Lesson 3: Absolute Value

The **absolute value** of a number is that number's distance from 0 on a number line. When you write the absolute value of a number *n,* use the notation $|n|$.

A distance can never be negative. For example, even walking backward for 20 feet still means that you've traveled 20 feet. Therefore, the absolute value of every number will be either positive or 0.

▷ **Example**

What are the values of $|-6|$ and $|6|$?

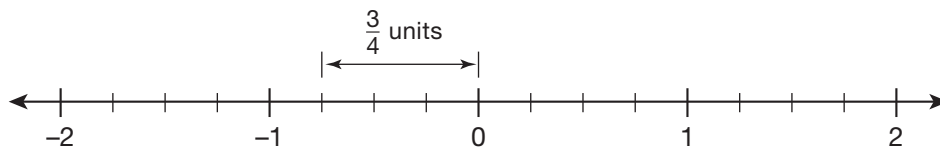Both -6 and 6 are exactly 6 units from 0 on a number line.

The absolute value of $-6 = |-6| = 6$. The absolute value of $6 = |6| = 6$.

▷ **Example**

What is the value of $\left|-\frac{3}{4}\right|$?

$-\frac{3}{4}$ is $\frac{3}{4}$ units from 0 on a number line.

The absolute value of $-\frac{3}{4} = \left|-\frac{3}{4}\right| = \frac{3}{4}$.

Absolute value can be used to represent a quantity in a real-world situation.

▷ Example

A fisherman's hook hangs 12 feet under the surface of the water. Write an expression using absolute value to interpret the distance that the hook hangs from the surface of the water.

The word *under* means the integer should be negative. The integer can be written as -12. However, distance cannot be negative. Therefore, the distance can be represented as the absolute value of -12.

$$|-12| = 12$$

Absolute value can also be used to compare quantities.
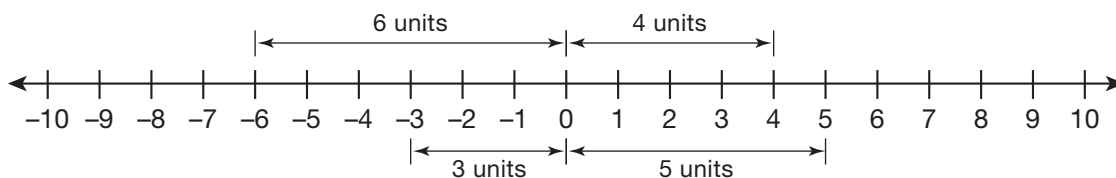
▷ Example

The following table shows two test scores for four students in Ms. Yan's class, as well as the change in score between the two tests.

Student	Test 1 Score	Test 2 Score	Change from Test 1 to Test 2
Amelia	93	97	4
Bobby	88	82	-6
Cathy	92	89	-3
Denzel	89	94	5

Which student's test score changed the most between test 1 and test 2?

To answer this question, you need to look at the numbers that show the change from test 1 to test 2. You then must find the number that is the farthest from 0 on the number line. The 0 does not represent a score of 0, however. The 0 represents the score on test 1. The following number line shows the four absolute values.

The -6 change from test 1 to test 2 represents the score that changed the most. Bobby's test score changed the most between test 1 and test 2.