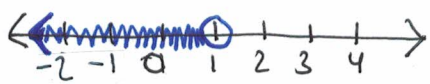
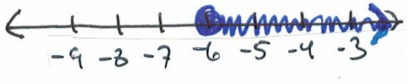
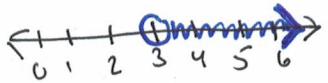
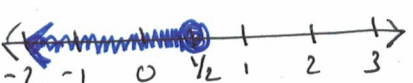


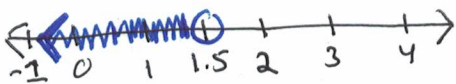
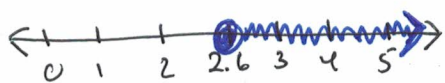


## Unit 2.2 Solving Multi-Step Inequalities

### Rules for Solving Inequalities

- Steps are the same as solving multi-step equations →
  - Get rid of grouping symbols, fractions, and decimals
  - Isolate the variable and put the constant (#) on the right side.  
 \*Isolate the variable on the **LEFT SIDE**\*
- You must follow **ONE RULE** with solving with inequalities →
  - if you Multiply or Divide by a Negative number, then you must Flip/Reverse the inequality symbol.   
 ex:  $\frac{-2x}{-2} > \frac{10}{-2} \rightarrow x < -5$   
 (Note: "divide by (-)" is written below the example)
- Since you will have to graph the solution after solving each inequality, it's suggested that you always move the variable to the LEFT SIDE.

**Example 1:** Solve each inequality and then graph your solution. **Do your work on a separate sheet.**

<p>a.) <math>x - 2 &lt; -1</math></p> <p style="text-align: center;"><math>x &lt; 1</math></p> 	<p>b.) <math>-\frac{1}{2}x \leq 3</math></p> <p style="text-align: center;"><math>x \geq -6</math></p> 
<p>c.) <math>-8 &lt; 5x - 23</math></p> <p style="text-align: center;"><math>x &gt; 3</math></p> 	<p>d.) <math>7 - 2x \geq 6</math></p> <p style="text-align: center;"><math>x \leq \frac{1}{2}</math></p> 
<p>e.) <math>2x - 4 - 3x &gt; -8</math></p> <p style="text-align: center;"><math>x &lt; 4</math></p> 	<p>f.) <math>8 \geq 4x + 2(x + 7)</math></p> <p style="text-align: center;"><math>x \leq -1</math></p> 
<p>g.) <math>8x + 12 &lt; 27 - 2x</math></p> <p style="text-align: center;"><math>x &lt; 1.5</math></p> 	<p>h.) <math>-6(x - 4) \leq 7(2x - 3) - 7</math></p> <p style="text-align: center;"><math>x \geq 2.6</math></p> 

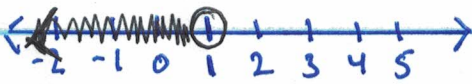
## 2.2 Solving Multi-Step Inequalities

Example 1:

$$a) \quad x - 2 < -1$$

$$\quad \quad \quad \underline{+2} \quad \underline{+2}$$

$$x < 1 \quad \leftarrow \text{* No Set Notation *}$$

Number Lines

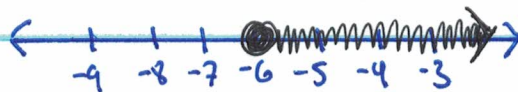
- must have arrowheads
- Inequality # centered
- Graph of solution correct and arrow head.

Your number has to have the inequality # centered, then three #'s to the left and to the right.

$$b) \quad -\frac{1}{2}x \leq 3$$

$$\begin{array}{c} \leftarrow \text{switch symbol direction b/c you multiplied} \\ \text{by a negative.} \\ \hline \cancel{(-2)} \frac{1x}{-2} \leq \textcircled{3} \cancel{(-2)} \end{array}$$

$$x \geq -6$$



$$c) \quad -8 < 5x - 23$$

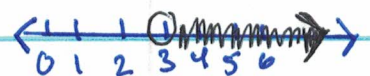
$$\quad \quad \quad \underline{+23} \quad \quad \quad \underline{+23}$$

Move/Rewrite with variable on left side at the end!

$$\frac{15}{5} < \frac{5x}{5}$$

$$3 < x \rightarrow \text{Rewrite with variable on left.}$$

$$x > 3$$





$$d) \quad \begin{array}{r} 7 - 2x \geq 6 \\ -7 \quad \quad -7 \end{array}$$

$$\begin{array}{r} -2x \geq -1 \\ -2 \quad -2 \end{array}$$

$$x \leq \frac{1}{2}$$



$$e) \quad \begin{array}{r} 2x - 4 - 3x > -8 \\ -1x - 4 > -8 \\ +4 \quad +4 \end{array}$$

$$\begin{array}{r} -1x > -4 \\ -1 \quad -1 \end{array}$$

$$x < 4$$



$$f) \quad 8 \geq 4x + 2(x+7)$$

$$8 \geq 4x + 2x + 14$$

$$\begin{array}{r} 8 \geq 6x + 14 \\ -14 \quad -14 \end{array}$$

$$\begin{array}{r} -6 \geq 6x \\ 6 \quad 6 \end{array}$$

DO NOT SWITCH SYMBOL.

$$\begin{array}{r} -1 \geq x \\ x \leq -1 \end{array}$$

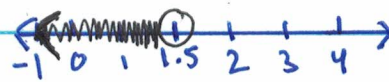


$$g) \quad \begin{array}{r} 8x + 12 < 27 - 2x \\ +2x \quad \quad +2x \end{array}$$

$$\begin{array}{r} 10x + 12 < 27 \\ -12 \quad -12 \end{array}$$

$$\begin{array}{r} 10x < 15 \\ 10 \quad 10 \end{array}$$

$$x < 1.5$$



$$h) \quad -6(x-4) \leq 7(2x-3) - 7$$

$$-6x + 24 \leq 14x - 21 - 7$$

$$\begin{array}{r} -6x + 24 \leq 14x - 28 \\ -14x \quad -14x \end{array}$$

$$\begin{array}{r} -20x + 24 \leq -28 \\ -24 \quad -24 \end{array}$$

$$\begin{array}{r} -20x \leq -52 \\ -20 \quad -20 \end{array}$$

$$x \geq 2.6$$

