

Integers Notes

Ecosystem In coastal regions, some animals live above sea level and other animals live in the ocean. A sea star can be found at an ocean depth of two feet. How can you represent an ocean depth of two feet?

What do you know? **A sea star is found at an ocean depth of two feet.**

What do you need to find? **I need to find how to represent an ocean depth of two feet.**

Practices
1, 3, 4

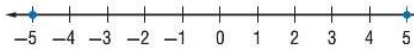


Investigation

Sea level can be represented with the number 0.

To represent a location above sea level, use a positive number. A positive number can be written with or without a positive sign, such as 5 or +5.

To represent a location below sea level, use a negative number. A negative number is written with a negative sign, such as -5.



Write a number to represent an ocean depth of two feet.

Step 1 Determine if a positive sign or a negative sign should be used.

Since the location is below, or less than sea level, use a **negative** sign.

Step 2 Determine which number to use.

Use the number **2** to represent two feet.

So, the number **-2** represents an ocean depth of two feet.



Reflect

7. **Reason Inductively** What negative number is the same distance from 0 as the number +4? Explain. Graph both numbers on the number line below.



-4; The number +4 is 4 units to the right of 0 on the number line.

The number -4 is 4 units to the left of zero on the number line.

Work with a partner. Write the correct number to represent each location in relationship to sea level. The first one is done for you.

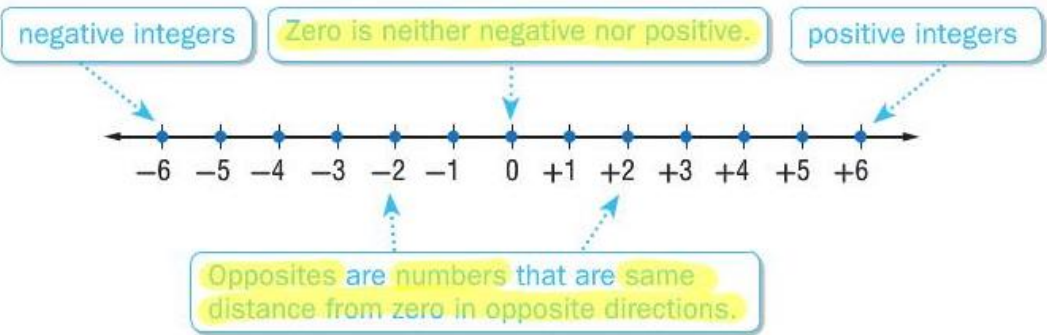
Animal	Elevation (ft)	Above or Below Sea Level	Number
Fiddler Crab	3	above sea level	+3
1. Eagle's Nest	75	above sea level	+75
2. Dolphin	10	below sea level	-10
3. Spider Crab	375	below sea level	-375
4. Blue Heron	4	above sea level	+4
5. Kelp Forest	656	below sea level	-656
6. White Egret	50	above sea level	+50

Show your work.



Use Integers to Represent Data

Positive whole numbers, their opposites, and zero are called **integers**. To represent data that are less than a 0, you can use **negative integers**. A negative integer is written with a **-** sign. Data that are greater than zero are represented by **positive integers**.



Zero

The number zero can have different meanings based on real-world context. Sometimes zero represents an amount that does not change. Zero can also be used to represent real-world ideas, such as sea level.

1 Write an integer for each situation. Explain the meaning of zero in each situation. **2**

1. a ~~10~~⁰-yard loss **1**

Because it represents a loss, the integer is **-10**. In football, the integer 0 represents no yards lost or no yards gained.

2. ~~4~~⁰ inches of rain above normal **1**

Because it represents above, the integer is **4**. In this situation, the integer 0 represents the normal amount of rain.

3. a ~~\$48~~⁰ deposit into a savings account

Because it represents an increase, the integer is **48**. In this situation, the integer 0 represents **neither a deposit nor a withdrawal from the account.**

Show your work.

a. **2**

b. **-10**

Got It? Do these problems to find out.

