Warm-Up: Solve and Graph

1. $17 \leq 3x + 2 < 11$

$-2 \quad -2 \quad -2$

$\frac{15}{3} \leq \frac{3x}{3} < \frac{9}{3}$

$5 \leq x < 3$

$17 \leq 3x+2$ and $3x+2<11$

2. $x - 4 > 1$ or $5x - 2 \leq 8$

$+4 \quad +4 \qquad +2 \quad +2$

$x > 5 \qquad \frac{5x}{5} \leq \frac{10}{5}$

$x \leq 2$

CHAPTER 6 SECTION 4

Solving Absolute-Value Equations and Inequalities

Review

- Solving Absolute Value Equations:

$|x - 5| + 2 = 9$

$-2 \quad -2$

$|x-5| = 7$

$x-5 = 7 \quad | \quad x-5 = -7$

$+5 \quad +5 \quad | \quad +5 \quad +5$

$x = 12 \quad | \quad x = -2$

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

$-4 \quad -4$

$|2x+1| = 5$

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

$-1 \quad -1 \quad | \quad -1 \quad -1$

$\frac{2}{2}x = \frac{4}{2} \quad | \quad \frac{2}{2}x = \frac{-6}{2}$

$x = 2 \quad | \quad x = -3$

Solving Absolute Value Inequalities

- Steps:
  - Isolate the Absolute Value
  - Set equation equal to positive and negative
    - (if negative, switch the inequality sign)
  - Solve for the Variable
  - Graph your Solutions
    - Example:

$$|x+2|-4<6 \Rightarrow |x+2|<10 \Rightarrow \begin{array}{l} x+2<10 \\ x+2>-10 \end{array}$$

$$\begin{array}{l} x<8 \\ x>-12 \end{array}$$

“And” and “Or”

AND $<$ $\leq$

OR $>$ $\geq$

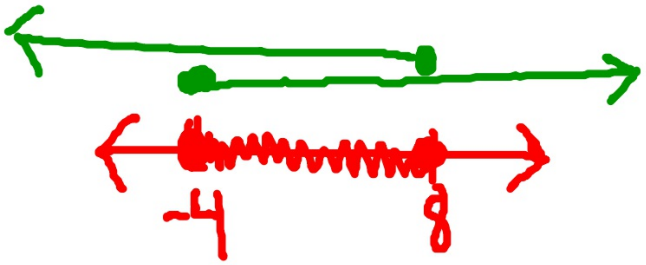
Examples: Solve then Graph

1. $|x - 2| \leq 6$

$x - 2 \leq 6$ and $x - 2 \geq -6$

$+2 \quad +2 \qquad +2 \quad +2$

$x \leq 8 \qquad x \geq -4$

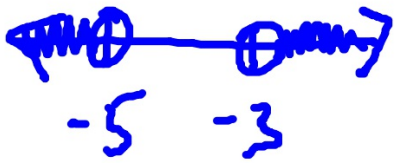


2. $|x + 4| > 1$

$x + 4 > 1$ or $x + 4 < -1$

$-4 \quad -4 \qquad -4 \quad -4$

$x > -3 \qquad x < -5$



Examples: Solve then Graph

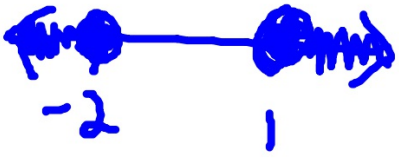
3. $|2x + 1| \geq 3$

$2x+1 \geq 3$ or $2x+1 \leq -3$

$-1 \quad -1 \qquad -1 \quad -1$

$\frac{2x}{2} \geq \frac{2}{2} \qquad \frac{2x}{2} \leq \frac{-4}{2}$

$x \geq 1 \qquad x \leq -2$



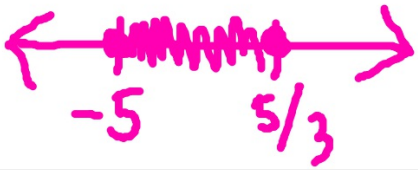
4. $|3x + 5| \leq 10$

$3x+5 \leq 10$ and $3x+5 \geq 10$

$-5 \quad -5 \qquad -5 \quad -5$

$\frac{3x}{3} \leq \frac{5}{3} \qquad \frac{3x}{3} \geq \frac{-15}{3}$

$x \leq 5/3 \qquad x \geq -5$



Class Work

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(15) $|x+6| < 4$

$x+6 < 4$ and $x+6 > -4$

$-6 \quad -6 \qquad -6 \quad -6$

$x < -2$ and $x > -10$

$-10 < x < -2$

(17) $|3x+1| \leq 5$

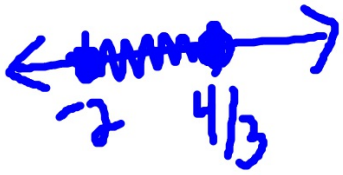
$3x+1 \leq 5$ and $3x+1 \geq -5$

$-1 \quad -1 \qquad -1 \quad -1$

$\frac{3x}{3} \leq \frac{4}{3} \qquad \frac{3x}{3} \geq \frac{-6}{3}$

$x \leq 4/3 \qquad x \geq -2$

$-2 \leq x \leq 4/3$



Hand-In Work

- 1. $x - 2 < 5$
- 2. $-3x \geq 9$
- 3. $-2 < x - 4 \leq 6$
- 4. $|x - 5| + 2 \geq 10$

Homework

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