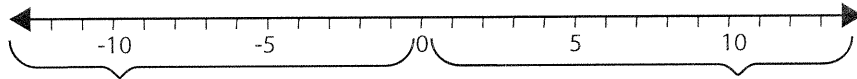


# Understanding Integers

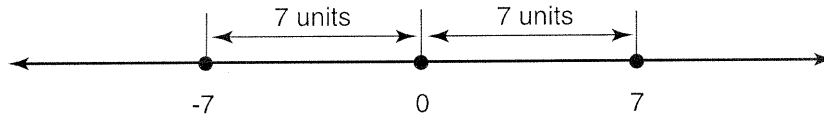


**Negative integers** are the opposite of positive integers.

Zero is neither positive nor negative. The opposite of 0 is 0.

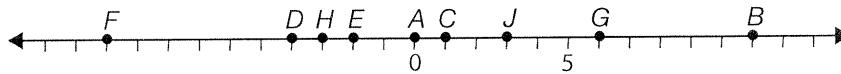
**Positive integers** are also called counting numbers.

The **absolute value** of an integer is the distance from that integer to zero on the number line. Distance is always a positive measure, so the absolute value of any integer is positive.



The distance from 0 to 7 is 7 units, so  $|7| = 7$ .

The distance from 0 to  $-7$  is 7 units, so  $|-7| = 7$ .



Use the number line above. Write the integer for each point. Then write its opposite and absolute value.

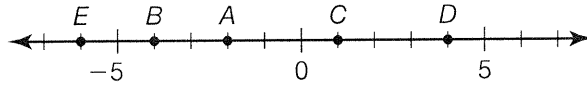
- |      |                 |      |                    |
|------|-----------------|------|--------------------|
| 1. A | <u>0; 0; 0</u>  | 2. B | <u>11; -11; 11</u> |
| 3. C | <u>1; -1; 1</u> | 4. D | <u>-4; 4; 4</u>    |
| 5. E | <u>-2; 2; 2</u> | 6. F | <u>-10; 10; 10</u> |
| 7. G | <u>6; -6; 6</u> | 8. H | <u>-3; 3; 3</u>    |
| 9. J | <u>3; -3; 3</u> |      |                    |

10. **Number Sense** John borrowed \$6 from Adam. The next week John borrowed \$15 more from Adam. Write an integer that represents John's total debt to Adam. -\$21

11. **Reasoning** What is the opposite of the opposite of negative nine? -9

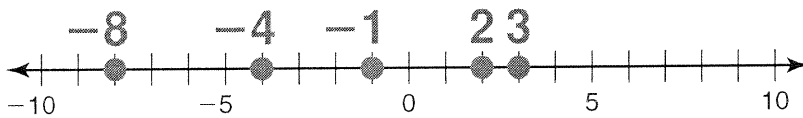
Name \_\_\_\_\_

# Understanding Integers



Use the number line. Write the integer for each point. Then give its opposite and absolute value.

1. A -2, 2, 2      2. B -4, 4, 4      3. C 1, -1, 1  
 4. D 4, -4, 4      5. E -6, 6, 6  
 6. On the number line, graph the points  $-8$ ,  $3$ ,  $-4$ ,  $2$ , and  $-1$ .



The table gives the highest and lowest temperatures for some states in the United States. Use integers to describe the two temperatures for each state.

**Record Temperatures**  
(in degrees, relative to zero)

State	Highest	Lowest
Alabama	112 above	27 below
Delaware	110 above	17 below
California	134 above	45 below
Colorado	118 above	61 below

7. Delaware 110, -17  
 8. California 134, -45  
 9. Colorado 118, -61  
 10. Alabama 112, -27

11. Which is an integer?

- A  $-0.5$   
 B  $-5$   
 C  $5.5$   
 D  $5\frac{4}{5}$

12. **Writing to Explain** In your own words, tell what is meant by “the absolute value of an integer.”

**Sample answer: The absolute value is the distance from zero.**

Name \_\_\_\_\_

# Sweater Days

## Number Sense

Claire is keeping track of the sales of some sweaters sold at the Clothes Barn. She is also keeping track of the sweaters that were purchased but were returned for some reason. When the buyer returns an item, the store takes it back and returns the money to the customer.

	Girls Sweaters		Boys Sweaters	
	Sold	Returned	Sold	Returned
Week 1	10	3	8	0
Week 2	7	4	9	1
Week 3	8	1	4	3
Week 4	4	2	7	5
Week 5	6	0	6	0
Week 6	5	2	2	2

Write an integer to represent each of the following situations. (Use negative integers to represent returned items.) Then write the opposite and the absolute value for each integer.

