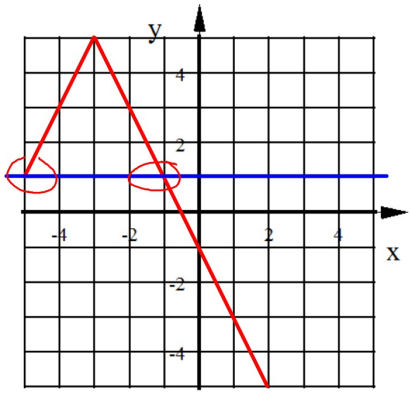


Graph these two equations together:

$y = -2|x+3|+5$ $\quad y = 1$

Use the graph to solve this equation:

$-2|x+3|+5 = 1$

$x = -5, -1$

Two graphs are equal where they Intersect

Solve:

$3|x - 8| + 1 = 19$

First, isolate the absolute value portion of the equation.

$-1 \quad -1$

$\frac{3|x-8|}{3} = \frac{18}{3}$

$|x-8| = 6$

Then use this definition of Absolute Value to Solve for x.

Definition	Algebraic Definition of Absolute Value
	• If $x \geq 0$, then $\lvert x\rvert = x$. • If $x < 0$, then $\lvert x\rvert = -x$.

This says that the absolute value of anything is either itself or its opposite

$|6| = 6$ $\quad x-8 = 6$

$|-6| = 6$ $\quad x-8 = -6$

$x = 2, 14$

Solve:

$3|x - 8| + 1 = 19$

OR

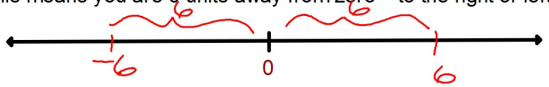
First isolate the absolute value portion of the equation:

$|x-8| = 6$

Then apply this definition of Absolute Value:

Absolute Value --- Distance from zero on a number line.

This means you are 6 units away from zero---to the right or left



$x-8 = 6$ $\quad x-8 = -6$

$x = 2, 14$

Solve this equation:

$4|2x + 9| - 1 = 27$

$+1 \quad +1$

$\frac{4|2x+9|}{4} = \frac{28}{4}$

$|2x+9| = 7$

$2x+9 = 7$ $\quad 2x+9 = -7$

$-9 \quad -9$ $\quad -9 \quad -9$

$2x = -2$ $\quad 2x = -16$

$x = -1$ $\quad x = -8$

Solve this equation: $23 - \frac{|3x - 11|}{2} = 7$

$-23 \quad -23$

$-2 \cdot \left(-\frac{|3x-11|}{2}\right) = (-16)(-2)$

$|3x-11| = 32$

$3x-11 = -32$ $\quad +11 \quad +11$

$\frac{3x}{3} = \frac{-21}{3}$

$3x-11 = 32$ $\quad +11 \quad +11$

$\frac{3x}{3} = \frac{43}{3}$

$x = 7, \frac{43}{3}$

Solve this equation: $|3x + 8| + 29 = 17$

$-29 \quad -29$

$|3x+8| = -12$

THIS won't be negative

NO SOL

Solve this equation: $|2x - 5| = x + 1$

$2x-5 = x+1$

$-x \quad -x$

$x-5 = 1$

$x = 6$

$2x-5 = -(x+1)$

$2x-5 = -x-1$

$+x \quad +x$

$3x-5 = -1$

$3x = 4$

$x = 4/3$

Solve this equation: $|x - 6| = 2x + 3$

$x-6 = 2x+3$

$-x \quad -x$

$-6 = x+3$

$-9 = x$

THIS doesn't make the orig. eq. true

$x-6 = -(2x+3)$

$x-6 = -2x-3$

$+2x \quad +2x$

$3x-6 = -3$

$3x = 3$

$x = 1$

Definition **Extraneous Solution**

An **extraneous solution** is a solution of an equation derived from an original equation that is not a solution of the original equation.

