

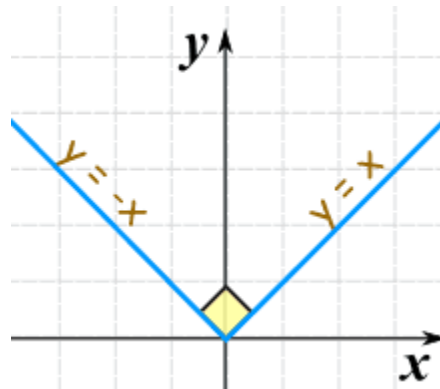
Absolute Value Function

This is the [Absolute Value](#) Function:

$$f(x) = |x|$$

It is also sometimes written: $\text{abs}(x)$

This is its graph:



$$f(x) = |x|$$

It makes a right angle at (0,0)

It is an [even function](#).

Its Domain is the [Real Numbers](#): \mathbb{R}

Its Range is the Non-Negative Real Numbers: $[0, +\infty)$

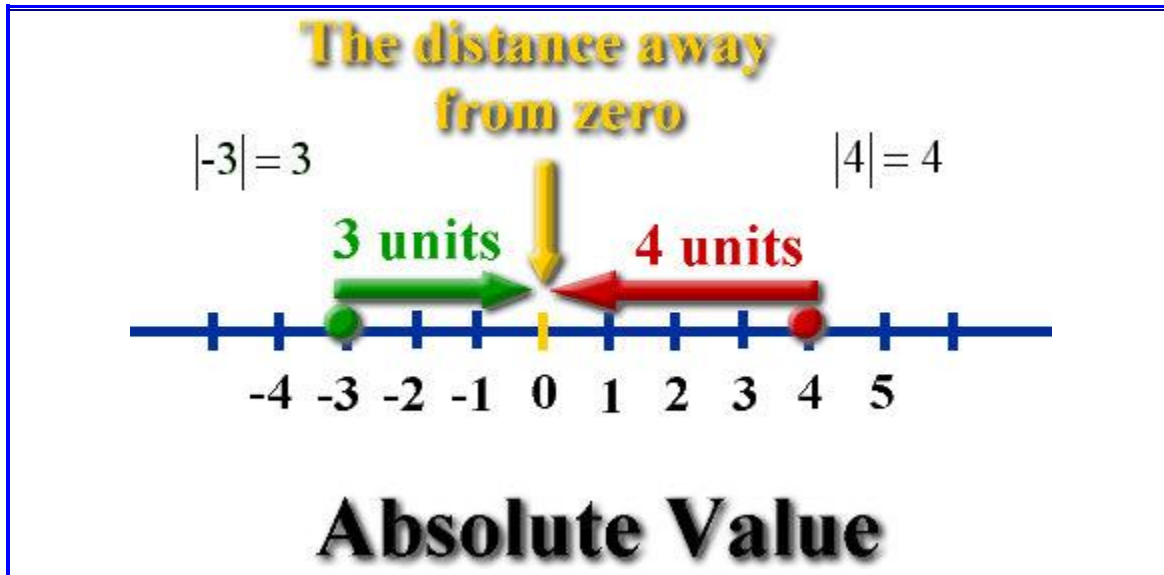
Piecewise

It is also a [Piecewise Function](#):

$$f(x) = |x| = \begin{cases} x, & \text{if } x \geq 0 \\ -x, & \text{if } x < 0 \end{cases}$$

Absolute Value

The **absolute value** of a number can be considered as the **distance** between 0 and that number on the real number line.



Remember that **distance** is always a positive quantity (or zero).

The distance in the diagram above from +4 to 0 is 4 units and the distance from -3 to 0 is 3 units. These units are never negative values.

Using absolute value, we write this as:

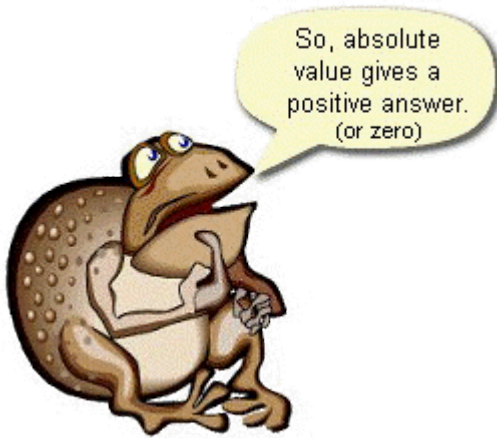
$$|4| = 4 \text{ and } |-3| = 3$$

The rule for computing absolute value is:



$$|a| = a \text{ if } a \geq 0$$

$$|a| = -a \text{ if } a < 0$$



Examples:

$$|25| = 25$$

$$|-25| = -(-25) = 25$$