1. The number of boy's sweaters sold in Week 4

7      -7      7

2. The number of girl's sweaters returned in Week 2

-4      4      4

3. The number of boy's sweaters returned in Week 6

-2      2      2

4. The total number of sweaters sold in Week 1

18      -18      18

5. The total number of boy's sweaters sold in 6 weeks

36      -36      36

6. The number of sweaters returned in Week 5

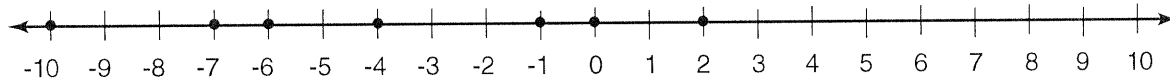
0      0      0

7. The number of girl's sweaters returned in Week 4

-2      2      2

# Comparing and Ordering Integers

When comparing two integers on a number line, the integer that is farther to the right is greater. The integer that is farther to the left is less.



Compare  $-6$  and  $-10$ .

Because  $-6$  is farther to the right than  $-10$ , it is greater. So,  $-6 > -10$ .

Compare  $-1$  and  $2$ .

Because  $2$  is farther to the right than  $-1$ , it is greater. So,  $2 > -1$ .

Order  $-4$ ,  $0$ , and  $-7$  from least to greatest.

Because  $-7$  is the farthest to the left, it is the least.  $0$  is farther to the right than  $-4$ , so  $-4$  is the next least. So, the numbers in order from least to greatest are  $-7$ ,  $-4$ , and  $0$ .

Use  $>$ ,  $<$ , or  $=$  to compare.

1.  $-5 < 3$

2.  $15 > -4$

3.  $0 < 27$

4.  $52 = |-52|$

5.  $-9 < |-9|$

6.  $-6 > -7$

7.  $13 > 12$

8.  $-17 < -15$

9.  $-8 = -8$

Order the numbers from least to greatest.

10.  $9, -1, -4, 2$   
 $-4, -1, 2, 9$

11.  $1, |-2|, -8, 6$   
 $-8, 1, |-2|, 6$

12.  $15, -7, -12, 0, |5|$   
 $-12, -7, 0, |5|, 15$

13. Manuel dug holes to plant an oak tree, a rosebush, lantana, and prairie grass. The table shows the depths of the holes. You can think of ground level as  $0$ , so the holes closest to ground level are not as deep as the holes farthest from ground level. Which plant hole is closest to ground level? Which is farthest? Compare the depths of their holes.

Plant	Hole (inches)
Lantana	$-8$
Prairie Grass	$-6$
Oak Tree	$-22$
Rosebush	$-15$

**Prairie grass; oak tree;  $-6 > -22$**

**Sample answer:  $-38, -50, -78$**

14. Reasoning Write 3 integers less than  $-27$ .

Name \_\_\_\_\_

# Comparing and Ordering Integers

Use  $<$ ,  $>$ , or  $=$  to compare.

1.  $6 > -8$

2.  $-12 < -11$

3.  $2 = |-2|$

4.  $12 > -11$

5.  $11 > -1$

6.  $|-3| < 4$

Order from least to greatest.

7.  $-6, 4, 7, 0, -9$

$-9, -6, 0, 4, 7$

8.  $-1, -5, 5, 7, -8$

$-8, -5, -1, 5, 7$

9.  $-7, -8, -2, 6, |-11|, -11, -9, 4, 5$

$-11, -9, -8, -7, -2, 4, 5, 6, |-11|$

10. **Reasoning** Can any negative integer be greater than a positive integer? Explain.

**No; Sample answer: All negative**

**numbers are less than zero and all**

**positive numbers are greater than zero.**

Kyle kept track of the number of points he scored each time he played a video game. Sometimes the score is less than zero.

Kyle's Scores	
Play 1:	Gained 5 points
Play 2:	Lost 15 points
Play 3:	Gained 32 points
Play 4:	Gained 10 points
Play 5:	Lost 12 points
Play 6:	Lost 8 points

11. Order the negative plays from least to greatest.

$-15, -12, -8$

12. Order the positive plays from greatest to least.

$32, 10, 5$

13. Which integer is greatest?

A 1

B -10

**C 9**

D 3

14. **Writing to Explain** Explain how to find the greatest integer plotted on a number line.

**Sample answer: Find the integer that is the**

**farthest to the right.**

Name \_\_\_\_\_

# Highs and Lows!

The table below shows a number of places from around the world. These places are listed in order from least elevation to greatest elevation. Use the elevations from the scattered boxes to complete the table.

