Honors 1 Name: ____________________________________

Chapter 5 Notes

5.1/5.2 – Solving Inequalities by Adding or Subtracting

Differences and Similarities Between Solving an Equation ***and*** Solving an Inequality

Solving an Equation	**Solving an Inequality**
Same Steps: 1) Simplify 2) Same Side 3) Solve x + 5 = 12 Only one ___________________	Same Steps: 1) Simplify 2) Same Side 3) Solve x + 5 > 12 Only one ___________________

< means ______________ and > means ________________

Example: Solve each, state 3 numbers in the solution set and graph the solution set.

1. $x + 3 > -15$	2. $-3 < x - 4$	3. $-5x \geq 15$	4. $\frac{x}{-2} \leq \frac{7}{8}$

<	>	≤	≥
less than fewer than	greater than more than	at most, no more than, less than or equal to	at least, no less than, greater than or equal to

5.3 – Solve Multi-Step Inequalities

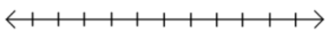
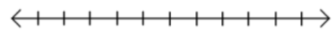
Example: Solve the inequality. Write in set builder notation!

$2(8 - 3x) > 14$

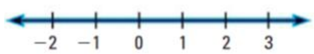
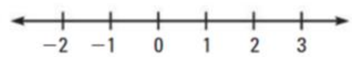
Set builder notation read as: ____

Example: $4(3x - 5) + 7 < 8x + 3$

Special Cases: Solve and graph each.

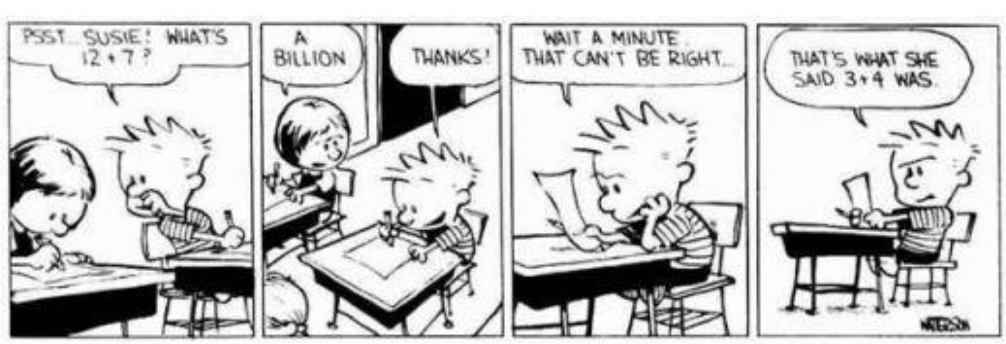
$5(m+5) < 5m + 17$	$1 - 8x \leq -4(2x - 1)$
	

NUMBER OF SOLUTIONS If an inequality is equivalent to an inequality that is true, such as $-3 < 0$, then the solutions of the inequality are *all real numbers*. If an inequality is equivalent to an inequality that is false, such as $4 < -1$, then the inequality has *no solution*.

 Graph of an inequality whose solutions are all real numbers Example: $3p - 5 > 3p - 7$	 Graph of an inequality that has no solution Example: $3p - 5 < 3p - 7$

Example: Translate from English to Math and then solve.

"Four times the quantity 3x plus two is at least the difference of 2x and five".



5.4 – Solving Compound Inequalities

Lead-In: At a Grizzly football game, the temperature at kickoff was 41 degrees. At halftime, it had dropped to 8 degrees. Can you write a mathematical expression for the temperature (t) at the game during some point between kickoff and halftime?

Example: Graphing Compound Inequalities

1. x > 4 and x < 10	2. x < 4 or x > 10

Intersection	**Union**
1. -2 < x and x ≤ 1 can also be written:	2. x < -1 or x ≥ 0

Example: Translate from Verbal (English) to Algebraic (Math), then graph.

A number p is greater than -2 and less than 3.

Example: Solve a compound inequality with *and*.

Method 1	Method 2
$2 < x + 5 < 9$	$2 < x + 5 < 9$

Example: Solve a compound inequality with *or* as well as unique solutions.

1. 2x + 3 < 9 or 3x – 6 > 12	2. $x - 23 > -10 \; and \; x - 16 < -20$

5.5 – Solve Absolute Value Inequalities

Translate to English and graph each.

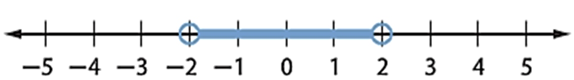
$\lvert x \rvert > 4$	$\lvert x \rvert \leq 1$

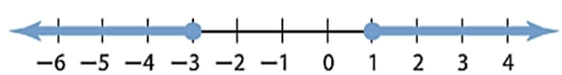
Example: Solve $\lvert x - 4 \rvert < 12$ and graph.

Example: Solve $\lvert 2x + 5 \rvert > 9$ and graph.

Example: Solve $\lvert 4x + 3 \rvert < -18$ and graph.	Example: Solve $\lvert 4x + 3 \rvert > -18$ and graph.

Challenge: Work with a neighbor to write a mathematical statement for the graphs shown. Your statement must include the absolute value symbol.



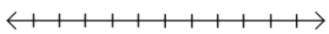
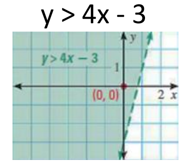


<u>5.6 – Graph Inequalities in Two Variables</u>

Which ordered pair is *not* a solution of $x - 3y \leq 6$?

Ⓐ $(0, 0)$ Ⓑ $(6, -1)$ Ⓒ $(10, 3)$ Ⓓ $(-1, 2)$

$x-3y \leq 6$	$x-3y \leq 6$	$x-3y \leq 6$	$x-3y \leq 6$

<u>Graphing Inequalities in One Dimension</u>	<u>Graphing Inequalities in Two Dimensions</u>
Points on the number line that make the statement true X > 3 	Points in the coordinate plane that make the statement true y > 4x - 3 

When graphing linear inequalities, we use a dashed line if ________________________________

When graphing linear inequalities, we use a solid line if ___________________________________

How do you know which side to shade? ____

Steps for Graphing Linear Inequalities

1.
2.
3.
4.

<u>Examples</u>: Graph the following linear inequalities.

$-6x + 2y \leq 10$	$x + 2y > 8$