

# Chapter 6

Family and Community Involvement (English).....	189
Family and Community Involvement (Spanish) .....	190
Section 6.1 .....	191
Section 6.2 .....	197
Section 6.3 .....	203
Section 6.4 .....	209
Section 6.5 .....	215
Extension 6.5 .....	221
Technology Connection.....	223

**Chapter  
6****Integers and the Coordinate Plane**

Dear Family,

Have you ever watched the countdown for a space shuttle launch? The time remaining to the launch gets smaller and smaller as the launch approaches, ending in the countdown "3...2...1...Blastoff!" For those working on the mission, time is divided into time before and after the launch. Blastoff is the zero. Time before the launch is negative, and time after the launch is positive.

We use a similar method with temperature—both the Fahrenheit and Celsius scales set a zero that is within the normal range of temperatures for a cold climate. Warmer temperatures are positive, and temperatures colder than zero are negative. A similar method is used to describe elevation, with sea level as the zero and positive and negative elevations on either side. Geographically the equator is set as zero latitude, and other latitudes reference north and south of that zero. For longitude the choice of a natural zero was less apparent, and so the zero was set through the Royal Astronomical Observatory in Greenwich, England. Other longitudes are measured east and west of this zero. Richmond, Virginia, for example, is located at  $37^\circ$  north latitude and  $77^\circ$  west longitude. Its sister city Windhoek, in Namibia, is found at  $22^\circ$  south latitude and  $17^\circ$  east longitude.

You can explore the idea of plotting with integers using a globe. First find the point that is  $0^\circ$  latitude and  $0^\circ$  longitude. How would you describe the location of a favorite spot, such as your home or a favorite vacation destination? What is on the opposite side of the globe from that place?

Happy hunting.

**Capítulo**  
**6****Números enteros y el plano de coordenadas**

Estimada Familia:

¿Han visto alguna vez la cuenta regresiva para el lanzamiento de un trasbordador espacial? El tiempo restante para el lanzamiento se hace más y más corto a medida que se acerca el lanzamiento, el cual termina en la cuenta regresiva "3... 2... 1... ¡Despegue!" Para aquéllos que trabajan en la misión, el tiempo se divide en antes y después del lanzamiento. El despegue es el cero. El tiempo anterior al lanzamiento es negativo, y el tiempo después del lanzamiento es positivo.

Nosotros utilizamos un método similar con la temperatura, tanto las escalas Fahrenheit como Celsius establecen un cero que se encuentra dentro del rango normal de temperaturas de un clima frío. Las temperaturas más cálidas son positivas, y las temperaturas más frías que cero son negativas. Un método similar se utiliza para describir la altitud, con el nivel del mar como el cero y las elevaciones positivas y negativas a cada lado. Geográficamente, el ecuador está fijado a una latitud cero, y otras latitudes se ubican al norte y al sur de ese cero. Para la longitud, la elección de un cero natural fue menos aparente, por lo que el cero se estableció a través del Observatorio Astronómico Real de Greenwich, Inglaterra. Otras longitudes se miden hacia el este y oeste de este cero. Richmond, Virginia, por ejemplo, se encuentra ubicado a  $37^\circ$  de latitud norte y  $77^\circ$  de longitud oeste. Su ciudad hermana de Windhoek, en Namibia, se encuentra a  $22^\circ$  de latitud sur y  $17^\circ$  de longitud este.

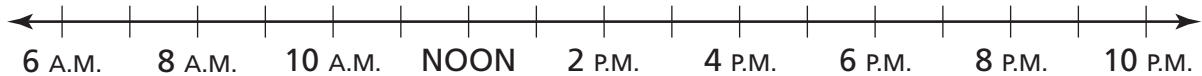
Ustedes pueden explorar la idea de determinar lugares con números enteros utilizando un globo terráqueo. Primero encuentren el punto que se encuentra a  $0^\circ$  de latitud y  $0^\circ$  de longitud. ¿Cómo describirían la ubicación de un lugar favorito, como su casa o un destino favorito de vacaciones? ¿Qué se encuentra al lado opuesto del globo de ese lugar?

Feliz búsqueda.

**Activity**  
**6.1****Start Thinking!**

For use before Activity 6.1

Copy the number line below. Choose four or five highlights from your day yesterday. For each highlight, use the start time to label the event on your number line.

**Activity**  
**6.1****Warm Up**

For use before Activity 6.1

**Graph the number on a number line.**

**1. 2****2. 5****3. 4****4. 3****5. 0****6. 1**

**Start Thinking!**

For use before Lesson 6.1

Use your number line from the Start Thinking! for use before Activity 6.1. Relabel the number line so that noon is at 0. Relabel the other times accordingly using positive and negative numbers.

Name one highlight that occurred after noon.

What time did it occur? What number corresponds to that time?

Name one highlight that occurred before noon.

What time did it occur? What number corresponds to that time?

**Warm Up**

For use before Lesson 6.1

**Graph the number that represents the situation on a number line.**

1. A football team gained 57 yards on one play.
2. The shores of the Dead Sea are 420 meters below sea level, the lowest dry land point on Earth.
3. The Kingda Ka roller coaster has a top speed of 128 miles per hour.
4. At its coldest, Mercury's surface temperature is 300 degrees Fahrenheit below zero.

## 6.1 Practice A

**Graph the number that represents the situation on a number line.**

- You lose a \$5 bill while walking home from school.
- You download 7 songs to your MP3 player.
- The wind chill is 35 degrees below zero.

**Write a positive or negative integer that represents the situation.**

- A parachutist descends 50 feet.
- A baker discards 12 loaves of bread.
- A football team advances 10 yards.
- You earn \$15 for mowing the neighbor's lawn.

**Graph the integer and its opposite.**

- |        |         |         |
|--------|---------|---------|
| 8. 5   | 9. -2   | 10. 13  |
| 11. 20 | 12. -18 | 13. -25 |
14. Describe and correct the error in describing opposites.

✗ The opposite of 7 is  $\frac{1}{7}$ .

**Identify the integer represented by the point on the number line.**

15. A                      16. B                      17. C                      18. D



19. To ride an amusement park ride, your height must be at or above the line on the sign. For each set of information, write an integer that represents a person's height relative to the line on the sign and write *yes* or *no* as to whether they can ride the ride.
- Height is 2 inches above the line on the sign.
  - Height is 5 inches below the line on the sign.
  - Height is 1 inch below the line on the sign.

## 6.1 Practice B

Write a positive or negative integer that represents the situation.

