

## Lesson 4: The Opposite of a Number

### Student Outcomes

- Students understand that each nonzero integer,  $a$ , has an opposite, denoted  $-a$ ; and that  $-a$  and  $a$  are opposites if they are on opposite sides of zero and are the same distance from zero on the number line.
- Students recognize the number zero is its own opposite.
- Students understand that since all counting numbers are positive, it is not necessary to indicate such with a plus sign.

Dec 2-4:10 PM

- Find the relationship between the sets of words.

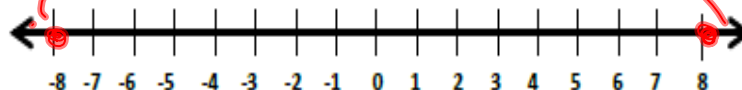
Fast → Slow	Rough → Smooth	Open → Close	Fiction → Nonfiction
Light → Dark	Empty → Full	Accept → Refuse	Shallow → Deep
Dirty → Clean	Apart → Together	Question → Answer	Ancient → Modern
Alike → Different	All → None	Dangerous → Safe	Correct → Incorrect
Defeat → Victory	Easy → Hard	Future → Past	Break → Fix
Inside → Outside	Up → Down	Wet → Dry	Entrance → Exit

.....

- Once you have determined the relationship, create your own examples, including a math example.

#### Example 1: Every Number has an Opposite

Locate the number 8 and its opposite on the number line. Explain how they are related to zero.

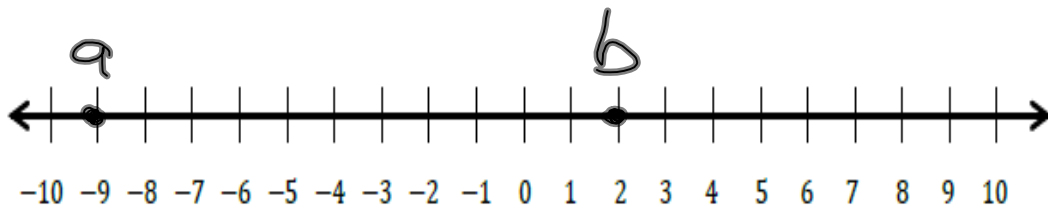


Dec 10-9:18 AM

**Exercises 2-3**

2. Locate the opposites of the numbers on the number line.

- a. 9    -9
- b. -2   2
- c. 4    -4
- d. -7   7

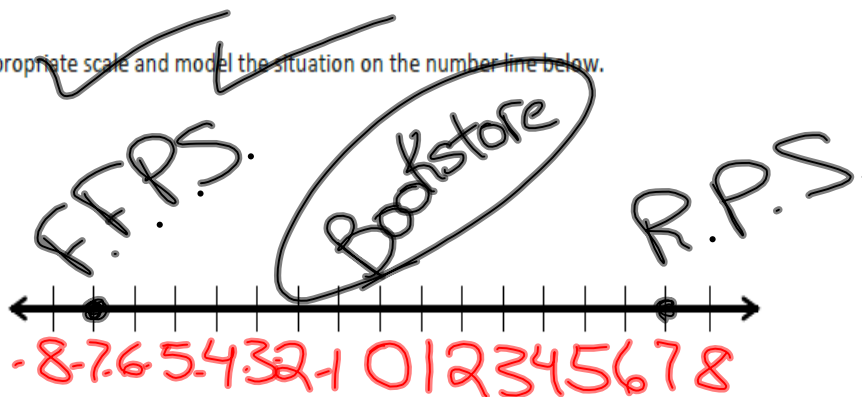


Dec 10-9:24 AM

**Example 2: A Real World Example**

Maria decides to take a walk along Central Avenue to purchase a book at the bookstore. On her way, she passes the Furry Friends Pet Shop and goes in to look for a new leash for her dog. The Furry Friends Pet Shop is seven blocks west of the bookstore. After she leaves the bookstore, she heads east for seven blocks and stops at Ray's Pet Shop to see if she can find a new leash at a better price. Which locations, if any, are the furthest from Maria while she is at the bookstore?