**Data**

Location	Elevation in feet
Dead Sea—Israel and Jordan	-1,339
Death Valley—California, United States	-282
Valdes Peninsula—Argentina	-131
Prins Alexander Polder—The Netherlands	-22
New Orleans—Louisiana, United States	-8
Houston —Texas, United States	49
Fresno—California, United States	328
Jermoth Hill—Rhode Island, United States	812
Campbell Hill—Ohio, United States	1,549
Timms Hill—Wisconsin, United States	1,951
Denver—Colorado, United States	5,280
Estrela—Portugal	6,539

Scattered boxes containing elevations for matching:

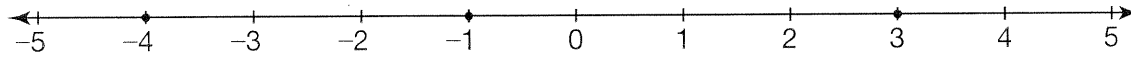
- 1,951
- 5,280
- 22
- 282
- 328
- 49
- 131
- 812
- 1,339
- 1,549
- 6,539
- 8

# Absolute Value

The absolute value of a number is its distance from 0 on a number line. You can use a number line to help you compare and order the absolute values of numbers.

Order the values from least to greatest:  $|-4|$ ,  $|-1|$ ,  $|3|$ .

Plot each number on the number line, and then look at each point's distance from 0.



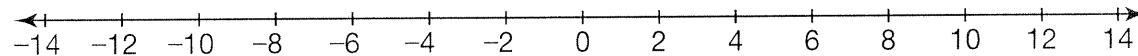
Since  $-1$  is the point closest to 0,  $|-1|$  is the least value.

Since 3 is the next closest point to 0,  $|3|$  is the next greater value.

Since  $-4$  is the point farthest from 0,  $|-4|$  is the greatest value.

The order of the values from least to greatest is  $|-1|$ ,  $|3|$ ,  $|-4|$ .

For 1 through 6, use  $<$  or  $>$  to compare. You can use the number line to help you.



1.  $|3| < |-4|$

2.  $|-5| > |0|$

3.  $|1| < |-2|$

4.  $|13| > |-12|$

5.  $|-10| > |-9|$

6.  $|6| < |-14|$

For 7 through 12, order the values from least to greatest. You can use the number line to help you.

7.  $|-4|, |-2|, |11|$

$|-2|, |-4|, |11|$

8.  $|-9|, |0|, |-2|$

$|0|, |-2|, |-9|$

9.  $|4|, |-5|, |-7|$

$|4|, |-5|, |-7|$

10.  $|-1|, |-8|, |2|$

$|-1|, |2|, |-8|$

11.  $|-14|, |0|, |-6|$

$|0|, |-6|, |-14|$

12.  $|8|, |-11|, |-6|$

$|-6|, |8|, |-11|$

13. **Writing to Explain** How do you know that  $|8|$  and  $|-8|$  are the same distance from 0? Do they have the same absolute value? Explain.

Since 8 and  $-8$  are both 8 units from 0 on a number line, they both have the same absolute value of 8.

14. **Number Sense** Name two numbers that are not located the same distance from 0. What are their absolute values?

Sample answer:  $-5$  and 2; 5 and 2

Name \_\_\_\_\_

# Absolute Value

For 1 through 6, use  $<$  or  $>$  to compare.

1.  $|-22| > |-12|$       2.  $|45| < |-46|$       3.  $|13| > |-2|$   
 4.  $|48| > |-39|$       5.  $|-55.5| > |55|$       6.  $|21\frac{1}{3}| < |-21\frac{1}{2}|$

For 7 through 12, order the values from greatest to least.

7.  $|-6|, |-4|, |11|, |0|$       8.  $|-20|, |16|, |-2|, |37|$       9.  $|41|, |-42|, |-63|, |11|$   
 $|11|, |-6|, |-4|, |0|$        $|37|, |-20|, |16|, |-2|$        $|-63|, |-42|, |41|, |11|$   
 10.  $|4|, |-3|, |-18|, |-3.18|$       11.  $|0|, |-27|, |-32|, |6|$       12.  $|\frac{1}{2}|, |\frac{2}{3}|, |\frac{1}{10}|, |0|$   
 $|-18|, |4|, |-3.18|, |-3|$        $|-32|, |-27|, |6|, |0|$        $|\frac{2}{3}|, |\frac{1}{2}|, |\frac{1}{10}|, |0|$

13. Which pair of numbers are located the same distance from 0 on the number line?

- A 5 and  $-4$       B 0 and 1      **C  $-3$  and 3**      D  $-2$  and  $-4$

14. A stock's price gained 3% in April and 5% in May, and then lost 4% in June and 1% in July. During which month did the stock's price change the most?

May

15. Max starts on the 20th floor of a building and takes the elevator 4 floors down. Then he takes the elevator up 3 floors, and then down another 5 floors. Write the absolute value of the greatest change in floors that Max made.

5

16. **Writing to Explain** The table shows the daily change in high temperature for several days. Explain how you can order the days from least to greatest amount of temperature change.

