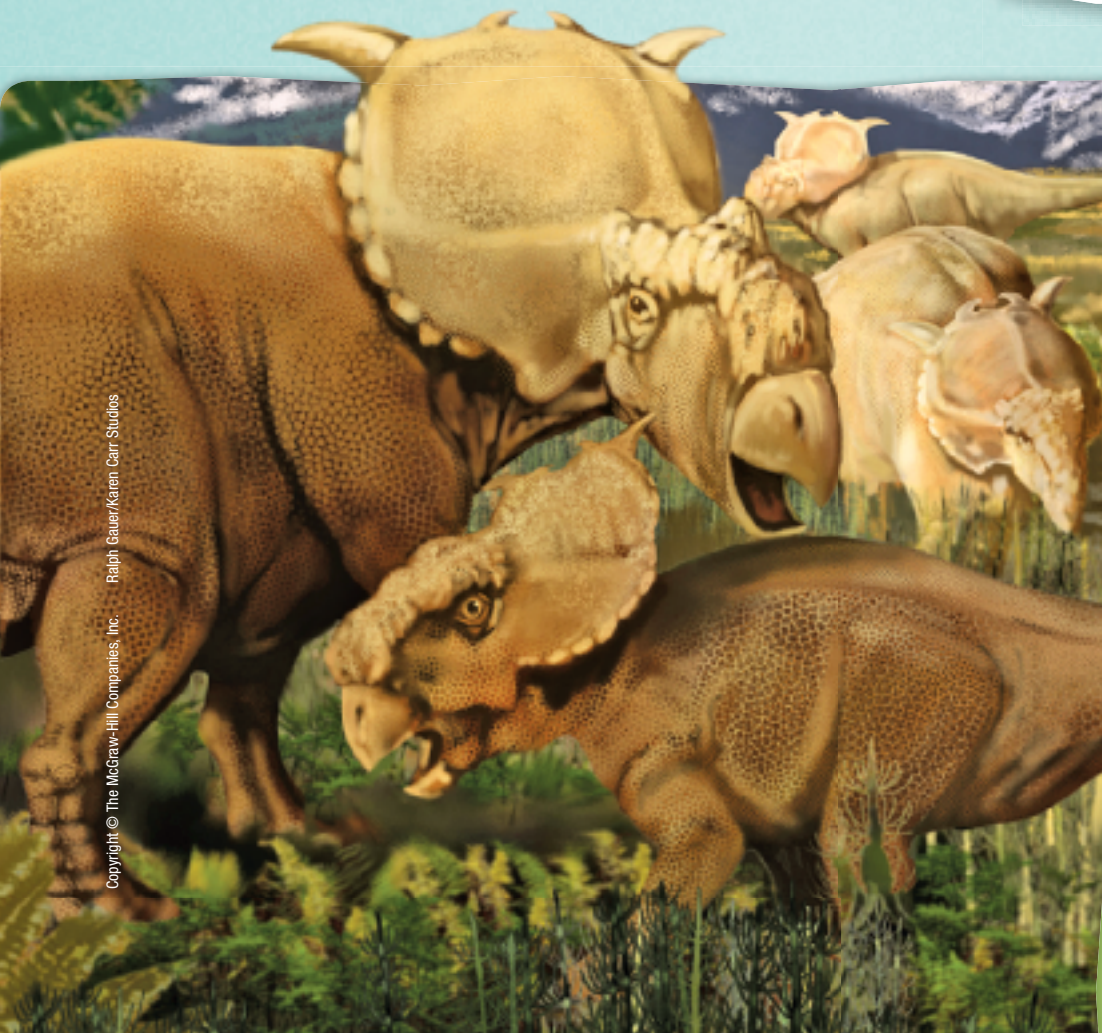


21ST CENTURY CAREER

in Art

Scientific Illustrator

If you are artistic and have a strong interest in science, you should think about a career as a scientific illustrator. Scientific illustrators combine their artistic abilities with their scientific backgrounds to draw scientifically accurate images. Karen Carr, a wildlife and natural history artist, has artwork in scientific publications, museums, and zoos. To draw animals that are extinct, she examines fossils, talks to scientists, and uses measurements and proportions from scientific literature.