Write an integer for each situation. Explain the meaning of zero in each situation.

a. a gain of ~~\$2~~^{\$0} a share

b. ~~10~~⁰ degrees below zero

The integer 0 represents neither a gain nor a loss per share.

The integer 0 represents zero degrees.

Graph Integers

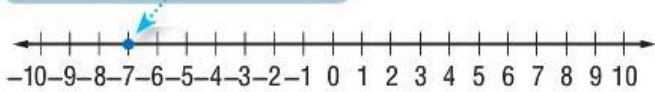
Integers and sets of integers can be graphed on a horizontal or vertical number line. To graph a point on the number line, draw a dot at the location. A set of integers is written using braces, such as $\{2, -9, 0\}$.

Examples



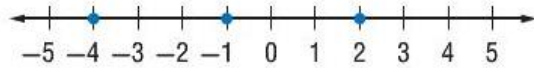
4. Graph -7 on a number line.

Draw a number line. Then draw a dot at the location that represents -7 .



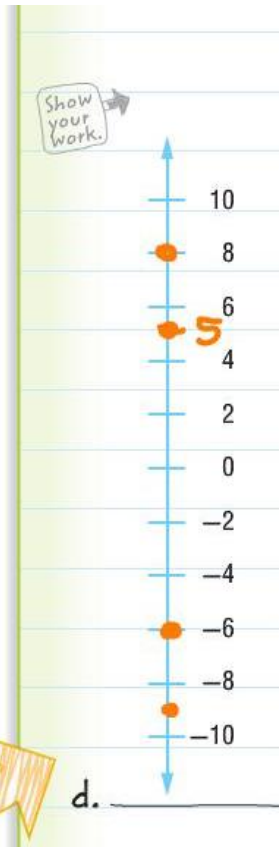
5. Graph the set of integers $\{-4, 2, -1\}$ on a number line.

Draw a number line. Then draw a dot at the location of each integer.



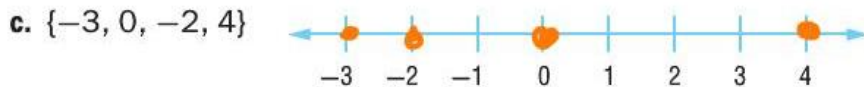
6. Graph the set of integers $\{0, 2, -3\}$ on a number line.

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.



d. $\{8, -6, -9, 5\}$

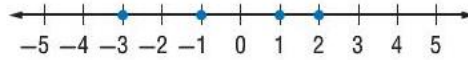


Example



7. Alaina and her dad played golf on four different days. The data set $\{-1, +1, -3, +2\}$ shows Alaina's scores in relation to par. Graph the scores. Explain the meaning of zero in this situation.

Draw a number line. Then draw a dot at the location of each golf score.



The integer 0 represents par.

Guided Practice



Write an integer for each situation. Explain the meaning of zero in each situation. (Examples 1–3)

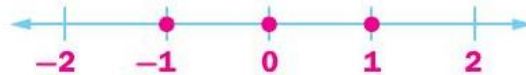
- 15-yard gain **15; The integer 0 represents neither a gain nor a loss.**
- loss of 2 hours **-2; The integer 0 represents neither a gain nor a loss.**

Graph each integer or set of integers on a number line. (Examples 4–6)

3. -2

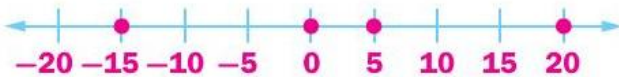


4. $\{-1, 1, 0\}$



5. The data set $\{+5, 0, -15, +20\}$ shows the number of points Delaney scored on each hand of a card game. Graph the scores. Explain the meaning of zero in this situation. (Example 7)

The integer 0 represents a score of 0.



Write an integer for each situation. Explain the meaning of zero in each situation. (Examples 1–3)

- 3 miles below sea level **-3; The integer 0 represents at sea level.**
- earning \$45 **45; The integer 0 represents neither earning nor spending.**
- moving back 5 spaces on a game board **-5; The integer 0 represents neither moving backward nor moving forward.**