



Going the Distance

► Use the number line to answer each question.



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

2 Describe the distance from -7 to 0 .

Seven spaces (units) from zero to the left

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?**

I plotted on additional point

There is only two total points that are 7 spaces (units) from zero.



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.

➤ Record what happens on the number line.

- **Student A:** Stand on 0 and hold one end of a piece of string.
- **Student B:** Take the other end of the string and locate a point on the number line that represents the length of the string. Now, while still holding onto the string, locate another point on the number line that represents the same length.
- Repeat this process 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?

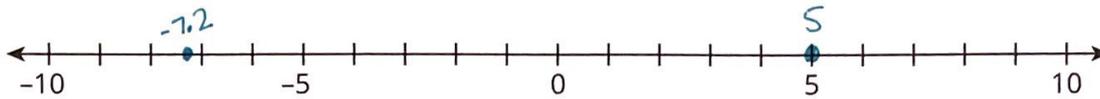
The magnitude, or **absolute value**, of a number is its distance from zero on a number line. The symbol for absolute value is $| |$. You read the expression $|n|$ as “the absolute value of a number n .”

TAKE NOTE...

Because distance is never negative, the absolute value of a number is always positive or 0.



- 2 Plot the values 5 and -7.2 on the number line. Then describe each value's distance from 0 and complete the statement.



(a) How far is 5 from 0?
5 units

(b) $|5| = 5$

(c) How far is -7.2 from 0?
7.2 units

(d) $|-7.2| = 7.2$

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

(a) $| -5 |$
 -5 is 5 units from zero on the number line
 $| -5 | = | 5 |$

(b) $| 1\frac{5}{6} |$
 $1\frac{5}{6}$ is $1\frac{5}{6}$ units from zero on a number line
 $| 1\frac{5}{6} | = | -1\frac{5}{6} |$

(c) $| 0.75 |$
 0.75 is $\frac{3}{4}$ of a unit from zero on a number line
 $| 0.75 | = | -0.75 |$

(d) $| -1.36 |$
 -1.36 is 1.36 units from zero on a number line
 $| -1.36 | = | 1.36 |$

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

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

Except for zero opposites will have the same absolute value

$2, -2$
 $| 2 | = 2 \quad | -2 | = 2$

- 5 What can you say about the absolute value of each type of number?

(a) Positive numbers
The absolute value will be the same as the original number

(b) Negative numbers
The absolute value will be the opposite of the original number

(c) Zero
Will stay zero



Interpreting Absolute Value Statements

HABITS OF MIND

- Attend to precision.

You can use absolute values in real-world applications when you have an interest 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.

- Complete the table with an appropriate situation, absolute value statement, 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.	<i>They spent \$250</i>	<i>-\$250</i>
The bank account balance went from \$495 to \$615.	<i>They deposited \$120</i>	\$120
<i>The water level went from 5 feet to 9.9 feet</i>	The water level increased by 4.9 feet.	<i>4.9 ft</i>
During the hike, the elevation went from 1125 feet to 1750 feet.	<i>The elevation increased by 625 feet</i>	<i>625 feet</i>
<i>The temperature went from 60°F to 50°F</i>	<i>The temperature dropped 10°F</i>	<i>-10 °F</i>