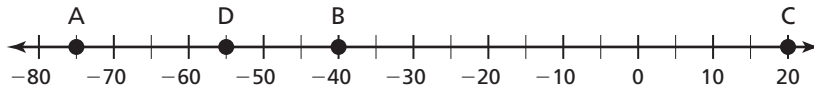
- You run up 24 steps.
- The temperature dropped 7 degrees.
- You give away 2 of your video games.
- You miss 3 days of practice.

Graph the integer and its opposite.

- 45
- 250
- 200
- You roll a number cube and move ahead 3 spaces. Your friend rolls a number cube and moves the opposite of your move. Graph both moves.

Identify the integer represented by the point on the number line.

- A
- B
- C
- D



- Use the information below to write an integer that represents your height on the teeter totter relative to the balance point height.
  - You are 8 inches below the balance point height.
  - You are 15 inches above the balance point height.
  - Your friend is 12 inches above the balance point height. Your height is the opposite.
  - You are resting at the balance point height.

Every number has an opposite. Write the opposite of the decimal or fraction. Then graph the number and its opposite.

- 8.2
- $-\frac{2}{3}$
- $-1\frac{1}{4}$

- You are riding a roller coaster. During the ride, you climb 25 feet, descend 30 feet, climb 50 feet, and then descend 55 feet. Do you finish *above*, *below*, or at the *same* height as you started? Explain.

## 6.1 Enrichment and Extension

### Letter Values

Each letter of the alphabet has been assigned an integer value. Use the values to answer the questions.

**Use your knowledge of integers to answer the questions.**

- Find two pairs of letters that are assigned opposite values of one another. What is the sum of each pair?
- Which integer is neither positive nor negative? Which letter has been assigned this value?
- What is the total combined value of the letters MATH?
- Write your first name.
  - Which letters in your first name are assigned values that are positive integers? Which letters are assigned values that are negative integers?
  - What is the combined total value of the letters in your first name?
  - What is the opposite of the value in part (b)?
- Find the combined total value of the letters used to spell your last name.
  - What is the opposite of the value?
  - Graph the value and its opposite on a number line. How far are the two values from one another on the number line?
- Graph the letters used to spell your last name on a number line according to their values. Do the letters still spell your last name once they are graphed on the number line?
- Write a word using only letters that have been assigned values that are negative integers.
- Write a word using letters whose total combined value is 5 or  $-5$ .

$$A = 13$$

$$B = 12$$

$$C = 11$$

$$D = 10$$

$$E = 9$$

$$F = 8$$

$$G = 7$$

$$H = 6$$

$$I = 5$$

$$J = 4$$

$$K = 3$$

$$L = 2$$

$$M = 1$$

$$N = 0$$

$$O = -1$$

$$P = -2$$

$$Q = -3$$

$$R = -4$$

$$S = -5$$

$$T = -6$$

$$U = -7$$

$$V = -8$$

$$W = -9$$

$$X = -10$$

$$Y = -11$$

$$Z = -12$$



# 6.1 Puzzle Time

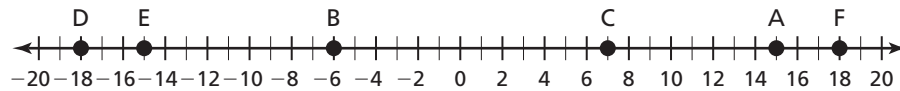
## What Do You Get When You Cross An Electrical Eel With A Sponge?

Write the letter of each answer in the box containing the exercise number.

Write a positive or negative integer that represents the situation.

1. Lisa puts 14 dollars into her piggy bank.
2. You are playing a game and must go back 4 spaces.
3. Claire loses 5 points on a spelling test.
4. The football team scores 21 points in the game.
5. Your dad gains 5 pounds.
6. Addison gets 4 bonus points on the science test.
7. The temperature drops 14 degrees.
8. You take 21 dollars out of your bank account.

Identify the location of the point on the number line.



- |       |       |
|-------|-------|
| 9. A  | 10. B |
| 11. C | 12. D |
| 13. E | 14. F |

**Answers**

O. 21

A. -18

R. -4

K. -14

B. -6

S. 7

B. 18

H. -5

O. 4

S. 14

C. -15

R. -21

S. 5

E. 15

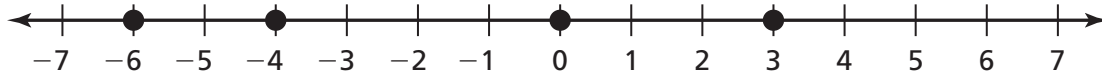
11	3	6	13	7		12	10	1	4	8	14	9	2	5
----	---	---	----	---	--	----	----	---	---	---	----	---	---	---

**Activity**  
**6.2**

**Start Thinking!**

For use before Activity 6.2

Of the numbers graphed on the number line below, which is the greatest? Which is the least? How do you know?



**Activity**  
**6.2**

**Warm Up**

For use before Activity 6.2

Identify the location of the point on the number line.

1. *A*

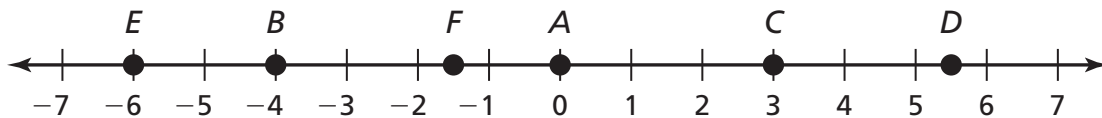
2. *B*

3. *C*

4. *D*

5. *E*

6. *F*



**Lesson  
6.2****Start Thinking!**

For use before Lesson 6.2

In golf, the goal is to use the fewest number of strokes to get the ball into a hole. A golfer's score is compared to par, the number of strokes a skilled golfer should need when completing a particular hole.

Number	Term	Definition
-2	Eagle	2 strokes under par
-1	Birdie	1 stroke under par
0	Par	Equal to par
1	Bogey	1 stroke over par
2	Double bogey	2 strokes over par

How is playing golf related to comparing and ordering integers?

**Lesson  
6.2****Warm Up**

For use before Lesson 6.2

Copy and complete the statement using  $<$  or  $>$ .

1.  $1 \underline{\quad ? \quad} 0$

2.  $0 \underline{\quad ? \quad} 5$

3.  $-14 \underline{\quad ? \quad} 0$

4.  $-5 \underline{\quad ? \quad} 5$

5.  $2 \underline{\quad ? \quad} -2$

6.  $-5 \underline{\quad ? \quad} 2$

**6.2 Practice A**

Copy and complete the statement using  $<$  or  $>$ .

