

2-8 Solving Absolute-Value Equations and Inequalities

Absolute Value

WORDS	NUMBERS	ALGEBRA
The absolute value of a real number x , $ x $, is equal to its distance from zero on a number line.	$ 5 = 5$ $ -5 = 5$	$ x = \begin{cases} x & \text{if } x \geq 0 \\ -x & \text{if } x < 0 \end{cases}$

Absolute-Value Equations and Inequalities

For all real numbers x and all positive real numbers a :

$$|x| = a$$

$$x = -a \text{ OR } x = a$$

$$|x| < a$$

$$x > -a \text{ AND } x < a$$

$$-a < x < a$$

$$|x| > a$$

$$x < -a \text{ OR } x > a$$

The Absolute-Value Parent Function $f(x) = |x|$

Domain: all real numbers

Range: nonnegative real numbers

Vertex: $(0,0)$

x	$y = x $
-10	10
-5	5
0	0
5	5
10	10

