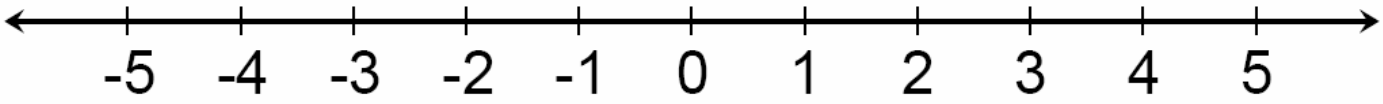
8.1 INTEGERS

The numbers 8 and -6 are integers. An **integer** is any number from the set $\{\ldots,-4,-3,-2,-1,0,1,2,3,4,\ldots\}$ where ... means *continues without end*.

Negative integers are integers less than zero.

Positive integers are integers greater than zero.



Negative integers are written with a – sign.

Zero is neither positive nor negative.

Positive numbers can be written with or without a + sign.

Examples: Write Integers for Real-Life Situations

Write an integer to describe each situation.

1. Football: a gain of 5 yards on the first down
   - ✓ The word *gain* represents an increase.
   - ✓ The integer is +5 or 5.

2. Weather: a temperature of 10 degrees below zero
   - ✓ Any number that is *below zero* is a negative number.
   - ✓ The integer is -10.

**Your Turn: Write an integer to describe each situation.

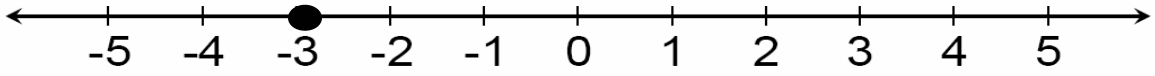
a) lost 6 points

b) 12 feet above sea level

To **graph** an integer on a number line, draw a dot at the location on the number line that corresponds to the integer.

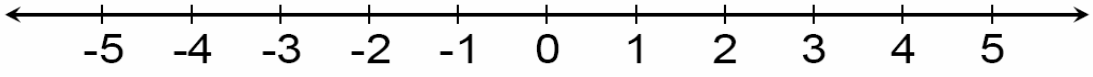
Example: Graph an Integer on a Number Line

3. Graph -3 on a number line.
   - ✓ Draw a number line. Then draw a dot at the location that represents -3.



**Your Turn: Graph each integer on a number line.

a) -1 b) 4 c) 0



A number line can also be used to compare and order integers. On a number line, the number to the left is always less than the number to the right.

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Example: Compare Integers

4. Use $<, >, =$ to make a true sentence.

-6 ◯ -4

- ✓ Graph -6 and -4 on a number line. Then compare.
- ✓ Since -6 is to the left of -4, then $-6 < -4$.

**Your Turn: Use $<, >, =$ to make a true sentence.

a) -3 ◯ -5

b) -5 ◯ 0

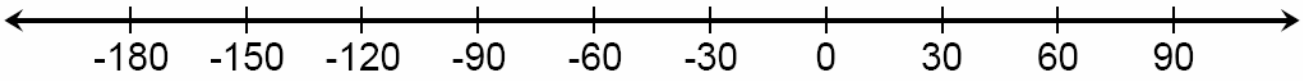
c) 6 ◯ -1

Example: Order Integers

5. The average temperatures of Jupiter, Mars, Earth, and the Moon are shown in the table. Order the temperatures from least to greatest.

Name	Average Surface Temperature (°F)
Jupiter	-162
Moon	-10
Mars	-81
Earth	59

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

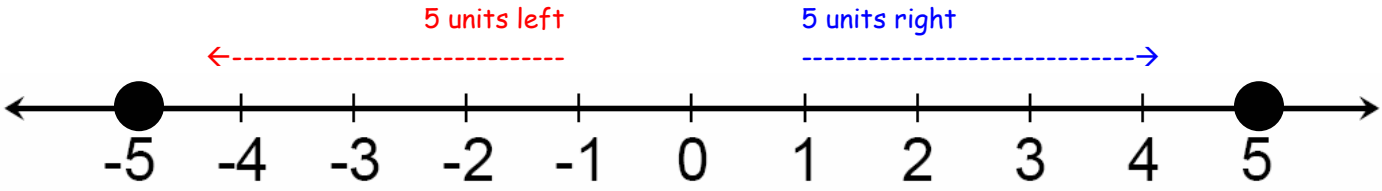


- ✓ The order from least to greatest is -162°, -81°, -10°, and 59°.

Opposites are numbers that are the same distance from zero in the opposite directions on the number line.

Example: Find the Opposite of an Integer

6. Write the opposite of +5.



- ✓ The opposite of +5 is -5.

**Your Turn: Write the opposite of each integer.

a) -4 b) +8 c) -9

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