Explore college and careers at cgr.mcgraw-hill.com

Is This the Career for You?

Are you interested in a career as a scientific illustrator?

Take some of the following courses in high school.

- ◆ Algebra
- ◆ Biology
- ◆ Geometry
- ◆ Life/Figure Drawing
- ◆ Physics

Find out how math relates to a career in Art.



You be the Scientific Illustrator!

Use the information in the table to solve each problem. Write in simplest form.

- Write the length and height of an Argentinosaurus as decimals. Use bar notation if necessary.

- How much taller was a Velociraptor than a Microraptor? Write your answer as a decimal. _____
- Which is greater, the height of the Argentinosaurus or the length of the Camptosaurus? _____

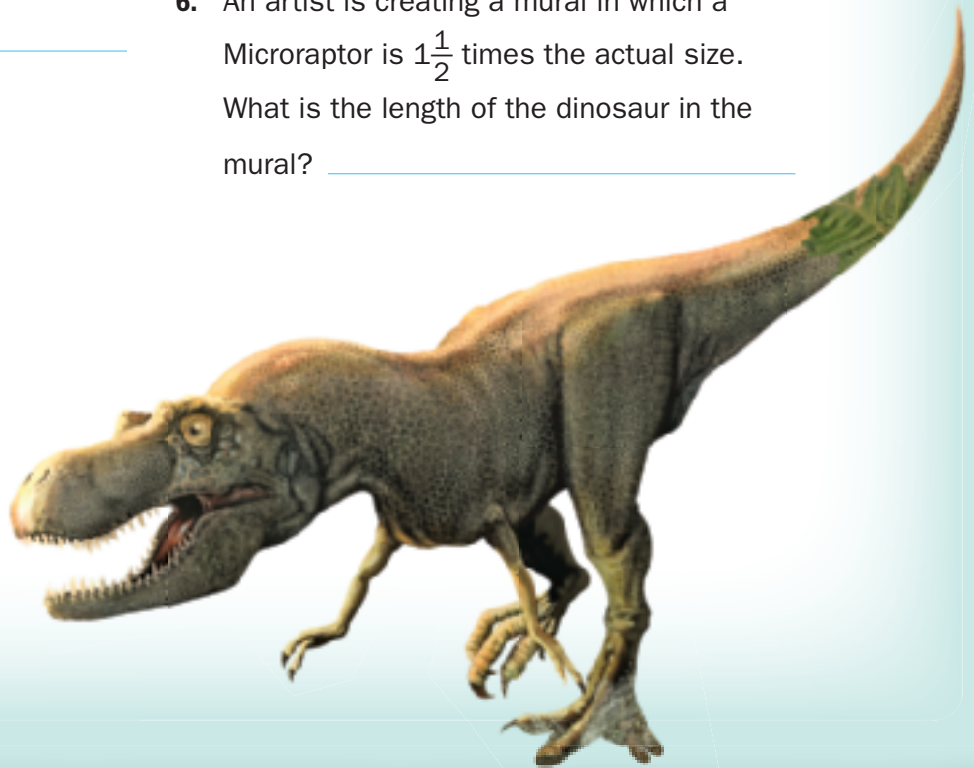
- How much longer was a Camptosaurus than a Velociraptor? Plot your answer on the number line.



- Compare the heights of all four dinosaurs. Order them from least to greatest.

- An artist is creating a mural in which a Microraptor is $1\frac{1}{2}$ times the actual size. What is the length of the dinosaur in the mural? _____

Dinosaur Measurements		
Dinosaur	Length (ft)	Height (ft)
Argentinosaurus	$114\frac{5}{6}$	$24\frac{1}{10}$
Camptosaurus	$16\frac{2}{5}$	$11\frac{4}{5}$
Microraptor	$2\frac{5}{8}$	$\frac{24}{25}$
Velociraptor	$5\frac{9}{10}$	$3\frac{7}{25}$



Career Project

It's time to update your career portfolio! Investigate the education and training requirements for a career as a scientific illustrator.