Day	Temperature Change
Monday	$+3^\circ\text{F}$
Tuesday	$-4^\circ\text{F}$
Wednesday	$-1^\circ\text{F}$
Thursday	$+2^\circ\text{F}$

Find the absolute value of each change and order the days by the absolute values.  $|+3| = 3$ ,  $|-4| = 4$ ,  $|-1| = 1$ ,  $|+2| = 2$ ;  $1 < 2 < 3 < 4$ ; **Wednesday, Thursday, Monday, Tuesday**



Name \_\_\_\_\_

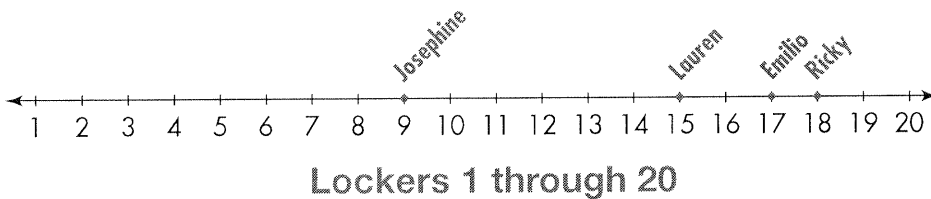
# Lost Lockers

Lauren, Josephine, Emilio, and Ricky were assigned lockers in the same row on the first day of school. The lockers in this row are all one unit apart, numbered 1 to 20.

## Extend Your Thinking

Later that day, it was so windy that their locker assignment sheets were blown away. Fortunately, each student remembered some important information about his or her locker number:

- Lauren found Locker 10 and then moved 5 units to her locker.
  - Josephine started at Locker 2 and moved 7 units to find her locker.
  - Emilio's locker is 2 units to the right of Lauren's locker.
  - Ricky's locker is 1 unit to the right of Emilio's. He also remembers Josephine's locker and Lauren's locker being 6 lockers apart.
1. Help the students find their locker numbers. Let the numbered tick marks in the diagram below represent the row of lockers. Plot a point for each student that corresponds with his or her locker number. Label each student's name above his or her point.



2. How did you find Josephine's locker number?  
**9 and  $-5$  are both 7 units from 2. Since locker numbers are between 1 and 20, her number must be 9.**
3. How did you find Lauren's locker number?  
**15 is 5 units from 10 and 6 units from Josephine's locker number, 9.**

# Rational Numbers on a Number Line

When comparing and ordering rational numbers on a number line, it helps to change all of the numbers to fractions and mixed numbers or to decimals.

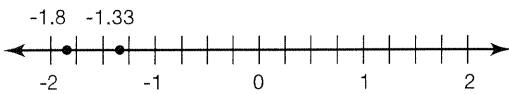
### How do you compare rational numbers?

Compare  $-1.33$  and  $-\frac{9}{5}$ .

Convert  $-\frac{9}{5}$  to a decimal so that both numbers are in the same form.

$$-\frac{9}{5} = -9 \div 5 = -1.8$$

Place the numbers on a number line.



$-1.33$  is to the right of  $-1.8$ .

So,  $-1.33 > -9/5$ .

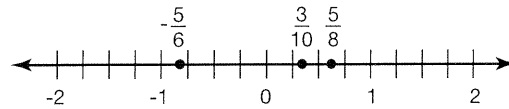
### How do you order rational numbers?

Order  $0.3$ ,  $-\frac{5}{6}$  and  $\frac{5}{8}$  from least to greatest.

Convert  $0.3$  to a fraction so that all of the numbers are in the same form.

$$0.3 = \frac{3}{10}$$

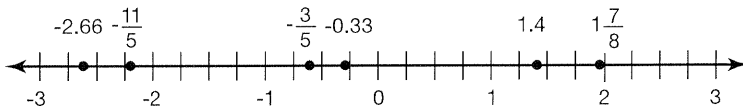
Place the numbers on a number line.



$\frac{3}{10}$  is to the right of  $-\frac{5}{6}$  and  $\frac{5}{8}$  is to the right of  $0.3$ .

So, the numbers in order from least to greatest are  $-\frac{5}{6}$ ,  $0.3$ ,  $\frac{5}{8}$ .

Write  $<$  or  $>$  in the circle.



- |  |  |   |
|--|--|---|
| 1. $-\frac{3}{5}$ $\left( < \right)$ $-0.33$ | 2. $1\frac{7}{8}$ $\left( > \right)$ $1.4$   | 3. $-2.66$ $\left( < \right)$ $-\frac{11}{5}$ |
| 4. $-2\frac{1}{3}$ $\left( > \right)$ $-2.8$ | 5. $-1.1$ $\left( > \right)$ $-\frac{14}{5}$ | 6. $1.15$ $\left( < \right)$ $\frac{11}{8}$   |

Write the numbers in order from least to greatest.

