

# 1.1: Solving Absolute Value Equations

° absolute value: distance a number is from 0  
ALWAYS positive.

## Steps:

- 1) Isolate the absolute value (if needed)
- 2) drop the absolute value symbol to set up 2 equations  
→ = positive #  
→ = negative #
- 3) solve both equations
- 4) write answers as  $x =$

° Ex 1) solve  $|x+2| = 7$

$x+2 = 7$ <del>-2</del> $x = 5$	$x+2 = -7$ <del>-2</del> $x = -9$
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° Ex 2) solve  $|x+8| = 7$

$x+8 = 7$ <del>-8</del> $x = -1$	$x+8 = -7$ <del>-8</del> $x = -15$
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Ex 3) Solve  $3|-8x| \begin{matrix} +8 \\ -8 \end{matrix} = 80$

$$\frac{3|-8x|}{3} = \frac{72}{3}$$

$$|-8x| = 24$$

$$\frac{-8x}{-8} = \frac{24}{-8}$$

$$x = -3$$

$$\frac{-8x}{-8} = \frac{-24}{-8}$$

$$x = 3$$

Ex 4)  $\left[ \frac{|7x+4|}{8} = 3 \right] \cdot 8$

$$|7x+4| = 24$$

$$7x+4 = 24$$

$$\frac{7x}{7} = \frac{20}{7}$$

$$x = \frac{20}{7}, 2.86$$

$$7x+4 = -24$$

$$\frac{7x}{7} = \frac{-28}{7}$$

$$x = -4$$

you try:

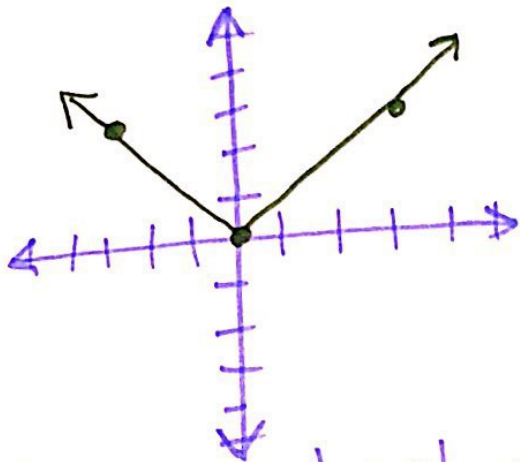
$$1) |-2x+6|=6$$

$$2) -5|3+4x|=-115$$

$$3) -5|5x-5|+2=-73$$

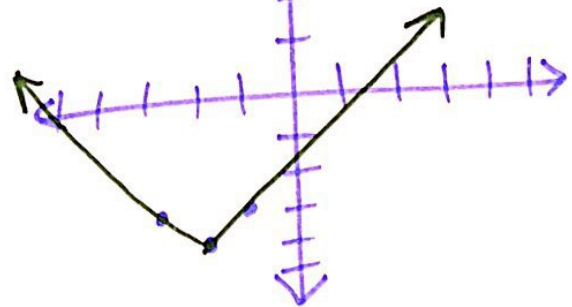
Graphing absolute value functions

• Ex 5) graph:  $y=|x|$



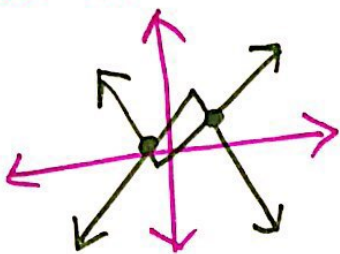
Ex 6)

$$y = |x+2| - 4$$

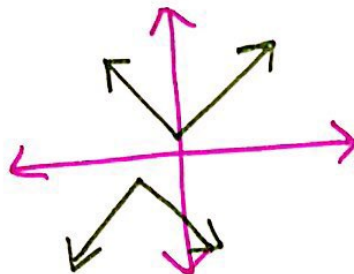


• Ex 7)  $y = -5|x-1| + 3$

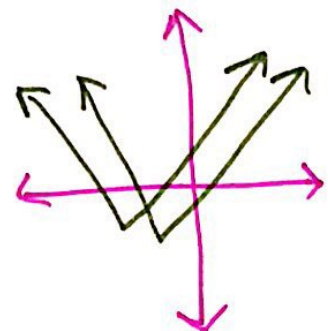
Types of solutions



2 solutions



no solution



1 solution

$$\text{Ex 8) } y = |x-3| - 4$$
$$y = -|x-3| + 6$$