1.  $-4$  ?  $0$

2.  $7$  ?  $0$

3.  $3$  ?  $-3$

4.  $-6$  ?  $2$

5.  $5$  ?  $9$

6.  $-8$  ?  $-2$

7. Describe and correct the error in comparing 2 and  $-5$ .

$\times$ $2 < 5$ . So, $2 < -5$ .
-----------------------------------

Order the integers from least to greatest.

8.  $0, -2, 2, 3, -3$

9.  $1, -3, 4, -4, 2$

10.  $3, -4, 4, 5, -5$

11.  $6, -3, 1, 4, -5$

12. A water pipe is 3 feet below the ground. A gas pipe is 8 feet below the ground. Which pipe is higher? Explain your answer.

13. A number is between  $-1$  and  $-5$ . What is the least possible integer value of its opposite?

Tell whether the statement is *always*, *sometimes*, or *never* true. Explain.

14. A negative integer is greater than its opposite.

15. An integer is more than its opposite and less than 0.

16. An integer is less than its opposite.

17. Nine students choose integers. Seven of them are

$$-16, 12, -13, -6, -5, 6, \text{ and } 1.$$

a. Order the numbers from least to greatest.

b. When all nine integers are ordered from least to greatest, the middle integer is  $-6$ . Describe the other two integers.

## 6.2 Practice B

Copy and complete the statement using  $<$  or  $>$ .

1.  $-5 \underline{\quad ? \quad} 5$

2.  $4 \underline{\quad ? \quad} -2$

3.  $-1 \underline{\quad ? \quad} -3$

4.  $-6 \underline{\quad ? \quad} -3$

5.  $-9 \underline{\quad ? \quad} -8$

6.  $-4 \underline{\quad ? \quad} -1$

Order the integers from least to greatest.

7.  $2, -5, 5, 8, -8$

8.  $4, -1, -3, -6, 2$

9.  $20, -20, 40, 50, -50$

10.  $10, -15, -20, 25, -30$

11. In a round of golf, the lowest score wins. At the end of a round, you have score  $-3$  and your friend has score  $-4$ . Who won the round? Explain.
12. Seven integers are ordered from least to greatest. The integer in the middle is zero. Describe the other six numbers.
13. The table shows the highest and lowest daily profit/loss of the five locations of a chain of restaurants.
- | Location | Highest Profit/Loss | Lowest Profit/Loss |
|----------|---------------------|--------------------|
| North    | 350                 | 125                |
| South    | 275                 | $-50$              |
| East     | 300                 | $-100$             |
| West     | 50                  | $-250$             |
| Central  | 225                 | 75                 |
- a. Order the locations by their highest profit/loss from least to greatest.
- b. Order the locations by their lowest profit/loss from least to greatest.
- c. Find the middle integer of the highest profit/loss.
- d. Find the middle integer of the lowest profit/loss.
- e. The company needs to close one of the locations. Which location should they close? Explain.
14. Point  $A$  is on a number line halfway between  $-20$  and  $-4$ . Point  $B$  is halfway between point  $A$  and  $0$ . What integer is represented by point  $B$ ?
15. Nine Celsius temperatures are recorded in a lab. The middle temperature is  $0^\circ\text{C}$ . What is the maximum number of temperatures that could be represented by negative numbers?

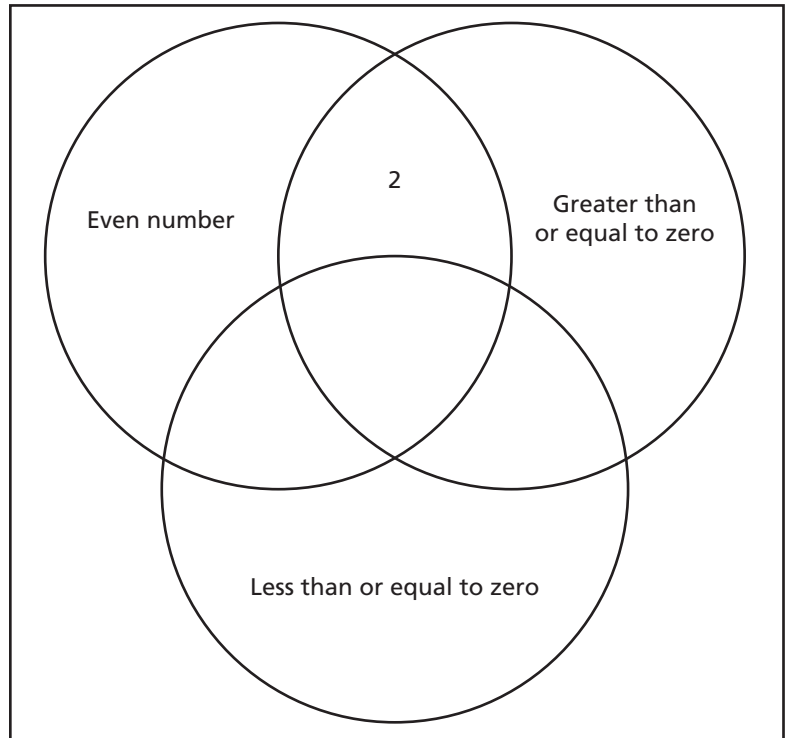
## 6.2 Enrichment and Extension

### Sorting Integers

Numbers can be categorized, or sorted, based on their properties. Three properties are listed in the Venn Diagram.

**Example: 2**

Two is an even number because it is evenly divisible by two. Two is not odd because it is even. Two is greater than zero because it falls to the right of zero when ordered on a number line. Because two is both even and greater than zero, it should be placed in the part of the Venn Diagram where the two properties overlap.



**In Exercises 1–6, use the Venn Diagram.**

1. Categorize the list of numbers based on their properties by placing them in the correct location in the Venn Diagram.  
 $-3, 12, 15, -4, 0, -5, -11, 17$
2. Consider the set containing only the values less than or equal to zero. What types of numbers are contained in this set?
3. How many values are in the category of the Venn Diagram containing both odd values and values less than zero?
4. What is the sum of the values that are located in the part of the Venn Diagram containing positive, odd values?
5. Is there any section of the Venn Diagram that contains no numbers? Why?
6. What is the only number that belongs to all three categories? That is, which is the only number that was placed in the section of the Venn Diagram where all three circles overlap?



**Activity**  
**6.3****Start Thinking!**

For use before Activity 6.3

Think of a positive fraction or mixed number that can be used to describe a situation.

