

# 9-1 Understanding Integers

*Learn* to identify and graph integers, find opposites, and find the absolute value of an integer.

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## Vocabulary

positive number

negative number

opposites

integer

absolute value

# 9-1 Understanding Integers

**Positive numbers** are greater than 0. They may be written with a positive sign (+), but they are usually written without it.

**Negative numbers** are less than 0. They are always written with a negative sign (-).

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## Additional Example 1A & 1B: Identifying Positive and Negative Numbers in the Real World

**Name a positive or negative number to represent each situation.**

**A. a jet climbing to an altitude of 20,000 feet**

Positive numbers can represent *climbing* or *rising*.

+20,000

**B. taking \$15 out of the bank**

Negative numbers can represent *taking* out or *withdrawing*.

-15

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## Additional Example 1 Continued

Name a positive or negative number to represent each situation.

**C. 7 degrees below zero**

Negative numbers can represent values *below* or *less* than a certain value.

-7

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## Try This: Additional Example 1A & 1B

Name a positive or negative number to represent each situation.

**A. 300 feet below sea level**

Negative numbers can represent values *below* or *less than* a certain value.

-300

**B. a hiker hiking to an altitude of 4,000 feet**

Positive numbers can represent *climbing* or *rising*.

+4,000

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## Try This: Example 1C

**Name a positive or negative number to represent each situation.**

**C. spending \$34**

Negative numbers can represent *losses* or *decreases*.

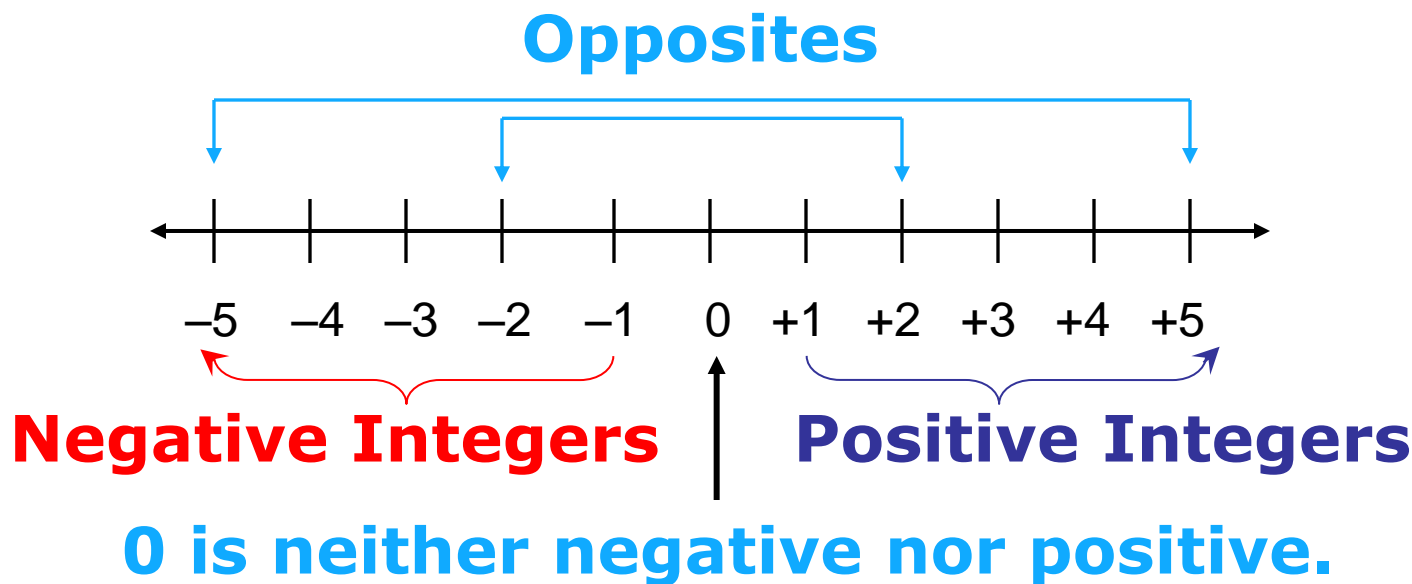
-34

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You can graph positive and negative numbers on a number line.

On a number line, **opposites** are the same distance from 0 but on different sides of 0.

**Integers** are the set of all whole numbers and their opposites.





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## Remember!