Solve this equation:

$|3x + 7| + 1 = 2x - 5$

$-1 \quad -1$

$|3x+7| = 2x-6$

$3x+7 = -(2x-6)$

$3x+7 = -2x+6$

$+2x \quad -2x$

$5x+7 = 6$

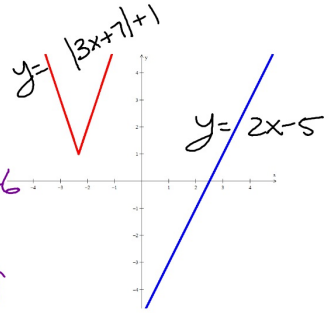
$5x = -1 \rightarrow x = -\frac{1}{5}$

$3x+7 = 2x+6$

$-2x \quad -2x$

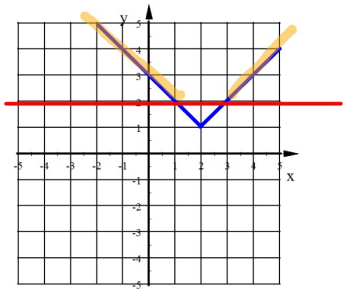
$x+7 = 6$

$x = -1$



these are both extraneous solutions

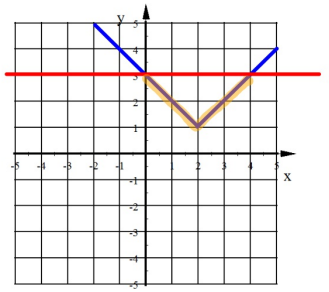
NO SOL



Use this graph of $y = |x - 2| + 1$ to solve this inequality:

$|x - 2| + 1 > 2$

$x < 1 \text{ , } x > 3$



Use this graph of $y = |x - 2| + 1$ to solve this inequality:

$|x - 2| + 1 \leq 3$

$0 \leq x \leq 4$

Properties — **Absolute Value Inequalities**

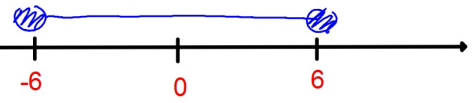
Let k represent a positive real number.

$\lvert x\rvert \geq k$	is equivalent to	$x \leq -k$ or $x \geq k$.
$\lvert x\rvert \leq k$	is equivalent to	$-k \leq x \leq k$.

$|x| \leq 6$

- Distance from zero is less than 6 units.
- Closer than 6 units from zero.

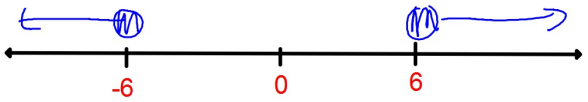
$-6 \leq x \leq 6$



$|x| \geq 6$

- Distance from zero is more than 6 units.
- Farther than 6 units from zero.

$x \leq -6$ or $x \geq 6$

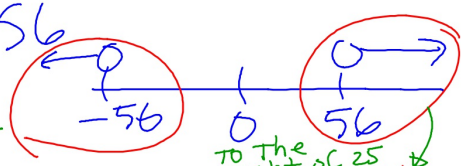


Solve. $|x + 7| - 13 > 43$

First, isolate the Absolute Value part on one side.

$+13 \quad +13$

$|x+7| > 56$



To the left of -25

$x+7 < -56$

To the right of 25

$x+7 > 56$

$x < -63$ or $x > 49$

Solve. $|2x - 1| + 19 \leq 44$

$|2x-1| \leq 25$

closer (less than) than 25 units from zero

inbetween -25 & 25

$-25 \leq 2x-1 \leq 25$

$+1 \quad +1 \quad +1$

$-24 \leq 2x \leq 26$

$\frac{-24}{2} \leq \frac{2x}{2} \leq \frac{26}{2}$

$-12 \leq x \leq 13$

Solve. $2|5x + 7| - 3 \geq 23$

$+3 \quad +3$

$\frac{2|5x+7|}{2} \geq \frac{26}{2}$

$|5x+7| \geq 13$

Farther than 13 units from zero

$5x+7 \leq -13$

$-7 \quad -7$

$5x \leq -20$

$x \leq -4$

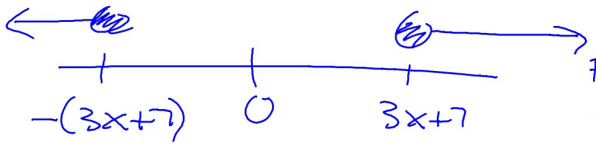
$5x+7 \geq 13$

$-7 \quad -7$

$5x \geq 6$

$x \geq 1.2$

Solve. $|x + 3| \geq 3x + 7$



Farther than 3x+7 units from zero

To the left of the neg value

$x+3 \leq -(3x+7)$

$x+3 \leq -3x-7$

$+3x \quad +3x$

$4x+3 \leq -7$

$-3 \quad -3$

$4x \leq -10$

$x \leq -2.5$

To the right of the pos value

$x+3 \geq 3x+7$

$-x \quad -x$

$3 \geq 2x+7$

$-7 \quad -7$

$-4 \geq 2x$

$x \leq -2$

Hwk #5 Sec 1-5

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Problems 10, 14, 20, 23, 41, 47, 51

You DON'T need to graph the solutions

Due Tomorrow