Think of a negative fraction or mixed number that can be used to describe a situation.

**Activity**  
**6.3****Warm Up**

For use before Activity 6.3

**Find an integer that is between the two numbers.**

1. 1 and 3

2.  $-1$  and 53.  $-7$  and  $-4$ 4.  $-8$  and  $-5$ 5.  $-2$  and 0

6. 0 and 5



**Lesson**  
**6.3**

**Start Thinking!**

For use before Lesson 6.3

Write your age in years and months. Then convert the age to a mixed number in simplest form.

After all students in the class have written their ages as mixed numbers, line up in order from youngest to oldest by comparing the mixed numbers.

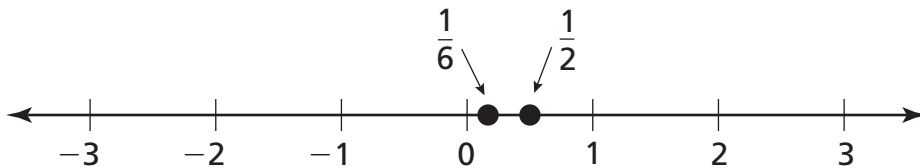
**Lesson**  
**6.3**

**Warm Up**

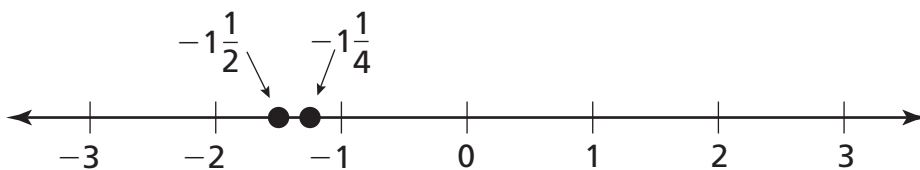
For use before Lesson 6.3

**Find a fraction or a mixed number that is between the two numbers.**

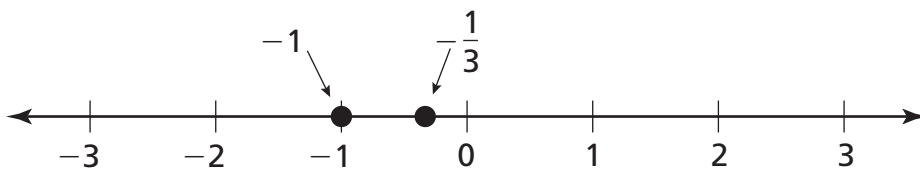
1.



2.



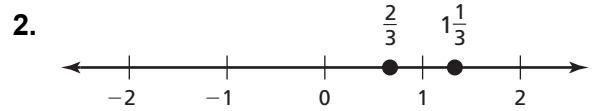
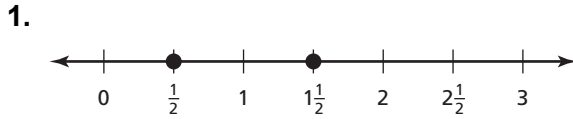
3.



# 6.3

## Practice A

Find a fraction or mixed number that is between the two numbers.



Graph the number and its opposite.

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

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

5.  $-2.6$

6.  $3.75$

Copy and complete the statement using  $<$  or  $>$ .

7.  $-\frac{10}{3}$   $\underline{\quad ? \quad}$   $-\frac{7}{4}$

8.  $\frac{4}{5}$   $\underline{\quad ? \quad}$   $-1\frac{7}{8}$

9.  $-\frac{7}{6}$   $\underline{\quad ? \quad}$   $-\frac{6}{7}$

10.  $-2\frac{3}{4}$   $\underline{\quad ? \quad}$   $-2\frac{2}{3}$

11.  $2.1$   $\underline{\quad ? \quad}$   $-2.1$

12.  $-0.08$   $\underline{\quad ? \quad}$   $-0.8$

13.  $-3.08$   $\underline{\quad ? \quad}$   $-4.16$

14.  $-4.82$   $\underline{\quad ? \quad}$   $-4.89$

Order the numbers from least to greatest.

15.  $-\frac{7}{10}, -\frac{1}{10}, \frac{2}{5}, -\frac{3}{10}, \frac{1}{2}$

16.  $1\frac{1}{12}, -\frac{3}{12}, 1\frac{5}{12}, \frac{7}{12}, -\frac{2}{12}$

17.  $-\frac{2}{3}, -2, -1\frac{1}{3}, -1\frac{2}{3}, -2\frac{2}{3}$

18.  $-2.4, -2.1, -3, -2.75, -2$

19. The position of a deep sea probe is  $-2\frac{3}{4}$  fathoms relative to sea level.

After finishing taking data, it moves to  $-2\frac{5}{8}$  fathoms relative to sea level.

Which was deeper, the first mission or the second?

20. An oceanographer takes readings at the following positions relative to sea level:  $-2.48$  kilometers,  $-2.83$  kilometers,  $-2.70$  kilometers, and  $-2.15$  kilometers.

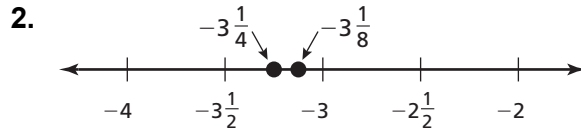
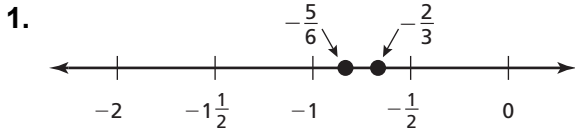
Order the positions from farthest from sea level to closest to sea level.

21. Describe and correct the error in determining which number is greater.

$\times$   $-5\frac{5}{6}$  is greater than  $-5.8$  because  $5\frac{5}{6}$  is greater than  $5.8$ .

## 6.3 Practice B

Find a fraction or mixed number that is between the two numbers.



Copy and complete the statement using  $<$  or  $>$ .

3.  $-\frac{2}{9}$   $\underline{\quad ? \quad}$   $-\frac{1}{3}$

4.  $-1\frac{6}{10}$   $\underline{\quad ? \quad}$   $-1\frac{3}{10}$

5.  $-\frac{2}{5}$   $\underline{\quad ? \quad}$   $-\frac{3}{10}$

6.  $-1\frac{2}{3}$   $\underline{\quad ? \quad}$   $-1\frac{1}{2}$

7.  $-6.3$   $\underline{\quad ? \quad}$   $-4.9$

8.  $-0.11$   $\underline{\quad ? \quad}$   $-0.44$

9.  $-2.05$   $\underline{\quad ? \quad}$   $-2.50$

10.  $-4.9$   $\underline{\quad ? \quad}$   $-4.6$

Order the numbers from least to greatest.

