TOPIC 10

LESSON 10.2a

# Magnificient Magnitude

Objective

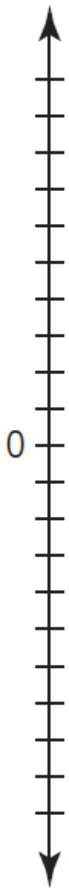
Absolute Value

## Warm-Up

Plot each set of numbers on the number line and describe the relationship between the numbers.

1. 5 and −5

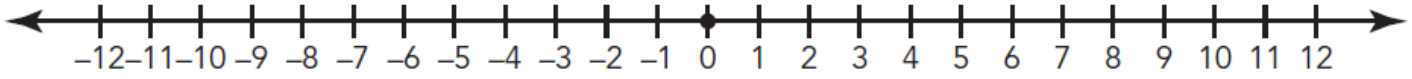
2. 8.634 and −8.634




**Once you have completed the warm-up continue with the lesson, Do Not wait**

# GETTING STARTED

Going the Distance




1. Plot a point at −7 on the number line.

2. Describe the distance from −7 to 0.

3. Plot as many other points as possible on the number line that are the same distance from 0 as −7.

4. How many numbers did you plot? Why do you think this is true?

EXPLORE 1

# Absolute Value as Magnitude

Let's revisit the number line from the Human Number Line lesson. Your teacher will assign students to participate in the activity. Be sure to record what happens on the number line.

- Student A: Stand on 0 and hold one end of the string provided by your teacher.
- Student B: Hold the other end of the string and stand on the number line as far as possible from Student A. Are there other places on the number line that you could stand and be as far from Student A as possible?
- Repeat this activity with two more pieces of string of different lengths and two additional students, Students C and D. Student A will hold the 0 end of each string.


1. Compare the locations where each student stood.

a. What do you notice about the distances each time the students moved?

b. What do you notice about the approximate values for the numbers where each stood?

The magnitude, or absolute value, of a number is its distance from zero on a number line. The symbol for absolute value is | |. The expression |n| is read as "the absolute value of a number n."

2. Plot 5 on the number line.

a. How far is 5 from 0?

b. $|5|$ = _____

3. Plot −7.2 on the number line.

a. How far is −7.2 from 0?

b. $|-7.2|$ = _____

4. Explain what each statement means. Name any other values that have the same absolute value, if possible.

a. $|-5|$

b. $|1\frac{5}{6}|$

c. $|0.75|$ d. $|-1.36|$

Use your investigation and a number line to answer each question.

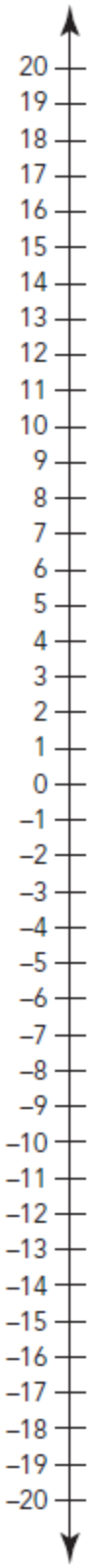
5. Can two different numbers have the same absolute value?
If so, provide examples.

6. What can you say about the absolute value of

a. any positive number?

b. any negative number?

c. zero?



EXPLORE 2

## Interpreting Absolute Value Statements

Absolute values are used in real-world applications when you are interested in only the number and not in the sign of the number. When you look at temperature changes, you could say the temperature "fell by," "decreased by," or "increased by" an absolute value.

1. Copy and complete the table with an appropriate situation, absolute value statement, and/or number. For the last row, assign the correct units to the number based on your situation.

| Situation | Absolute Value Statement | Numeric Example (with units) |
|---|---|---|
| The temperature went from 55°F to 5°F. | The temperature fell by 50°F. | −50°F |
| The bank account balance went from $2500 to $2250. | | |
| The bank account balance went from $495 to $615. | | $120 |
| | The water level increased by 4.9 feet. | |
| During the hike, the elevation went from 1125 feet to 1750 feet. | | |
| | | −10_____ |

You also use absolute value statements to describe how numbers compare with other numbers. You often use these statements without thinking about “less than” or "greater than." Rather, you use words like “debt,” “lost,” “colder,” “depth,” “above,” “hotter,” or “below.”

2. Complete the table with an appropriate situation, absolute value statement, and/or example. For the last row, assign the correct units to the numeric example based on your situation.

| Situation | Absolute Value Statement | Numeric Example (with units) |
|---|---|---|
| A water level less than $-2\frac{1}{2}$ feet | More than $2\frac{1}{2}$ feet below a full pool | $-3$ feet |
| An account balance less than $-\$30$ | A debt greater than \$30 | |
| A weight less than $-7.5$ pounds of previous weight | Lost more than 7.5 pounds | |
| A dive to a height less than $-350$ feet | | |
| | Colder than 10 degrees below 0 | |
| | A depth greater than 15 m | |
| | A golf tournament stroke total more than 7 strokes below par | |
| | | $-100$_____ |

Name: _____ Date: _____ Class: _____

Homework HW

LESSON 10.2a

# Magnificient Magnitude

Objective

Absolute Value

**Practice**

Tyler measured the rainfall and evaporation using a rain gauge in his backyard for 8 days. Tyler marked his rain gauge with values from −6 inches to +6 inches and filled the gauge with water to the zero mark. For each question, write an expression using absolute value and then calculate the answer

| Days | 1 | 2 | 3 | 4 | 5 | 6 | 7 | 8 |
|---|---|---|---|---|---|---|---|---|
| Gauge Reading | 0.5 | −1.3 | 3.7 | 4.2 | 2.1 | −0.9 | −2.4 | 5.6 |

a. On how many days out of the eight did it rain?

b. Between which two consecutive readings did it rain the most? How many inches were recorded?

c. Between which two consecutive readings was evaporation the greatest? How many inches of water evaporated?

d. Calculate the gain or loss of water in the rain gauge between days 1 and 2. Express the change in the water level in the gauge as a positive or negative number.

e. Calculate the gain or loss of water in the rain gauge between days 2 and 3. Express the change in the water level in the gauge as a positive or negative number.