- |   |   |   |
|---|---|---|
| 7. $0.15, -\frac{2}{3}, -0.1$<br><u><math>-\frac{2}{3}, -0.1, 0.15</math></u> | 8. $-\frac{11}{5}, -2.5, -2\frac{2}{3}$<br><u><math>-2\frac{2}{3}, -2.5, -\frac{11}{5}</math></u> | 9. $1.6, \frac{15}{8}, 1\frac{2}{5}$<br><u><math>\frac{12}{5}, 1.6, \frac{15}{8}</math></u> |
|---|---|---|

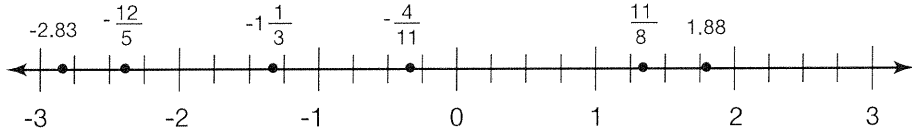
10. **Reasoning** The rainfall in a city was  $-\frac{3}{8}$  in. below average in June and  $-0.45$  in. below average in July. Which month is closest to the average?

**June**

Name \_\_\_\_\_

# Rational Numbers on a Number Line

Write  $<$  or  $>$  in the circle.



1.  $-1\frac{1}{3}$   $>$   $-\frac{12}{5}$       2.  $\frac{11}{8}$   $<$  1.88      3.  $-2.83$   $<$   $-1\frac{1}{3}$   
 4.  $-\frac{4}{11}$   $<$   $-0.19$       5. 1.6  $>$   $\frac{4}{3}$       6.  $-\frac{1}{6}$   $<$   $-0.1$

Write the numbers in order from least to greatest.

7.  $0.66, -\frac{1}{3}, -\frac{5}{12}$       8.  $-\frac{12}{5}, -1.35, -1\frac{7}{9}$       9.  $\frac{3}{8}, \frac{2}{5}, 0.38$   
 ~~$-\frac{5}{12}, -\frac{1}{3}, 0.66$~~        ~~$-\frac{12}{5}, -1\frac{7}{9}, -1.35$~~        ~~$\frac{3}{8}, 0.38, \frac{2}{5}$~~

Use the table for 10 and 11.

10. A scientist is testing lake water at different depths. Order the samples of lake water from greatest depth to least depth.

$-1.55, -1\frac{3}{8}, -\frac{9}{16}, -0.4$

Day	Feet Below the Lake Surface
Monday	$-1\frac{3}{8}$
Tuesday	$-0.4$
Wednesday	$-1.55$
Thursday	$-\frac{9}{16}$

11. **Number Sense** At what depth could the scientist take a new sample that would be shallower than the shallowest sample?

Sample answer:  $-\frac{1}{4}$  ft

12. Which rational number is least?

- A 0.66  
 B  $-\frac{4}{5}$   
**C  $-\frac{6}{7}$**   
 D  $-0.6$

13. **Writing to Explain** Lauren says that  $-3.5$  is greater than  $-3\frac{1}{3}$ . Do you agree? Explain.

No. Sample answer:  $-3\frac{1}{3}$  is to the right of  $-3.5$  on the number line; so,  $-3.5$  is less than  $-3\frac{1}{3}$ .

Name \_\_\_\_\_

# Restaurant Riddle

How do you know the woman at the next table in the restaurant is a math teacher?

**Mental Math**

Compare the decimals and fractions below to find the answer. Write  $>$ ,  $<$ , or  $=$  in each blank. Then circle the letter next to the greater number. If you wrote  $=$ , do not circle either letter.