11.  $-\frac{5}{8}, -\frac{3}{4}, -1\frac{1}{8}, -\frac{3}{8}, -1\frac{1}{4}$

12.  $0.7, -0.3, 0, 0.25, -0.37$

13. Two runners slow down. One decelerates at  $-\frac{5}{8}$  ft/sec<sup>2</sup> and the second at  $-\frac{3}{5}$  ft/sec<sup>2</sup>. Which runner slowed down more?

14. In physics, positive speeds denote upward motion and negative speeds denote downward motion. The table gives the speed of a ball thrown upward at a rate of 20.0 meters per second.

<b>Time (seconds)</b>	0	1	2	3	4
<b>Speed (meters/second)</b>	20.0	10.2	0.4	-9.4	-19.2

- When was the speed greatest going upward?
  - When was the speed greatest going downward?
  - Between what two times was the speed zero? What does a speed of 0 mean?
15. A stock lost value on both Monday and Tuesday. On Monday, it changed by  $-5.7$  points, and on Tuesday it changed by  $-3.8$  points. On which day did it drop the least?

## 6.3 Enrichment and Extension

### Fraction Game

Cut 10 index cards in half. Divide the cut index cards between you and a partner. Follow the rules below to play a game.

- Write a fraction or mixed number on a piece of index card that is between the two decimals given.
- Compare your number with your friend's number. The person with the larger number gets both index cards. If the numbers are equivalent, each player writes a different fraction or mixed number. Repeat until there is not a tie.
- The person with the most index cards after the last set of numbers is the winner.

1.  $-0.5, 1.33$

2.  $0.1, -1.86$

3.  $-1.2, -0.6$

4.  $-1.75, -2.25$

5.  $-4.77, -12.42$

6.  $-6.8, -5.71$

7.  $-4.63, -5.38$

8.  $-10.5, -9.62$

9.  $-20.5, -15.33$

10.  $-62.55, -70.45$



## Puzzle Time

### What Did One Plate Say To The Other Plate?

Write the letter of each answer in the box containing the exercise number.

Which number is greater?

1.  $-\frac{1}{2}, \frac{3}{5}$

2.  $-\frac{2}{3}, -\frac{5}{6}$

3.  $-5\frac{1}{4}, -5\frac{1}{2}$

4.  $-2\frac{7}{8}, -2\frac{3}{4}$

5. 4.8, -4.2

6. -21.5, -21.05

7. -3.07, -3.14

Order the numbers from least to greatest.

8. 3.4, -4, -2.7, 0, -2.85

9. 3,  $-2\frac{1}{4}$ ,  $-2\frac{1}{6}$ ,  $3\frac{1}{5}$ ,  $-2\frac{3}{4}$

10. Use a number line to determine which number is between -4.4 and -5.8.

- A. -5.68      B. -4.14      C. -5.92

11. Use a number line to determine which number is between -2.61 and -5.49.

- A. -2.49      B. -5.51      C. -3.11

#### Answers

H.  $-2\frac{3}{4}, -2\frac{1}{4}, -2\frac{1}{6}, 3, 3\frac{1}{5}$

O.  $-\frac{2}{3}$

M. -21.05

N.  $\frac{3}{5}$

E.  $-2\frac{3}{4}$

N. -3.07

U. A

S. 4.8

L. -4, -2.85, -2.7, 0, 3.4

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

I. C

8	10	1	3	9		11	5		2	7		6	4
---	----	---	---	---	--	----	---	--	---	---	--	---	---

**Activity**  
**6.4****Start Thinking!**

For use before Activity 6.4

Sketch a number line. Can you graph two different numbers that are the same distance from zero on the number line? What are the numbers? How far from zero are they?

**Activity**  
**6.4****Warm Up**

For use before Activity 6.4

**Graph the integer and its opposite.**

1.  $-8$

2.  $4$

3.  $-2$

4.  $10$

5.  $-3$

6.  $9$

7.  $-5$

8.  $12$

**Use the true statements below to make a conjecture about how to find the absolute value of an integer.**

The absolute value of 4 is 4.

The absolute value of 17 is 17.

The absolute value of 0 is 0.

The absolute value of  $-3$  is 3.

The absolute value of  $-11$  is 11.

**Use a vertical number line to graph the location of each object. Then tell which object is farther from sea level.**

1. Transparent sea cucumber:  $-2750$  m

Dumbo octopus:  $-3500$  m

2. Snorkeler:  $-1$  m

Mast of a sailboat: 10 m

3. Shark:  $-1500$  m

Submarine:  $-1000$  m

## 6.4 Practice A

Use a vertical number line to graph the location of each object. Then tell which object is farther from sea level.

1. Manatee:  $-2$  m  
Flounder:  $-13$  m
2. Snapper:  $-8$  m  
Osprey:  $7$  m

Find the absolute value.

3.  $|-4|$                       4.  $|-1|$                       5.  $|5.2|$
6.  $|-12|$                       7.  $\left|2\frac{1}{3}\right|$                       8.  $|-51|$
9.  $\left|-\frac{5}{6}\right|$                       10.  $|-38|$                       11.  $|40|$

12. Describe and correct the error in finding the absolute value.

$\times$	$ -20  = -20$
----------	---------------

Copy and complete the statement using  $<$ ,  $>$ , or  $=$ .

13.  $|-6|$     ?  $4$                       14.  $10$     ?  $|-10|$
15.  $|-4.5|$     ?  $|-5.2|$                       16.  $\left|\frac{2}{3}\right|$     ?  $\left|-\frac{1}{6}\right|$

17. In a sailboat race series, a boat's score indicates the number of points it is behind the winning boat. Your boat has score  $-18$  and your friend's boat has score  $-23$ .

- a. Find the absolute value score of each boat.
- b. Whose boat is farther behind the winning boat?

Order the values from least to greatest.

18.  $0, |-3|, 1, -2, |5|$                       19.  $|3|, |-1|, -3, |-5|, -5$

Tell whether the statement is *always*, *sometimes*, or *never* true. Explain.

20. The absolute value of a negative number is its opposite.
21. The absolute value of a number is less than the number.
22. The absolute value of a negative number is equal to the number.