Determine an appropriate scale and model the situation on the number line below.



Explain your answer. What does zero represent in the situation?

Dec 2-4:10 PM

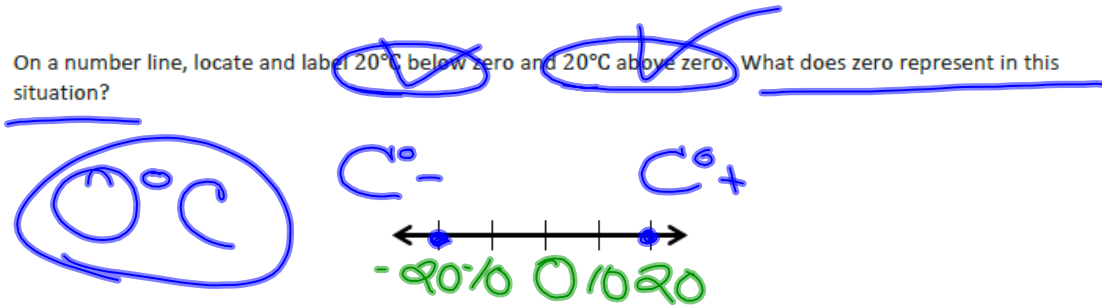
Exercises 4-5

Read each situation carefully and answer the questions.

4. On a number line, locate and label a credit of \$15 and a debit for the same amount from a bank account. What does zero represent in this situation?



5. On a number line, locate and label 20°C below zero and 20°C above zero. What does zero represent in this situation?



6. A proton represents a positive charge. Write an integer to represent 5 protons. An electron represents a negative charge. Write an integer to represent 3 electrons.

$-3$        $5$

Dec 2-4:16 PM

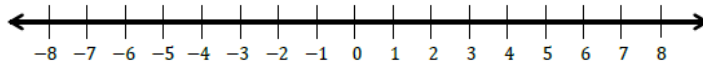
Lesson 5: The Opposite of a Number's Opposite

Student Outcomes

- Students understand that, for instance, the opposite of  $-5$  is denoted  $-(-5)$  and is equal to  $5$ . In general, they know that the opposite of the opposite is the original number; e.g.,  $-(-a) = a$ .
- Students locate and position opposite numbers on a number line.

Dec 2-4:17 PM

1. Locate the number  $-2$  and its opposite on the number line below.



2. Write an integer that represents each of the following:

- 90 feet below sea level
  - \$100 of debt
  - $2^{\circ}\text{C}$  above zero
3. Joe is at the ice cream shop and his house is 10 blocks north of the shop. The park is 10 blocks south of the ice cream shop. When he is at the ice cream shop, is Joe closer to the park or his house? How could the number zero be used in this situation? Explain.

Dec 2-4:18 PM

### Example 1: The Opposite of an Opposite of a Number

What is the opposite of the opposite of 8? How can we illustrate this number on a number line?

- What number is 8 units to the right of 0? \_\_\_\_\_
- How can you illustrate locating the opposite of 8 on this number line? What is the opposite of 8? \_\_\_\_
- Use the same process to locate the opposite of  $-8$ . What is the opposite of  $-8$ ? \_\_\_\_\_



- The opposite of an opposite of a number is \_\_\_\_\_.

Dec 2-4:19 PM

**Exercise**

Complete the table using the cards in your group.

Person	Card ( $a$ )	Opposite of Card ( $-a$ )	Opposite of Opposite of Card $-(-a)$

1. Write the opposite of the opposite of  $-10$  as an equation.
2. In general, the opposite of the opposite of a number is the \_\_\_\_\_.
3. Provide a real-world example of this rule. Show your work.

Dec 2-4:19 PM