Jan. 31, 2018

Sect. 3-5

Solving Absolute Value Equations

Solve $|x| = 5$

What #(s) are 5 units away from 0?

5 and -5

Solve $|x-2| = 17$

Case I

$x-2 = 17$

$x = 19$

or

Case II

$x-2 = -17$

$x = -15$

$\{-15, 19\}$

Solve: $|2x+1| = 9$

$2x+1 = 9$ $\qquad$ $2x+1 = -9$

$2x = 8$ $\qquad$ $2x = -10$

$x = 4$ or $x = -5$

$\{4, -5\}$

Solve: $|3x-2|=12$

$3x-2=12$

$3x=14$

$x=\frac{14}{3}$

$3x-2=-12$

$3x=-10$

$x=-\frac{10}{3}$

or

$\left\{-\frac{10}{3}, \frac{14}{3}\right\}$

$$\frac{2|x+1|}{2} = \frac{6}{2} \Rightarrow |x+1| = 3$$

Finish...

$$|x-3| + 4 = 10$$

$$-4 \quad -4$$

$$|x-3| = 6$$

Finish...

Special Case: Be careful!

$$|x+2| = -5$$

Can't do it!

No Solution

$\varnothing$

$$\frac{-2|x+1|}{-2} = \frac{-6}{-2}$$

$$|x+1| = 3$$

$$x+1 = 3 \quad \text{or} \quad x+1 = -3$$

$$x = 2 \quad \text{or} \quad x = -4$$

$$\{-4, 2\}$$