**6.4 Practice B****Find the absolute value.**

1.  $|-9|$

2.  $|9.2|$

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

4.  $|-10.2|$

5.  $|99|$

6.  $\left|2\frac{1}{7}\right|$

7.  $|15.9|$

8.  $|-125|$

9.  $|200|$

10. Write two integers that have an absolute value of 15.

**Copy and complete the statement using  $<$ ,  $>$ , or  $=$ .**

11.  $|-11.3| \underline{\quad ? \quad} |16.5|$

12.  $|9| \underline{\quad ? \quad} |-9|$

13.  $\left|-\frac{1}{6}\right| \underline{\quad ? \quad} \left|\frac{1}{2}\right|$

14.  $|-3| \underline{\quad ? \quad} |2|$

15. Two boats lie at the bottom of the ocean. In relation to sea level, the position of Boat A is  $-33$  feet, and the position of Boat B is  $-25$  feet.

a. Find the absolute value of each position.

b. Which boat is closer to sea level?

**Order the values from least to greatest.**

16.  $12, |-13|, -9, -12, |-7|, 0$

17.  $|20|, |-18|, -15, |-16|, 22, -17$

**Simplify the expression.**

18.  $-|0|$

19.  $-|4|$

20.  $-|-3|$

21. The word *ROTATOR* is a palindrome.a. Graph and label the following points on a number line:  $T = -2$ ,  $A = 0$ ,  $R = -6$ . Then, graph and label the absolute value of each point on the *same* number line.b. Assign a value to point O so that the letters spell the word *ROTATOR*. Then, graph point O and the absolute value of point O on the *same* number line as part (a).22. Find values of  $x$  and  $y$  so that  $|x| > |y|$  and  $x < y$ .

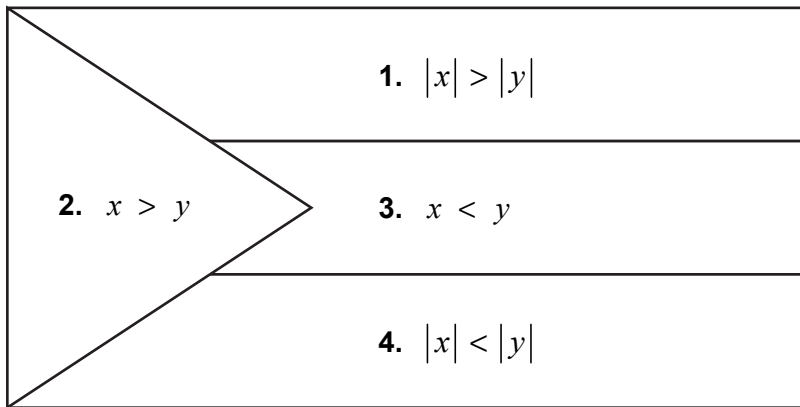
# 6.4

## Enrichment and Extension

### Flags

Copy the flag shown. Assume  $x > 0$  and  $y < 0$ . Tell whether the statement is *always*, *sometimes*, or *never* true. Use the table to color the portion of your flag that contains the exercise.

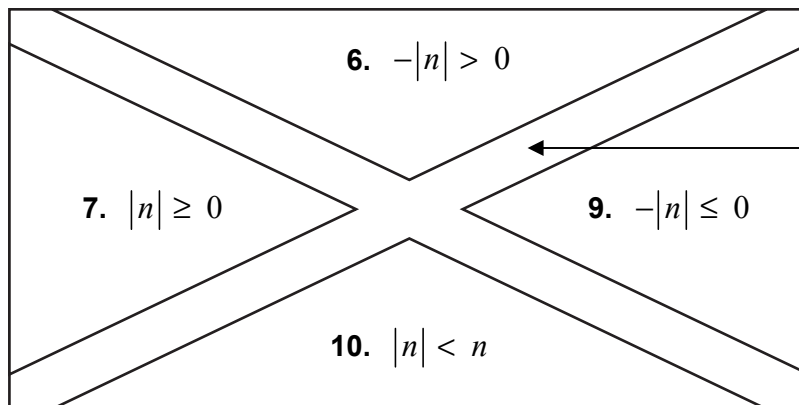
Answer	Color
Always	Black
Sometimes	Aqua
Never	Yellow



5. Which country does the flag represent?

Copy the flag shown. Tell whether the possible values of  $n$  are *all integers*, *all positive integers*, *all negative integers*, or *no integers*. Use the table to color the portion of your flag that contains the exercise.

Answer	Color
All integers	Black
All positive integers	Red
All negative integers	Yellow
No integers	Green



11. Which country does the flag represent?



**Activity**  
**6.5****Start Thinking!**

For use before Activity 6.5

What real-life situations can be represented by a horizontal number line? by a vertical number line?

**Activity**  
**6.5****Warm Up**

For use before Activity 6.5

**Plot the ordered pair in a coordinate plane.**

1.  $K(-2, 3)$

2.  $L(1, -4)$

3.  $M(-8, 0)$

4.  $N(-7, -4)$

5.  $P(5, 5)$

6.  $Q(-6, 4)$

7.  $R(0, -1)$

8.  $S(4, -7)$

**Lesson**  
**6.5****Start Thinking!**

For use before Lesson 6.5

Explain how locating a city on a map is like graphing on a coordinate grid.

**Lesson**  
**6.5****Warm Up**

For use before Lesson 6.5

**Plot and connect the points to make a picture.**

1.  $(0, 2)$

2.  $(1, 3)$

3.  $(3, 3)$

4.  $(4, 2)$

5.  $(0, -3)$

6.  $(-4, 2)$

7.  $(-3, 3)$

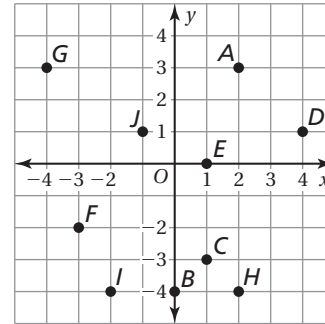
8.  $(-1, 3)$

9.  $(0, 2)$

## 6.5 Practice A

Write an ordered pair corresponding to the point.

1. Point  $A$
2. Point  $B$
3. Point  $C$
4. Point  $D$
5. Point  $E$
6. Point  $F$
7. Point  $G$
8. Point  $H$
9. Point  $I$
10. Point  $J$



Plot the ordered pair in a coordinate plane. Describe the location of the point.

11.  $K(5, 2)$
12.  $L(-3, 6)$
13.  $M(-5, 0)$
14.  $N(-4.5, 2.5)$
15.  $P(7, -4)$
16.  $Q\left(1\frac{1}{2}, 3\right)$
17.  $R(-2, 4)$
18.  $S(0, 3)$

19. Describe and correct the error in the solution.

$\times$  To plot  $(3, -4)$ , start at  $(0, 0)$  and move 3 units up and 4 units left.