1.  $\textcircled{S}$  0.77  $>$   $\frac{3}{5}$  J

2. T 3.9  $=$   $3\frac{18}{20}$  A

3.  $\textcircled{H}$   $\frac{8}{9}$   $>$  0.8 I

4. R 4.11  $<$   $4\frac{1}{3}$   $\textcircled{E}$

5.  $\textcircled{O}$   $3\frac{7}{8}$   $>$  3.78 M

6. D  $\frac{3}{16}$   $<$  0.36  $\textcircled{R}$

7.  $\textcircled{D}$  2.98  $>$   $2\frac{21}{30}$  F

8. G  $1\frac{3}{8}$   $<$  1.45  $\textcircled{E}$

9. P 0.2  $=$   $\frac{5}{25}$  B

10.  $\textcircled{R}$   $\frac{4}{12}$   $>$  0.32 K

11.  $\textcircled{S}$  34.91  $>$   $34\frac{36}{40}$  A

12. E  $7\frac{7}{16}$   $<$  7.852  $\textcircled{D}$

13. Q 1.27  $<$   $1\frac{4}{13}$   $\textcircled{E}$

14. U 0.972  $<$   $1\frac{1}{100}$   $\textcircled{C}$

15.  $\textcircled{I}$   $6\frac{1}{3}$   $>$  6.125 W

16. V 0.002  $=$   $\frac{1}{500}$  N

17. B  $9\frac{3}{18}$   $<$  9.37  $\textcircled{M}$

18.  $\textcircled{A}$  3.11  $>$   $\frac{37}{49}$  I

19. Y  $8\frac{1}{9}$   $<$  81.9  $\textcircled{L}$

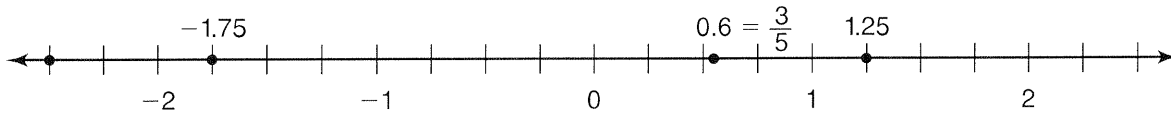
20.  $\textcircled{S}$  100.9  $>$   $100\frac{100}{125}$  Z

21. To solve the riddle, write the circled numbers in order.

S H E O R D E R S D E C I M A L S

# Comparing and Ordering Rational Numbers

When ordering rational numbers on a number line, the number that is farther to the right is greatest. The number farthest to the left is least.



Order  $\frac{3}{5}$ , 1.25, and  $-1.75$  from least to greatest.

### One Way

Use number sense and the number line to order the rational numbers.

- $-1.75$  is negative, so it is farthest to the left.
- $\frac{3}{5}$  is between 0 and 1.
- 1.25 is greater than 1.

### Another Way

Convert rational numbers to a common form to order them.

- Use division to convert  $\frac{3}{5}$  to a decimal.  
 $\frac{3}{5} = 0.6$
- $-1.75$  is to the left of 0.6.
- 0.6 is to the left of 1.25.

Place these numbers on the number line.  
Write the order:  $-1.75, 0.6, 1.25$ .

Use  $>$ ,  $<$ , or  $=$  to compare.

1.  $-4.875 < 2\frac{1}{3}$

2.  $10\frac{3}{4} > -30.5$

3.  $-6\frac{1}{2} = -6.5$

Order the rational numbers from greatest to least.

4. 7.25,  $-8.9$ , 0

7.25, 0,  $-8.9$

5.  $12\frac{1}{2}$ ,  $-22.1$ , 11.9

$12\frac{1}{2}$ , 11.9,  $-22.1$

6.  $-\frac{3}{2}$ ,  $-\frac{3}{4}$ , 0.375

0.375,  $-\frac{3}{4}$ ,  $-\frac{3}{2}$

Order the rational numbers from least to greatest.

7. 0.56,  $-\frac{5}{6}$ ,  $\frac{6}{5}$

$-\frac{5}{6}$ , 0.56,  $\frac{6}{5}$

8. 15.5,  $-15\frac{1}{2}$ ,  $-\frac{15}{2}$

$-15\frac{1}{2}$ ,  $-\frac{15}{2}$ , 15.5

9. 0, 1.1,  $-27\frac{9}{10}$

$-27\frac{9}{10}$ , 0, 1.1

10. Leslie, Anthony, and Pam are playing a game with rational numbers. The chart shows the number they add to their score for each roll of a number cube. Order the points they could get from a roll of a number cube from greatest to least.

$2\frac{3}{4}$ , 2.7,  $-1.56$ ,  $-1\frac{5}{6}$

Roll	Points
1 or 2	$-1\frac{5}{6}$
3	2.7
4	$-1.56$
5 or 6	$2\frac{3}{4}$

# Comparing and Ordering Rational Numbers

Use  $<$ ,  $>$ , or  $=$  to compare.

1.  $6\frac{5}{6} > -9.9$

2.  $-1\frac{2}{5} < -1.25$

3.  $-17.5 = -17\frac{1}{2}$

4.  $10\frac{3}{10} > -100.25$

5.  $0 > -47.5$

6.  $-18\frac{2}{3} < 3.33$

Order the rational numbers from least to greatest. Draw a number line to help you.

7.  $7\frac{1}{4}, 0, -6.25, 7.14$

$-6.25, 0, 7.14, 7\frac{1}{4}$

8.  $13.35, -\frac{3}{2}, 13\frac{3}{5}, -1.3$

$-\frac{3}{2}, -1.3, 13.35, 13\frac{3}{5}$

Order the rational numbers from greatest to least. Draw a number line to help you, if necessary.