What are some short-term goals you need to achieve to become a scientific illustrator?

- _____
- _____
- _____
- _____



Vocabulary Check



Complete the puzzle by unscrambling the letters below to reveal words from the vocabulary list at the beginning of the chapter.

Q	U	A	D	R	A	N	T	S	:									
	-																.	
			D		I		A											
			O	R	A	D	N	T	A	S		I	N		A	H	S	
		C	A	O	R	G	A	A	N	T		Y	H	E	T	F	E	
X	U	A	X	E	S	I	T	S	D		B	Y	L	A	N	E		
Q	S	E	P	R	R	I	O	E	D	E	T	P	A	X	I	O	U	R

Complete each sentence using the vocabulary list at the beginning of the chapter.

1. A _____ is a number that can be written as a fraction.
2. A number that is less than zero is a _____.
3. A number that is greater than zero is a _____.
4. The _____ of a number is the distance between the number and zero on a number line.
5. The division of a _____ ends.
6. A decimal whose digits repeat in groups of one or more is a _____.

Key Concept Check

Use Your **FOLDABLES**

Use your Foldable to help review the chapter.

Tape here

Compare and Order Numbers

Examples

Examples

Examples

Got it?

Circle the correct term or number to complete each sentence.

1. The opposite of -4 is $(-4, 4)$.
2. The distance of a number from 0 is its (opposite, absolute value).
3. The value listed first in an ordered pair is the (x-coordinate, y-coordinate).
4. The absolute value of 17 is $(-17, 17)$.
5. $(1.\overline{25}, 6.543)$ is a terminating decimal.

Problem Solving

1. Kirk bought songs for his MP3 player. He needed 6 more songs to have a total of 100. Write an integer to represent how many more songs Kirk needs.

(Lesson 1)

2. In a football game, the quarterback was tackled behind the line of scrimmage and lost 7 yards. Represent the loss of 7 yards as an integer.

(Lesson 1)

3. Kelsey's bank transactions are shown in the table. A positive number represents a deposit and a negative number represents a withdrawal.

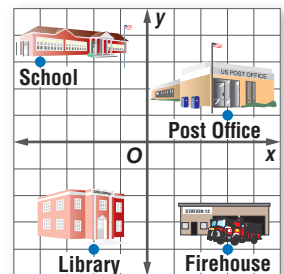
What is the absolute value of the transaction in Week 3? (Lesson 2)

Week	Transaction
1	50
2	-15
3	-20
4	30

4. The high temperatures in a city during a 5 day period were -6° , 8° , -2° , 6° , and 11° . Place the temperatures in order from least to greatest.

(Lesson 3)

5. **CCPS Use Math Tools** Refer to the diagram. Which building is located at $(-2, -4)$? (Lesson 6)



6. **CCPS Be Precise** Farah made 28 out of 84 shots on a goal in a recent hockey season. Write her shots made out of shots attempted as a decimal.

(Lesson 4)

7. The heights of the lifeguard chairs are $66\frac{1}{3}$ inches and $72\frac{5}{8}$ inches. One section of the lake has a depth of $\frac{203}{4}$ inches, and another section has a depth of $\frac{109}{2}$ inches. Represent each height and depth using a positive or negative number. Then order the numbers from least to greatest. (Lesson 5)

Reflect



Answering the Essential Question

Use what you learned about integers and the coordinate plane to complete the graphic organizer.



Essential Question

HOW are integers and absolute value used in real-world situations?



Vocabulary	Definition
integer	
absolute value	

Describe a real-world situation that can be represented by the absolute value of 27.

Describe a real-world situation that can be represented by the absolute value of -16 ?



Answer the Essential Question. HOW are integers and absolute value used in real-world situations?