The set of whole numbers includes zero and the counting numbers.

$$\{0, 1, 2, 3, 4, \dots\}$$

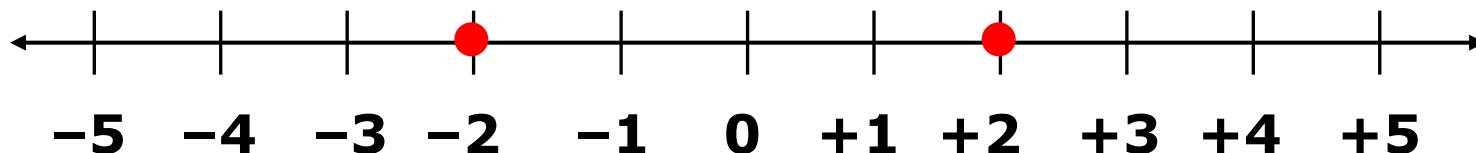
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## Additional Example 2A & 2B: Graphing Integers

Graph each integer and its opposite on a number line.

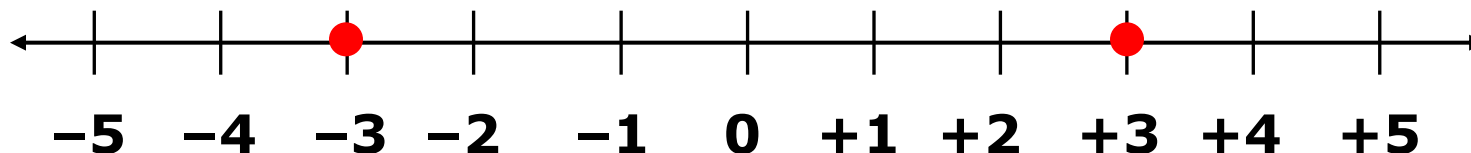
A. +2

-2 is the same distance from 0 as +2.



B. -3

+3 is the same distance from 0 as -3.



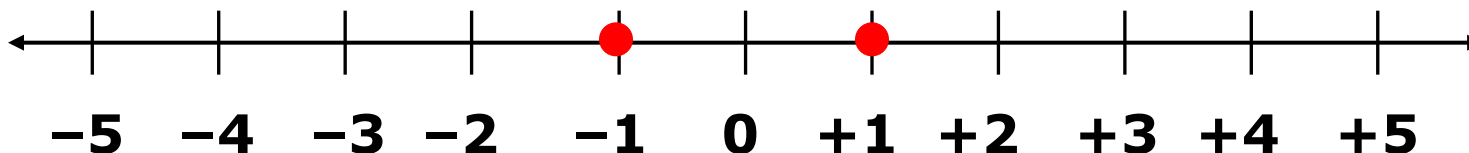
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## Additional Example 2C: Graphing Integers

Graph each integer and its opposite on a number line.

C.  $+1$

$-1$  is the same distance from 0 as  $+1$ .



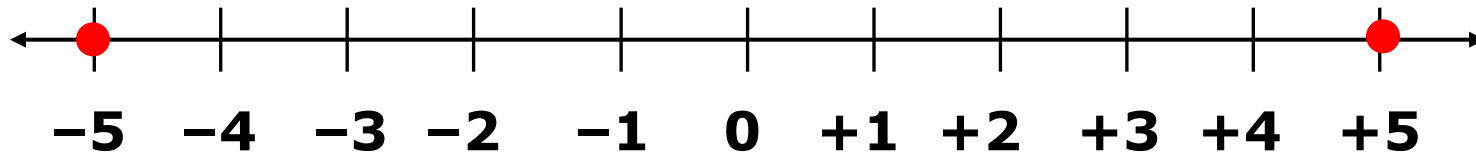
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## Try This: Example 2A & 2B

**Graph each integer and its opposite on a number line.**

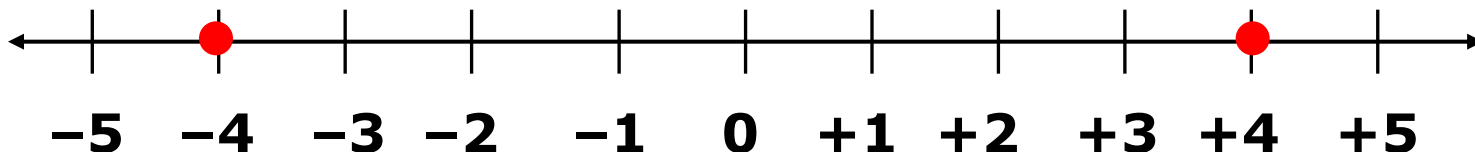
**A. +5**

-5 is the same distance from 0 as +5.



**B. -4**

+4 is the same distance from 0 as -4.