9.  $4\frac{7}{10}, -8.875, 4.75, -8\frac{9}{10}$

$4.75, 4\frac{7}{10}, -8.875, -8\frac{9}{10}$

10.  $-2.4, \frac{9}{8}, -2\frac{3}{8}, 1.9$

$1.9, \frac{9}{8}, -2\frac{3}{8}, -2.4$

11. **Reasoning** Omar says that  $-9.5$  is greater than  $1.75$  because  $9.5$  is greater than  $1.75$ . Do you agree with him? Explain.

**No; Sample answer:  $-9.5$  is to the left of the zero on a number line.  $1.75$  is to the right of the zero on a number line. So,  $1.75$  is the greater number.**

12. Two scientists compared measurements they took during different experiments. The first scientist had  $0.375$ ,  $-1.5$ , and  $1.4$  written down. The second scientist wrote down  $\frac{3}{4}$ ,  $-1\frac{5}{8}$ , and  $1\frac{3}{5}$ . Order their measures from least to greatest.

$-1\frac{5}{8}, -1.5, 0.375, \frac{3}{4}, 1.4, 1\frac{3}{5}$

13. Which rational number is the greatest?

A  $20\frac{3}{8}$

B  $-25.95$

C  $20.25$

D  $20.4$

14. **Writing to Explain** Explain how to find the least rational number plotted on a number line.

**Sample answer: Find the rational number that is the farthest to the left.**

Name \_\_\_\_\_

# What Comes Next?

You have found patterns in number sequences before. You can also find patterns and rules for fraction sequences. Complete each pattern and write the rule.

**Patterns**

1.  $2\frac{1}{3}$ ,  $2\frac{2}{3}$ , 3,  $3\frac{1}{3}$ ,  $3\frac{2}{3}$  \_\_\_\_\_, 4 \_\_\_\_\_,  $4\frac{1}{3}$  \_\_\_\_\_,

Rule: Add  $\frac{1}{3}$

2.  $\frac{1}{2}$ , 4,  $7\frac{1}{2}$ , 11,  $14\frac{1}{2}$  \_\_\_\_\_, 18 \_\_\_\_\_,  $21\frac{1}{2}$  \_\_\_\_\_,

Rule: Add  $3\frac{1}{2}$

3.  $\frac{4}{7}$ ,  $2\frac{1}{7}$ ,  $3\frac{5}{7}$ ,  $5\frac{2}{7}$ ,  $6\frac{6}{7}$  \_\_\_\_\_,  $8\frac{3}{7}$  \_\_\_\_\_, 10 \_\_\_\_\_,

Rule: Add  $1\frac{4}{7}$

4.  $\frac{3}{4}$ ,  $1\frac{7}{12}$ ,  $2\frac{5}{12}$ ,  $3\frac{1}{4}$ ,  $4\frac{1}{12}$  \_\_\_\_\_,  $4\frac{11}{12}$  \_\_\_\_\_,  $5\frac{3}{4}$  \_\_\_\_\_,

Rule: Add  $\frac{5}{6}$

5.  $13\frac{4}{5}$ ,  $14\frac{9}{10}$ , 16,  $17\frac{1}{10}$ ,  $18\frac{1}{5}$  \_\_\_\_\_,  $19\frac{3}{10}$  \_\_\_\_\_,  $20\frac{2}{5}$  \_\_\_\_\_,

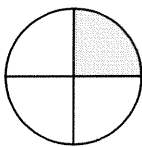
Rule: Add  $1\frac{1}{10}$

6.  $6\frac{1}{16}$ ,  $10\frac{9}{16}$ ,  $15\frac{1}{16}$ ,  $19\frac{9}{16}$ ,  $24\frac{1}{16}$  \_\_\_\_\_,  $28\frac{9}{16}$  \_\_\_\_\_,  $33\frac{1}{16}$  \_\_\_\_\_,

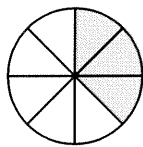
Rule: Add  $4\frac{1}{2}$

Draw the next three pictures for the pattern.

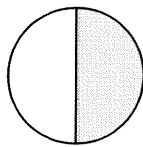
7.



