

PG 191

# Integers and Absolute Value



### What You'll Learn

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

*• INTEGERS - 2, -19,  $\frac{3}{3} = 1$ ,  $-\frac{20}{5} = -4$*

*• NOT INTEGERS -  $\frac{1}{2}$ , 0.75,  $\frac{2}{3}$ , -1.5,  $\frac{9}{5} = 1\frac{4}{5}$*



### Essential Question

WHAT happens when you add, subtract, multiply, and divide integers?



### Vocabulary

- integer
- negative integer
- positive integer
- graph
- absolute value



### Common Core State Standards

**Content Standards**  
Preparation for 7.NS.3

**Mathematical Practices**  
1, 3, 4, 5




### Vocabulary Start-Up



Numbers like 5 and  $-8$  are called integers. An **integer** is any number from the set  $\{\dots, -4, -3, -2, -1, 0, 1, 2, 3, 4, \dots\}$ , where ... means *continues without end*.

Complete the graphic organizer.

<p>Describe It</p> <p>_____</p> <p>_____</p> <p>_____</p>	<p>Picture It</p> 
<p>integer</p>	<p>integer</p>
<p>List Some Examples</p> <p>_____</p> <p>_____</p> <p>_____</p>	<p>List Some NonExamples</p> <p>_____</p> <p>_____</p> <p>_____</p>

Awesome halfpipe!



### Real-World Link

- The bottom of a snowboarding halfpipe is 5 meters below the top. Circle the integer you would use to represent this position?

5 or  $-5$

- Describe another situation that uses negative integers. \_\_\_\_\_

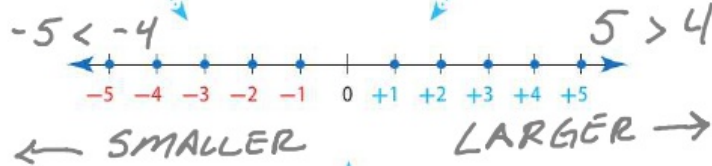


## Identify and Graph Integers

**Negative integers** are integers less than zero. They are written with a  $-$  sign.

**Positive integers** are integers greater than zero. They can be written with a  $+$  sign.

*TEST NOTES?*



Zero is neither negative nor positive.

Integers can be graphed on a number line. To **graph** an integer on the number line, draw a dot on the line at its location.

### Examples



Write an integer for each situation.

1. an average temperature of 5 degrees below normal

Because it represents below normal, the integer is  $-5$ .

*NEGATIVE, NOT MINUS*

2. an average rainfall of 5 inches above normal

Because it represents above normal, the integer is  $+5$  or  $5$ .

*POSITIVE, NOT ADDITION*

Show your work.

a. \_\_\_\_\_

b. \_\_\_\_\_

**Got It?** Do these problems to find out.

Write an integer for each situation.

- a. 6 degrees above normal

- b. 2 inches below normal

$-2$

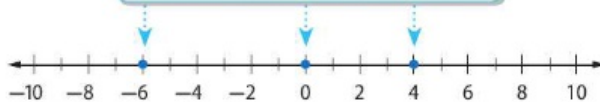
*6 OR +6*  
*NO SIGN = POSITIVE*

### Example



3. Graph the set of integers  $\{4, -6, 0\}$  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.  $\{-2, 8, -7\}$

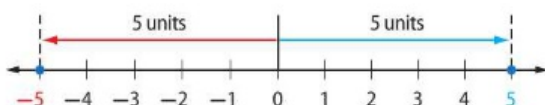
d.  $\{-4, 10, -3, 7\}$

*DISTANCE IS ALWAYS POSITIVE, ABSOLUTE VALUE IS ALWAYS POSITIVE*



## Absolute Value

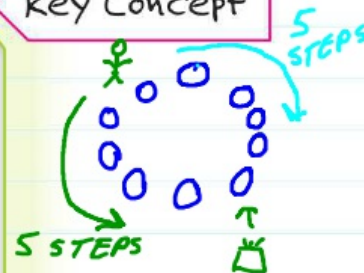
**Words** The absolute value of a number is the distance between the number and zero on a number line.



**Examples**  $|-5| = 5$

$|5| = 5$

### Key Concept



On the number line in the Key Concept box, notice that  $-5$  and  $5$  are each 5 units from 0, even though they are on opposite sides of 0. Numbers that are the same distance from zero on a number line have the same **absolute value**.

*THE ABSOLUTE VALUE OF 5*  
*THE ABSOLUTE VALUE OF NEGATIVE 5*

## Examples



Evaluate each expression.

4.  $|-4|$

The graph of  $-4$  is 4 units from 0.  
So,  $|-4| = 4$ .



5.  $|-5| - |2|$

$|-5| - |2| = 5 - 2$       $|-5| = 5, |2| = 2$   
So,  $|-5| - |2| = 3$ .

*$|-5| - |2|$   
 $5 - 2 = 3$*

### Order of Operations

The absolute value bars are considered to be a grouping symbol. When evaluating  $|-5| - |2|$ , evaluate the absolute values before subtracting.

**Got It?** Do these problems to find out.

e.  $|8| = 8$

*↑  
8 SPACES  
FROM ZERO*

f.  $2 + |-3|$

*↓   ↓  
2 + 3 = 5*

g.  $|-6| - 5$

Show your work.

c. \_\_\_\_\_

d. \_\_\_\_\_

Show your work.

e. \_\_\_\_\_

f. \_\_\_\_\_

g. \_\_\_\_\_