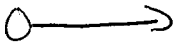
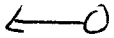
Algebra 1
Unit 3, lesson 1 notes

Name Key Block _____ Date _____

Essential Question: How do I graph, write, & solve one, two, & multi-step inequalities?

Inequality Signs:

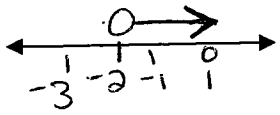
Sign	Words	open or closed circle?	Picture (graph)
$>$	greater than	open	
$<$	less than	open	
$\geq$	greater than or equal to	closed	
$\leq$	less than or equal to	closed	
$\neq$	not equal to	open	

Examples:

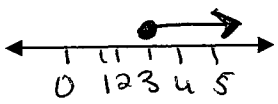
points same direction as the arrow!

1. Graph the inequalities:

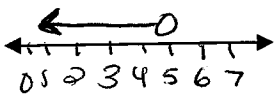
a. $x > -2$



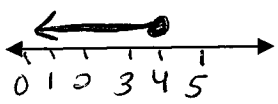
b. $x \geq 3$



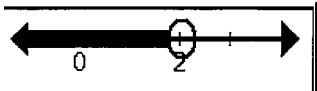
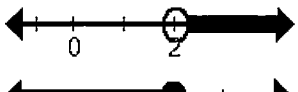
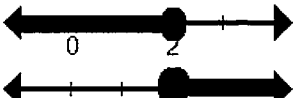
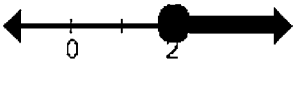
c. $x < 5$



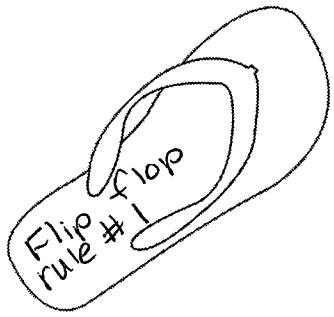
d. $x \leq 4$



2. Write the inequality for each graph

	$x < 2$
	$x > 2$
	$x \leq 2$
	$x \geq 2$

To solve inequalities: The steps are the same as Solving linear equations, except for one BIG difference:



When you × or ÷ both sides of an inequality by a negative number, you need to "flip-flop" the inequality sign!

ex: ① $-4\left(\frac{x}{-4}\right) > (6)-4$

$x < -24$

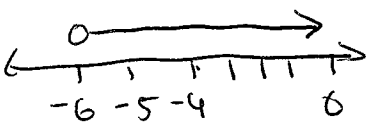
② $-2x < 10$

$x > -5$

Examples: Solve the inequalities. Graph your answer on a number line.

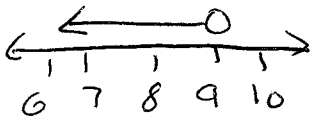
1) $x + 4 > -2$

$x > -6$



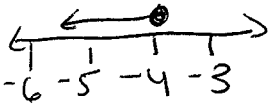
2) $x - 6 < 3$

$x < 9$



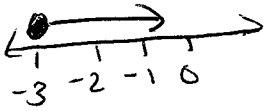
3) $x + 5 \leq 1$

$x \leq -4$



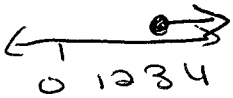
4) $-2x \leq 6$

$x \geq -3$



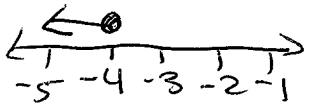
5) $9x \geq 27$

$x \geq 3$



6) $\frac{x}{-2} \geq 2$

$x \leq -4$

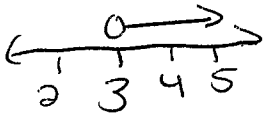


Now try these (you need to do 2 steps to get the answer!)

7) $2x - 4 > 2$

$2x > 6$

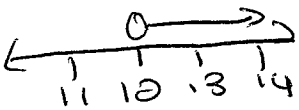
$x > 3$



8) $\frac{x}{-4} + 8 < 5$

$\frac{x}{-4} < -3$

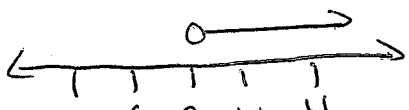
$x > 12$



9) $30 < 4x - 6$

$36 < 4x$

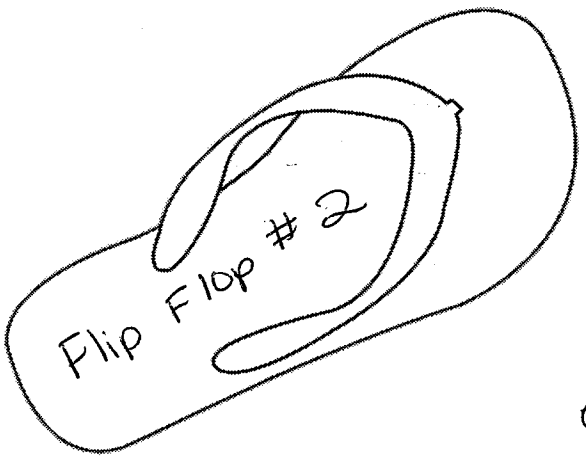
$9 < x$ OR $x > 9$



* see next page!