Tell whether the statement is *sometimes*, *always*, or *never* true.

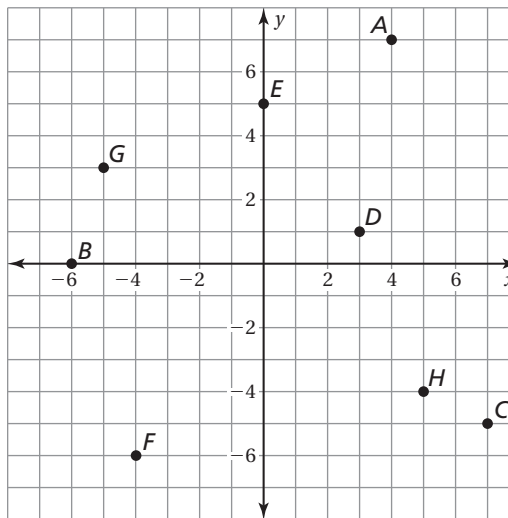
20. The  $y$ -coordinate of a point in Quadrant II is positive.
21. The  $x$ -coordinate of a point on the  $y$ -axis is zero.
22. The  $y$ -coordinate of a point on the  $y$ -axis is positive.
23. Your house is located at  $(0, 0)$ .
  - a. To get from your house to school, you walk 2 blocks east and 1 block south. What ordered pair corresponds to the location of your school?
  - b. To get from your house to the mall, you walk 4 blocks west and 3 blocks north. What ordered pair corresponds to the location of the mall?
  - c. Is your school or the mall closer to your home?
  - d. Describe how you would walk from your school to the mall.
  - e. Your friend lives 2 blocks from the mall. Is your friend's house in the same quadrant as the mall? Explain.

# 6.5

## Practice B

Write an ordered pair corresponding to the point.

- |                   |                   |
|-------------------|-------------------|
| 1. Point <i>A</i> | 2. Point <i>B</i> |
| 3. Point <i>C</i> | 4. Point <i>D</i> |
| 5. Point <i>E</i> | 6. Point <i>F</i> |
| 7. Point <i>G</i> | 8. Point <i>H</i> |



Plot the ordered pair in a coordinate plane.  
Describe the location of the point.

- |                  |  |
|------------------|--|
| 9. $W(-3, 2)$    | 10. $X\left(\frac{1}{2}, -3\frac{1}{2}\right)$ |
| 11. $Y(0, -3.5)$ | 12. $Z(-1, 4)$                                 |

Tell whether the statement is *sometimes*, *always*, or *never* true.

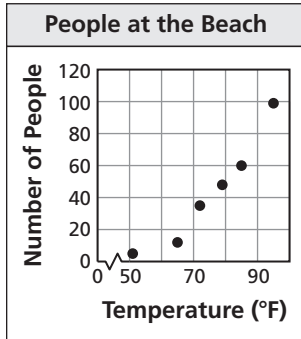
13. The *y*-coordinate of points in Quadrant IV are positive.
14. A point with an *x*-coordinate of zero and a positive *y*-coordinate lies on the *y*-axis between Quadrants III and IV.
15. Two points, one with a positive *y*-coordinate and another with a negative *x*-coordinate, both lie in Quadrant II.
16. The points  $P(2, 1)$ ,  $Q(2, -3)$ ,  $R(-1, -3)$ , and  $S(-1, 1)$  are vertices of a figure.
  - a. Draw the figure in a coordinate plane.
  - b. Find the perimeter of the figure.
  - c. Find the area of the figure.
17. A movie theater is located at  $(1, 7)$ .
  - a. To get from your house to the movie theater, you walk 4 blocks east and 5 blocks north. What ordered pair corresponds to the location of your house?
  - b. After walking 6 blocks to the movie theater as described in part (a), you meet your friend at your friend's house. What ordered pair corresponds to the location of your friend's house?
  - c. How far do you and your friend walk to get to the movie theater?
  - d. There are two ice cream parlors, one located at  $(0, 6)$  and another located at  $(-1, 5)$ . After a movie and ice cream, you will each walk home alone. Which location is most advantageous to both you and your friend?

# 6.5

## Enrichment and Extension

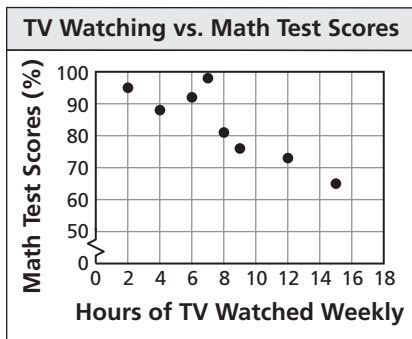
### Scatter Plots and Correlation

A **scatter plot** is used to show relationships between two sets of numerical data with plotted points on a graph. Scatter plots also help you to see **correlations** in data.

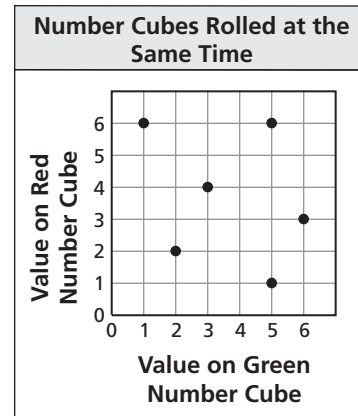


<b>Number of people</b>	60	48	35	5	99	12
<b>Temperature (°F)</b>	85	79	72	51	95	65

This scatter plot shows a **positive correlation**: as the temperature *increases*, there are *more* people at the beach.



This scatter plot shows a **negative correlation**: students who watch *more* TV, get *lower* scores on their math tests.



This scatter plot shows **no correlation**: there is no relationship between the values on two number cubes.

**Predict whether the following will have a positive correlation, negative correlation, or no correlation.**

1. Money spent on car repairs vs. mileage on the odometer
2. Years of education vs. number of convicted crimes
3. Number of letters in a state's name vs. number of parks in the state
4. Age of a computer vs. value of the computer
5. After making your prediction for the following data, create a scatter plot to test your prediction.