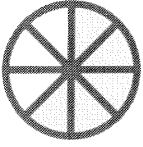
$\frac{1}{4}$



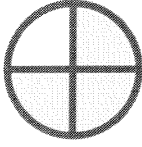
$\frac{3}{8}$



$\frac{1}{2}$



$\frac{5}{8}$



$\frac{3}{4}$



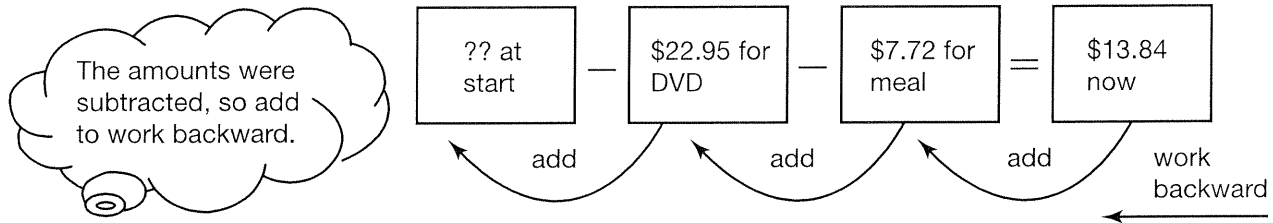
$\frac{7}{8}$

Name \_\_\_\_\_

# Problem Solving: Use Reasoning

After he bought a meal for \$7.72 and a new DVD for \$22.95, Eric had \$13.84 in his pocket. How much money did he start with?

You can solve the problem by using reasoning.



$\$13.84 + \$7.72 + \$22.95 = \$44.51$   
Eric started with \$44.51.

1. Elana spent 45 minutes at the library, half an hour at the grocery store, 20 minutes visiting a friend, and arrived home at 4:10 P.M. What time did she leave home?

**2:35 PM**

2. The football team gained 13 yards, lost 5 yards, gained 8 yards, and gained another 11 yards to end on their 47-yard line. At what yard line did they start?

**20-yard line**

3. Scott has \$82.50 in his checking account after he wrote checks to pay bills for \$37.96, \$52.00, \$12.26, and \$97.36. How much was in his checking account before he paid his bills?

**\$282.08**

4. Vince helped the Pep Club make sandwiches to raise money. He put two sandwiches in each of 30 bags and 5 sandwiches in 26 family bags, and he has 17 sandwiches left over. How many sandwiches did they make to start with?

**207 sandwiches**

5. Kimo divided a number by 3, subtracted 6, multiplied by 3.6 and added 12 to get 282. What number did he start with?

**243**



## Problem Solving: Use Reasoning

1. The delivery person stopped on the 14<sup>th</sup> floor to talk to a friend. Before stopping, he had just made a delivery 4 floors above. Before that he made a delivery 6 floors below. Before that he had made a delivery 9 floors above. Before that he had made a delivery 15 floors below. On what floor did he make his first delivery?

**6<sup>th</sup> floor**

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2. **Geometry** The volume of a rectangular prism is  $208 \text{ cm}^3$ . If the area of one end is  $16 \text{ cm}^2$ , what is the length of the prism?

**13 cm**

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3. On one day, a store sold 16 boxes of rice, restocked the shelf with 22 boxes, sold 27 boxes, restocked with 30 boxes, and sold 15 boxes. There are now 21 boxes of rice on the shelf. How many boxes were on the shelf at the start of the day?

**27 boxes**

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4. At the end of the day, Brooke had \$138.75 in her checking account. She had made a deposit of \$115.07 and written checks totaling \$176.94. How much did she have in her checking account at the beginning of the day?

A -\$76.88

B \$76.88

C \$200.62

D \$430.76

5. **Writing to Explain** The football team gained 7 yards, gained 4 yards, lost 5 yards, gained 21 yards, lost 2 yards, and gained 4 yards to their 43 yard line. Explain how you solved this problem. Then find the yard line where the team began.

**Sample answer: I worked backward because I know where the team ended up, and I am being asked to find where the team began. The team started on the 14 yard line.**

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# Growing Patterns

1. Look at the pattern. Describe the changes from the first line through the fourth line in the pattern.

**Sample answer:** In each successive line, one 9 is added to each factor, and one 9 and one 0 are added to each product.

## Patterns

$$9 \times 9 = 81$$

$$99 \times 99 = 9,801$$

$$999 \times 999 = 998,001$$

$$9,999 \times 9,999 = 99,980,001$$

2. Write the next two lines in the number pattern.

$$99,999 \times 99,999 = 9,999,800,001;$$

$$999,999 \times 999,999 = 999,998,000,001$$

3. Write the tenth line in the number pattern.

$$9,999,999,999 \times 9,999,999,999 =$$

$$99,999,999,980,000,000,001$$

4. Look at the pattern. Describe the changes from the first line through the fourth line in the pattern.

**Sample answer:** In each successive line, one 1 is added to each factor, and the highest number in the product is repeated, and the next highest counting number is added in the middle of the product.

$$1 \times 1 = 1$$

$$11 \times 11 = 121$$

$$111 \times 111 = 12,321$$

$$1,111 \times 1,111 = 1,234,321$$

5. Write the next three lines in the number pattern.

$$11,111 \times 11,111 = 123,454,321;$$

$$111,111 \times 111,111 = 12,345,654,321;$$

$$1,111,111 \times 1,111,111 = 1,234,567,654,321$$