VARIABLE	SYMBOL	CONSTANT
X	$<$ $\leq$ $>$ $\geq$	3

***Look at your answer in #9... this leads to another flip flop!



Your solution should be:

Variable Sign Constant

* If it's backwards, change the order -- remember to "flip the sign"

ex. 1) $7 < x$ → $x > 7$

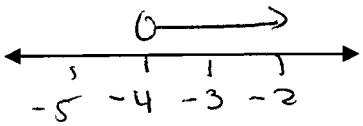
2) $3 > x$ → $x < 3$

3) $-\frac{1}{2} < x$ → $x > -\frac{1}{2}$

Examples: Try "flipping" these answers so they read: Variable, Symbol, Constant, then graph them on a number line.

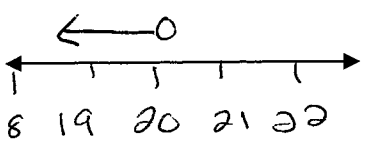
1) $-4 < x$

$x > -4$



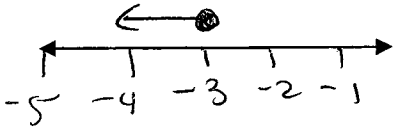
2) $20 > x$

$x < 20$



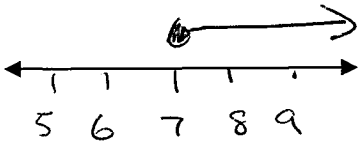
3) $-3 \geq x$

$x \leq -3$



4) $7 \leq x$

$x \geq 7$



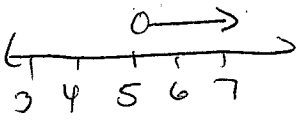
Putting it all together: Solve the inequality and graph your answer on a number line.

1) $8 < 3x - 7$

$15 < 3x$

$5 < x$

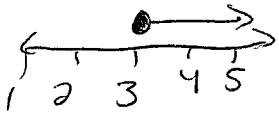
$x > 5$



2) $12 - 2x \leq 6$

$-2x \leq -6$

$x \geq 3$

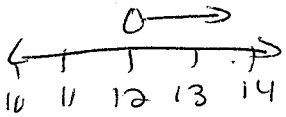


3) $54 < 4x + 6$

$48 < 4x$

$12 < x$

$x > 12$

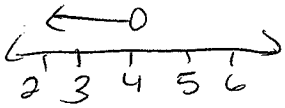


4) $25 > 4x + 9$

$16 > 4x$

$4 > x$

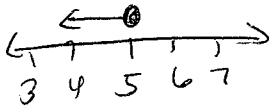
$x < 4$



5) $1 - 3x \geq -14$

$-3x \geq -15$

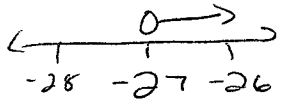
$x \leq 5$



6) $-\frac{1}{3}(x + 21) < 2$

$x + 21 > -6$

$x > -27$

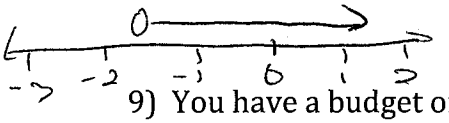


7) $5(-3x - 4) < 5$

$-3x - 4 < 1$

$-3x < 5$

$x > -\frac{5}{3}$ or $-1\frac{2}{3}$

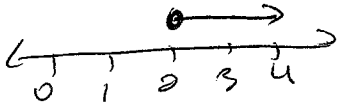


8) $-\frac{1}{2}(-4x + 10) \geq -1$

$-4x + 10 \leq 2$

$-4x \leq -8$

$x \geq 2$



9) You have a budget of $45 to buy pizza for a student council meeting. Pizzas cost $7.50 each. Write and solve an inequality to find the possible numbers of pizzas that you can buy.

X = # of pizzas

$7.50x \leq 45$

$x \leq 6$

You can buy at most 6 pizzas.

10) You have $50 to spend at a county fair. You spend $20 on admission. You want to play a game that costs $1.50. Describe the possible number of times you can play the game.

X = # of times you play the game

$20 + 1.50x \leq 50$

$1.5x \leq 30$

$x \leq 20$

You can play 20 or fewer times.