<b>Baby's age (months)</b>	2	10	5	0	4	6	12	9	8	1
<b>Baby's weight (pounds)</b>	10	22.5	16.5	7	15	17	24	21	20	8



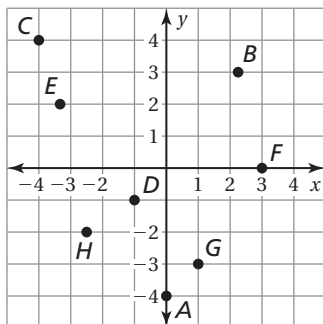
# 6.5 Puzzle Time

## What Has Stars and Stripes?

Write the letter of each answer in the box containing the exercise number.

Write an ordered pair corresponding to the point.

- 1. Point *A*
- 2. Point *B*
- 3. Point *C*
- 4. Point *D*
- 5. Point *E*
- 6. Point *F*
- 7. Point *G*
- 8. Point *H*



Plot the ordered pair in a coordinate plane. Describe the location of the point.

- 9.  $(6, -2)$
- 10.  $(2\frac{1}{8}, 6)$

- 11.  $(-1, 2)$
- 12.  $(-4.8, -6.1)$

Plot the points and find the distance between the points.

- 13.  $(3, -4), (7, -4)$
- 14.  $(5\frac{1}{2}, 3), (5\frac{1}{2}, -2)$

- 15.  $(2, -2.4), (2, 4.6)$
- 16.  $(-1, 4), (-1, 6)$

- 17. A rectangle is drawn in a coordinate plane with the vertices  $A(-3, 4), B(6, 4), C(6, -3),$  and  $D(-3, -3)$ . Find the area of the rectangle.

### Answers for 1–8

O.  $(2.25, 3)$       E.  $(-3\frac{1}{3}, 2)$

A.  $(0, -4)$       E.  $(-4, 4)$

A.  $(3, 0)$

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

O.  $(-1, -1)$       U.  $(1, -3)$

### Answers for 9–12

A. Quadrant I

T. Quadrant II

R. Quadrant III

A. Quadrant IV

### Answers for 13–17

B. 7      Z. 63

B. 4      V. 5

M. 2

9		16	4	14	8	3		10	13	2	7	11		6		17	5	15	12	1
---	--	----	---	----	---	---	--	----	----	---	---	----	--	---	--	----	---	----	----	---

**Extension  
6.5****Start Thinking!**

For use before Extension 6.5

Plot the following ordered pairs in a coordinate plane:  $(4, 3)$ ,  $(-4, 3)$ ,  $(4, -3)$ , and  $(-4, -3)$ .

What do you notice about these four points?  
Explain.

**Extension  
6.5****Warm Up**

For use before Extension 6.5

**Plot the ordered pair in a coordinate plane.**

1.  $T(1, 4)$

2.  $U(-1, 4)$

3.  $V(5, 3)$

4.  $W(5, -3)$

5.  $X(-6, 2)$

6.  $Y(-6, -2)$

**Extension  
6.5****Practice**

Reflect the point (a) in the  $x$ -axis, and (b) in the  $y$ -axis.

- |                                   |                  |  |
|-----------------------------------|------------------|--|
| 1. $(3, 2)$                       | 2. $(5, -2)$     | 3. $(-3, 4)$                                 |
| 4. $(-1, -4)$                     | 5. $(3, 0)$      | 6. $(0, -6)$                                 |
| 7. $\left(2\frac{1}{2}, 4\right)$ | 8. $(-2.5, 3.5)$ | 9. $\left(-\frac{1}{2}, 4\frac{1}{2}\right)$ |

Reflect the point in the  $x$ -axis followed by the  $y$ -axis.

- |                 |                |                                    |
|-----------------|----------------|------------------------------------|
| 10. $(5, 3)$    | 11. $(3, -1)$  | 12. $\left(5, 4\frac{1}{2}\right)$ |
| 13. $(-1.5, 4)$ | 14. $(-6, -2)$ | 15. $(3.5, 8.5)$                   |

16. A point is reflected in the  $x$ -axis. The reflected point is  $(2, 1)$ .

- What is the original point?
- What is the distance between the points?

17. A point is reflected in the  $y$ -axis. The reflected point is  $(-3, 2.5)$ .

- What is the original point?
- What is the distance between the points?

18. A point is reflected in the  $x$ -axis followed by the  $y$ -axis. The reflected point is  $(-3, -4)$ . What is the original point?

19. The vertices of a parallelogram are  $(0, 0)$ ,  $(5, 0)$ ,  $(8, 2)$ , and  $(3, 2)$ .

- The parallelogram is reflected in the  $x$ -axis. Give the coordinates of the reflected parallelogram.
- The original parallelogram is reflected in the  $y$ -axis. Give the coordinates of the reflected parallelogram.

**Chapter**  
**6**
**Technology Connection**

For use after Section 6.3

**Ordering Numbers**

When working with a list of numbers, a spreadsheet application can be used to sort the list in either ascending or descending order. While integral and decimal numbers can be easily inputted to the spreadsheet, fractions require a little more care as you need to be certain the spreadsheet program interprets the division sign  $\boxed{/}$  correctly.

**EXAMPLE** Use a spreadsheet to order the numbers from least to greatest.

$$7, -2.4, \frac{5}{2}, -\frac{3}{4}, 0, -1, 5.9, -\frac{9}{5}, 5\frac{7}{8}, -2\frac{4}{9}$$

**SOLUTION**

**Step 1** Enter the list of numbers into column A.

**Step 2** When you come to  $\frac{5}{2}$ , type  $\boxed{=}$  5  $\boxed{/}$  2 into the cell. The equal sign tells the program to display in the cell the value of the calculation.

**Step 3** Continue entering numbers into column A. For a mixed number such as  $5\frac{7}{8}$ , you can either change it to an improper fraction or enter  $\boxed{=}$  5 + 7  $\boxed{/}$  8 into the cell.

**Step 4** To order the numbers from least to greatest, first highlight cells A1 to A10. Then, find the DATA menu and SORT command. Use the "Ascending," or "A→Z" option.

**ANSWER**  $-2\frac{4}{9}, -2.4, -\frac{9}{5}, -1, -\frac{3}{4}, 0, \frac{5}{2}, 5\frac{7}{8}, 5.9, 7$

**Use a spreadsheet to order the numbers from least to greatest.**

1.  $-\frac{2}{9}, 8, -8\frac{3}{7}, \frac{61}{8}, -8, 8\frac{3}{7}, -\frac{61}{8}, -1, -\frac{3}{11}, -1.1$

2.  $5.1, -4.6, \frac{6}{5}, -\frac{9}{2}, 1, -4\frac{3}{4}, 5\frac{1}{9}, \frac{16}{3}, -4, 0.98$