

# Algebra 1

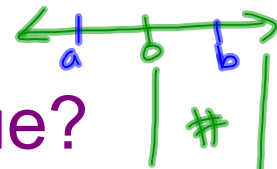
Chapter 3

Section 3-7

May 13-10:02 PM

Recall

What is absolute value?



*The absolute value of a number (or expression) is its distance away from zero*

*always positive (or zero)*

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## Review: Absolute Values

$$|3| = 3$$

$$|-7| = 7$$

when  $x = -8$  and  $y = -1$ ,  $|2x - 3y| =$

$$\begin{aligned} & |2(-8) - 3(-1)| \\ & |-16 + 3| \\ & |-13| = 13 \end{aligned}$$

Sep 29-3:15 PM

## Review: Absolute Values

What numbers have an absolute value of 6?

$$6, -6$$

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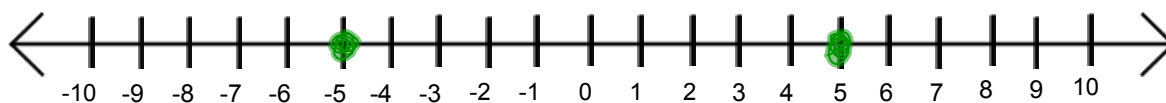
## Solving Absolute Value Equations

\*\*Graph solutions

$$|x| = 5$$

$$x = 5$$

$$x = -5$$



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## Solving Absolute Value Equations

\*\*Graph solutions

$$|2x + 1| = 11$$

$$2x + 1 = 11$$

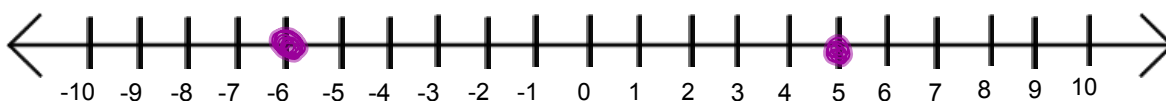
$$2x = 10$$

$$x = 5$$

$$2x + 1 = -11$$

$$2x = -12$$

$$x = -6$$



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## Solving Absolute Value Equations

\*\*Check solutions

$$|13x| + 7 = 8$$

$\begin{array}{c} -7 \\ -7 \end{array}$

$$|13x| = 1$$

$$\frac{13x}{13} = \frac{1}{13}$$
$$x = \frac{1}{13}$$

$$\frac{13x}{13} = -\frac{1}{13}$$
$$x = -\frac{1}{13}$$

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## Solving Absolute Value Equations

\*\*Check solutions

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

abs.val. = neg

No Solution

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## Solving Absolute Value Equations

\*\*Check solutions

$$\cancel{-2} |x + 9| = \frac{-12}{\cancel{-2}}$$

$$|x + 9| = 6$$

$$x + 9 = 6$$

$$x = -3$$

$$x + 9 = -6$$

$$x = -15$$

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## Solving Absolute Value Equations

\*\*Check solutions

$$\cancel{19} + |x| = 8$$

$$|x| = \textcircled{-11}$$

No solution

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## Method for solving absolute value equations

- Write down original problem
- Isolate the absolute value
- Separate into two equations
  - > Set expression inside to "+" and "-"
- Solve each equation separately

$$\begin{array}{l}
 \bullet |2x - 5| - 7 = -2 \\
 \bullet |2x - 5| = 5 \\
 \bullet 2x - 5 = 5 \quad 2x - 5 = -5 \\
 \bullet 2x = 10 \quad 2x = 0 \\
 \bullet x = 5 \quad x = 0
 \end{array}$$

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## Method for solving absolute value inequalities

- Write down original problem
- Isolate the absolute value
- Separate into two inequalities
  - > Set inside to "+" and "-" (flip ineq.)
- Solve each inequality separately

$$\begin{array}{l}
 \bullet |9 - 3x| + 7 < 61 \\
 \bullet |9 - 3x| < 54 \\
 \bullet 9 - 3x < 54 \quad 9 - 3x > -54 \\
 \bullet -3x < 45 \quad -3x > -63 \\
 \bullet x > -15 \quad x < 21
 \end{array}$$

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## Solving Absolute Value Inequalities

\*\*Graph solutions

$$|x| > 2$$

$x > 2$        $x < -2$



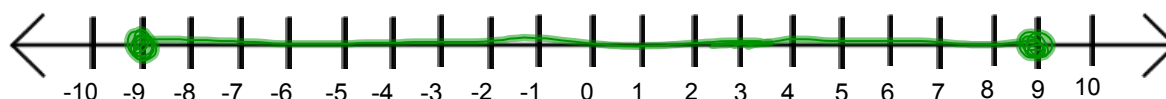
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## Solving Absolute Value Inequalities

\*\*Graph solutions

$$|x| \leq 9$$

$x \leq 9$        $x \geq -9$



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## Solving Absolute Value Inequalities

\*\*Graph solutions

$$|2 - 4x| \geq 22$$

$$\begin{aligned} 2 - 4x &\geq 22 \\ -2 &\quad -2 \\ -4x &\geq 20 \\ \frac{-4x}{-4} &\geq \frac{20}{-4} \\ x &\leq -5 \end{aligned}$$

$$\begin{aligned} 2 - 4x &\leq -22 \\ -2 &\quad -2 \\ -4x &\leq -24 \\ \frac{-4x}{-4} &\leq \frac{-24}{-4} \\ x &\geq 6 \end{aligned}$$



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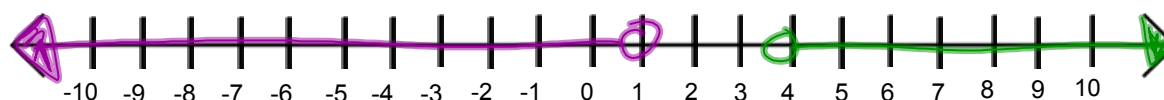
## Solving Absolute Value Inequalities

\*\*Graph solutions

$$|5x - 12.5| > 7.5$$

$$\begin{aligned} 5x - 12.5 &> 7.5 \\ +12.5 &\quad -12.5 \\ 5x &> 20 \\ \frac{5x}{5} &> \frac{20}{5} \\ x &> 4 \end{aligned}$$

$$\begin{aligned} 5x - 12.5 &< -7.5 \\ +12.5 &\quad +12.5 \\ 5x &< 5 \\ \frac{5x}{5} &< \frac{5}{5} \\ x &< 1 \end{aligned}$$



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