

Negative Numbers, Opposites and Absolute Value

Grade 6 math · Lesson · Standards: 6.NS.C.5, 6.NS.C.6a, 6.NS.C.7

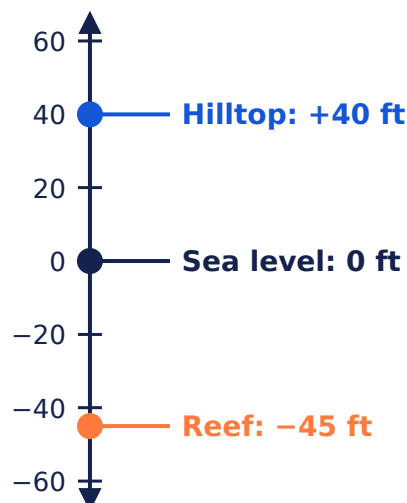
Quick answer: Integers are the whole numbers and their opposites: ..., -2 , -1 , 0 , 1 , 2 , ... Opposites lie the same distance from 0 on opposite sides of it. The absolute value of a number is its distance from 0 , so it is never negative; for example, $|-7| = 7$. On a number line, numbers farther right are greater.

Standards: 6.NS.C.5, 6.NS.C.6a, 6.NS.C.7 · **Level:** Grade 6

Where do negative numbers show up in real life?

Negative numbers describe amounts on the other side of zero: a freezing morning, a spot below sea level, or money owed.

Situation	Signed number
14 °F below zero	-14
A \$30 withdrawal	-30
A \$45 deposit	$+45$
70 feet below sea level	-70



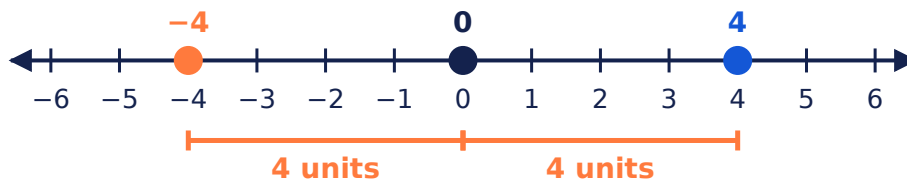
Elevation uses positive numbers above sea level and negative numbers below it.

Integers and rational numbers

The **integers** are the whole numbers and their opposites: ..., -3 , -2 , -1 , 0 , 1 , 2 , 3 , ... A **rational number** can be written as a fraction or decimal, such as -2.5 or $\frac{3}{4}$.

What are opposites?

Two numbers are **opposites** when they lie the same distance from 0 on opposite sides. The opposite of 4 is -4 , the opposite of -9.5 is 9.5, and 0 is its own opposite. Reading the sign as a word helps: $-(-6)$ means “the opposite of negative 6,” which is 6.

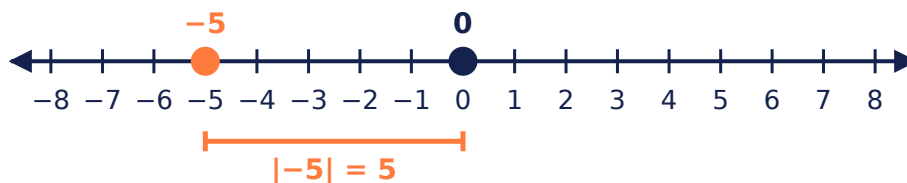


Opposites: -4 and 4 sit 4 units from 0 on opposite sides.

What does absolute value mean?

Absolute value

The absolute value of a number is its distance from 0 on the number line. It is written $|x|$ and is never negative.



Absolute value is distance from 0: $|-5| = 5$.

Because $|-5|$ and $|5|$ are both 5 units from 0, opposites always have the same absolute value.

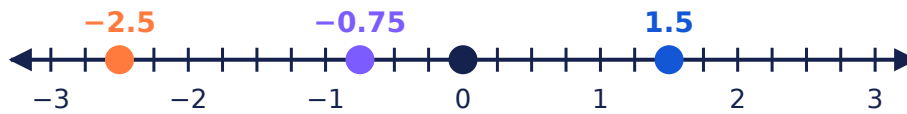
How do you compare and order rational numbers?

Method: order from least to greatest

1. Rewrite every number in the same form, such as decimals.
2. Sketch a number line and place each number.
3. Read the points from left to right.

Worked example

Order 1.5, -2.5 , 0 and $-\frac{3}{4}$. As decimals: 1.5, -2.5 , 0, -0.75 . Reading left to right on the line gives **-2.5 , -0.75 , 0, 1.5**.



Points farther right are greater: -2.5 is less than -0.75 , which is less than 1.5 .

Common mistake

Thinking a bigger digit means a greater number. Since -9 lies left of -2 , we write $-9 < -2$, even though $|-9| > |-2|$.

Mathbot's tip

Greater means farther right, less means farther left. Picture the line whenever two negatives confuse you.

Key points to remember

- Negative numbers show amounts below zero, such as -12°F or -40 feet.
- Opposites like 6 and -6 are the same distance from 0 .
- $|x|$ is the distance from 0 , so $|-8| = 8$ and $|8| = 8$.
- On a horizontal number line, the number farther right is greater.
- A negative number with a larger absolute value is less: -9 is less than -2 .

Negative Numbers, Opposites and Absolute Value: frequently asked questions

What is the opposite of a number?

The opposite is the number the same distance from 0 on the other side. The opposite of 11 is -11 , and the opposite of -0.5 is 0.5 . Zero is its own opposite.

Can an absolute value be negative?

No. Absolute value measures distance, and distance cannot be negative. The expression $-|-3|$ is negative only because of the minus sign placed in front, and it equals -3 .

Why is -10 less than -4 ?

On the number line, -10 is farther to the left than -4 . Left means less. Although 10 is bigger than 4 as a distance, the number -10 is smaller.

How do you compare a fraction and a decimal?

Convert both to the same form, usually decimals, then place them on a number line. For instance, $-3/4 = -0.75$, which is greater than -1.2 because it sits farther right.

Is zero positive or negative?

Zero is neither positive nor negative. It separates the two groups on the number line and is an integer. Its absolute value is 0.