

Name: Notes

Date:

Period:

Lesson 1.4 Solving Inequalities Notes

<p><u>Graphing Inequalities</u></p>	<ul style="list-style-type: none"> Use a <u>shaded point</u> for \geq or \leq symbols. Use an <u>unshaded point</u> for $>$ or $<$ symbols.
<p><u>Interval Notation</u></p>	<p>INTERVAL NOTATION is a way to write the solution to an inequality using <u>infinity symbols</u>, <u>parenthesis</u>, and <u>brackets</u>.</p> <ul style="list-style-type: none"> Parentheses indicate "not included" or "open" or "exclusive." () Brackets indicate "included" or "closed" or "inclusive." []

Directions: Graph each inequality and write the solution in interval notation. *Smaller # on left*

Ex1:
 $x \geq 8$

Interval Notation: $[8, \infty)$

Infinity can not be included

Ex2:
 $a < -1$

Interval Notation: $(-\infty, -1)$

negative infinity is not included

<p><u>Solving Inequalities</u></p>	<ul style="list-style-type: none"> Follow the same rules to solve an inequality as you do an equation. Reverse \rightarrow flip directions the inequality symbol if you multiply or divide by a negative number. to isolate the variable
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Directions: Solve, graph, and write the solution to each inequality in interval notation.

Ex3:

$$3 - (4m + 1) \geq 5m - 25$$

$$3 - 4m - 1 \geq 5m - 25$$

$$-4m + 2 \geq 5m - 25$$

$$\begin{array}{r} +4m \\ \hline 2 \geq 9m - 25 \\ +25 \\ \hline 27 \geq 9m \\ \frac{27}{9} \geq \frac{9m}{9} \\ 3 \geq m \\ m \leq 3 \end{array}$$

Ex4:

$$12p + 52 > -2(4 - 2p)$$

$$12p + 52 > -8 + 4p$$

$$\begin{array}{r} +8 \\ \hline 12p + 60 > 4p \\ -12p \\ \hline 60 > -8p \\ \frac{60}{-8} > \frac{-8p}{-8} \\ -\frac{60}{8} < p \\ -\frac{15}{2} < p \end{array}$$

Ex5

$$3(8x-9) > 4(6x+1)$$

$$\begin{array}{r} \rightarrow 24x - 27 > 24x + 4 \\ -24x \quad \quad -24x \\ \hline -27 > 4 \end{array}$$

no solution \emptyset
 This can never be true. $24x$ represents a number. That number -27 will ever be greater than that number $+4$.

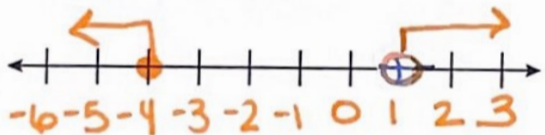
Ex6

$$11x - 4 \leq 6x - (3 - 5x)$$

$$\begin{array}{r} 11x - 4 \leq 6x - 3 + 5x \\ 11x - 4 \leq 11x - 3 \\ -11x \quad \quad -11x \\ \hline -4 \leq -3 \text{ Always} \end{array}$$

The value $11x - 4$ will always be less than $11x - 3$. $(-\infty, \infty)$



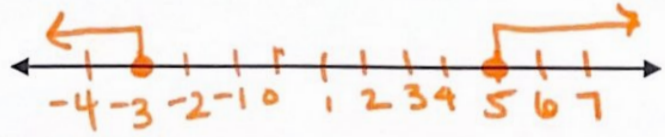
<u>Compound Inequalities</u>	Two or more inequalities graphed together on the same number line.
<u>Union "OR" Inequalities</u>	 <p>Inequality: $x \leq -4$ OR $x > 1$ Int. Notation: $(-\infty, -4] \cup (1, \infty)$</p>
<u>Solving "OR" Inequalities</u>	To solve "or" inequalities, solve each part, then graph on a number line to show the solutions.

Directions: Solve, graph, and write the solution to each inequality in interval notation.

Ex7: $-3y + 8 \leq -7$ OR $10y - 3 \leq -33$

$$\begin{array}{r} -3y + 8 \leq -7 \\ -8 \quad -8 \\ \hline -3y \leq -15 \\ -3 \quad -3 \\ \hline y \geq 5 \end{array} \quad \text{OR} \quad \begin{array}{r} 10y - 3 \leq -33 \\ +3 \quad +3 \\ \hline 10y \leq -30 \\ 10 \quad 10 \\ \hline y \leq -3 \end{array}$$

Solution: $(-\infty, -3] \cup [5, \infty)$



Intersection

<p><u>"AND"</u> <u>Inequalities</u></p>		<p>Inequality: $-2 \leq x < 5$</p> <p>Int. Notation: $[-2, 5)$</p>
<p><u>Rewriting "AND"</u> <u>Inequalities</u></p>	<p>Because the solutions to an "and" inequality fall between two endpoints, they are frequently written in a more condensed form.</p> <p>Example: $x \geq -2$ AND $x < 5 \rightarrow -2 \leq x < 5$</p>	
<p><u>Solving "AND"</u> <u>Inequalities</u></p>	<ul style="list-style-type: none"> • If the "and" inequality is written separately, solve each part. • If condensed, you can solve it all together working inside out. <ul style="list-style-type: none"> ○ Then, graph to show all possible solutions. 	

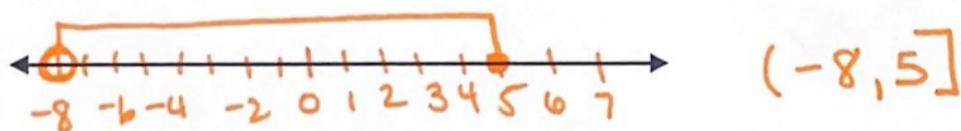
Directions: Solve, graph, and write the solution to each inequality in interval notation.

Ex8:

$$2w + 1 \leq 11 \quad \text{AND} \quad 1 - 5w < 41$$

$$\begin{array}{r} -1 \quad -1 \\ \hline 2w \leq 10 \\ w \leq 5 \end{array} \qquad \begin{array}{r} -1 \quad -1 \\ \hline -5w < 40 \\ \frac{-5}{-5} \quad \frac{-1}{-5} \\ w > -8 \end{array}$$

$$-8 < w \leq 5$$



Ex9:

$$28 > -2 - 10m \geq -7$$

$$28 > -2 - 10m \quad \text{AND} \quad -2 - 10m \geq -7$$

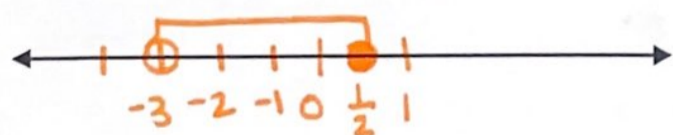
$$\begin{array}{r} +2 \quad +2 \\ \hline 30 > -10m \\ \frac{-10}{-10} \quad \frac{-10}{-10} \\ -3 < m \end{array}$$

$$m > -3 \quad \text{AND}$$

$$\begin{array}{r} +2 \quad +2 \\ \hline -10m \geq -5 \\ \frac{-10}{-10} \quad \frac{-10}{-10} \\ m \leq \frac{1}{2} \end{array}$$

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

$$-3 < m \leq \frac{1}{2}$$



$$(-3, \frac{1}{2}]$$