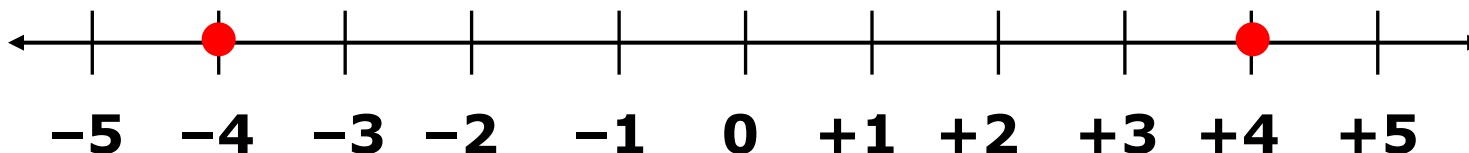
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## Try This: Example 2C

**Graph each integer and its opposite on a number line.**

**C. +4**

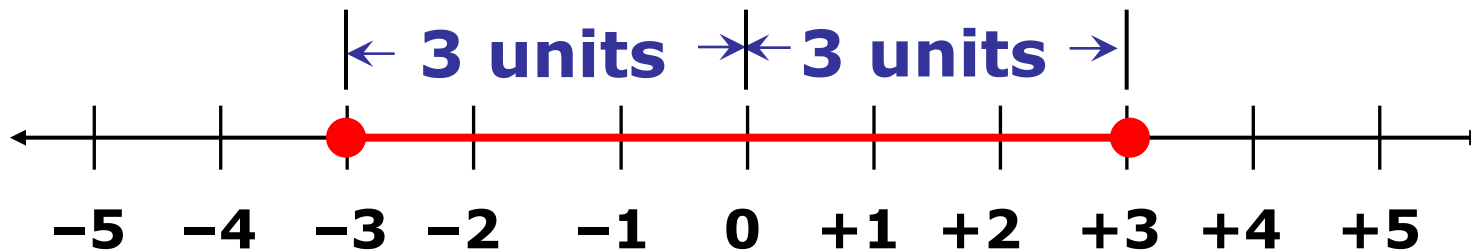
-4 is the same distance from 0 as +4.



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The **absolute value** of an integer is its distance from 0 on a number line. The symbol for absolute value is  $| \ |$ .

$$|-3| = 3 \qquad |3| = 3$$



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- Absolute values are never negative.
- Opposite integers have the same absolute value.
- $|0| = 0$

## Reading Math

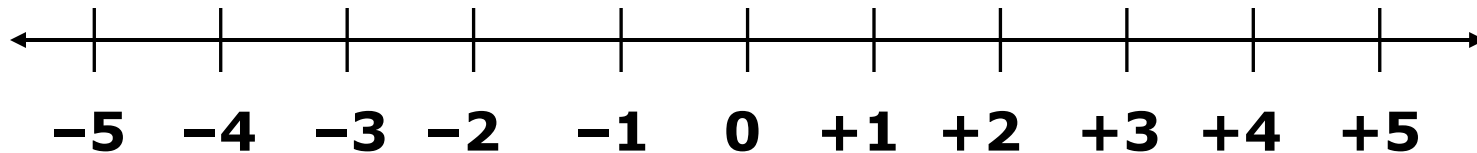
Read  $|3|$  as “the absolute value of 3.”

Read  $|-3|$  as “the absolute value of negative 3.”

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## Additional Example 3A & 3B: Finding Absolute Value

Use the number line to find the absolute value of each integer.



A.  $|-4|$

4     *-4 is 4 units from 0, so  $|-4| = 4$ .*

B.  $|2|$

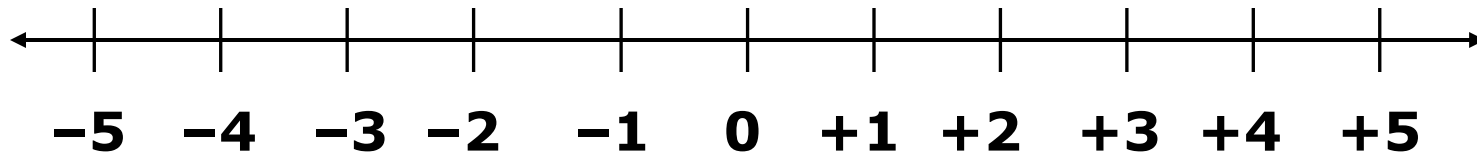
2     *2 is 2 units from 0, so  $|2| = 2$ .*



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## Try This: Example 3A & 3B

Use the number line to find the absolute value of each integer.



**A.  $|-3|$**

3

*-3 is 3 units from 0, so  $|-3| = 3$ .*

**B.  $|1|$**

1

*1 is 1 unit from 0, so  $|1| = 1$ .*

# 9-1 Understanding Integers

## Lesson Quiz

**Name a positive or negative number to represent each situation.**

1. saving \$15 **+15**
2. 12 feet below sea level **-12**
3. What is the opposite of  $-6$ ? **6**
4. What is the absolute value of  $-12$ ? **12**
5. When the Swanton Bulldogs football team passed the football, they gained 25 yards. Write an integer to represent this situation. **+25**