Unit 5 Notes

Inequalities and Absolute Value

$$a > b \Rightarrow b < a$$

"Reversal" Property of Inequality

Tentative Schedule

Day	*Date*	*Classwork*	*Assignment*
	Fri. 10/31 (all)	Test #4	Video #5.1 with Notes: Inequalities in One Variable
1	Mon. 11/3 (S) Tues. 11/4 (R)	1 – 9	Video #5.2 with Notes: Compound Inequalities
2	Mon. 11/10 (all)	10 – 26	Video #5.3 with Notes: Two-Variable Inequalities
3	Wed. 11/12 (S) Thurs. 11/13 (R)	27 – 36	Video #5.4 with Notes: Systems of Inequalities
4	Fri. 11/14 (all)	37 – 45	Video #5.5 with Notes: Absolute Value Equations
5	Mon. 11/17 (S) Tues. 11/18 (R)	46 – 63	Video #5.6 with Notes: Absolute Value Inequalities
6	Wed. 11/19 (all)	64 – 74	Finish Problem Sets
7	Thurs. 11/20 (S) Fri. 11/21 (R)	Review for Test #5	Review for Test #5
8	Mon. 11/24 (all)	**Test #5**	Video #6.1 with Notes

Name: _____

Notes 5.1 - One-Variable Inequalities

Inequality Symbols

$a < b$: a is _____ b

$a \leq b$: a is _____ b

$a > b$: a is _____ b

$a \geq b$: a is _____ b

Graphing Inequalities

1.) Always draw a number line.

2.) Draw a circle around the number.

a.) Use an _____ circle for < or > statements.

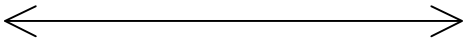
b.) Use a _____ circle for ≤ or ≥ statements.

3.) Shade the number line in the correct place.

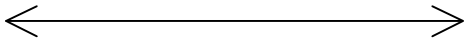
Example: $x > 3$

What is the point of drawing a number line?

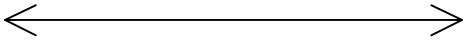
1.) $x \leq 5$



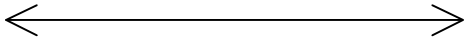
2.) $x > -3$



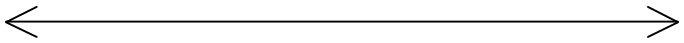
3.) $4 < x$



4.) x is **at most** 15.



5.) $-6z < 42$



Important!

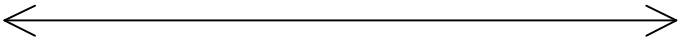
If you have to multiply or divide by a negative number, you have to ALWAYS

_____ _____

_____ _____!!!

Why?

6.) $5x - 7 \leq x + 9$

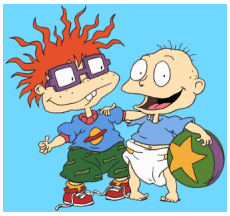


7.) If three-fourths of a whole number decreased by 8 is at least 3, what is the smallest number that will satisfy the solution?

8.) Stephen decided that he would spend at most $450 on a snowboard and a helmet with speakers. If the price of the snowboard was $100 less than four times the price of the helmet, find the highest possible price of the snowboard.

Notes 5.2 - Double Inequalities

1.) Graph the solution set of $x \geq -2$ and $x < 5$.



2.) Graph the solution set of $-2 \leq x < 5$.

3.) Graph the solution set of $-4 < x \leq 2$.

4.) Write the compound inequality without using and. Then graph the solution set.

$x < 9$ and $x > 0$.

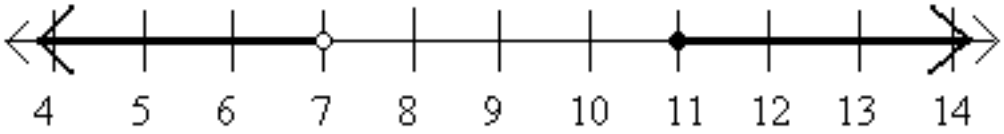
5.) Graph the solution set of $x \geq 1$ or $x < -4$.

6.) Graph the solution set of $x > 5$ and $x < 2$.

7.) Graph the solution set of $x \leq 7$ or $x > 4$.

8.) Write a compound inequality for the solution set shown below.

9.) Write a compound inequality for the solution set shown below.



Solve the following compound inequalities. Then, graph the solution set.

10.) $20 < -3x + 11 \leq 29$

11.) $5m - 7 > 13$ or $5m - 7 \leq -22$

Notes 5.3 - Graphing Inequalities in Two-Variables

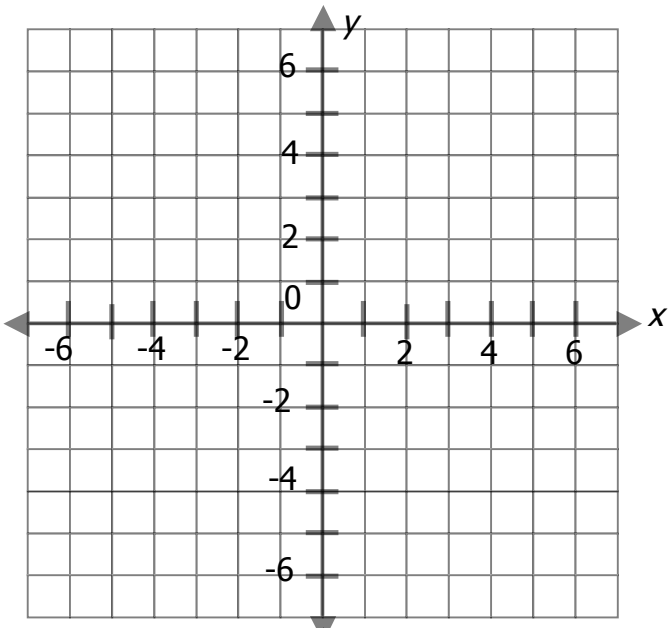
Step 1: Graph the inequality as if you would graph the line.

Step 2: If the sign is < or >, use a _____ line.

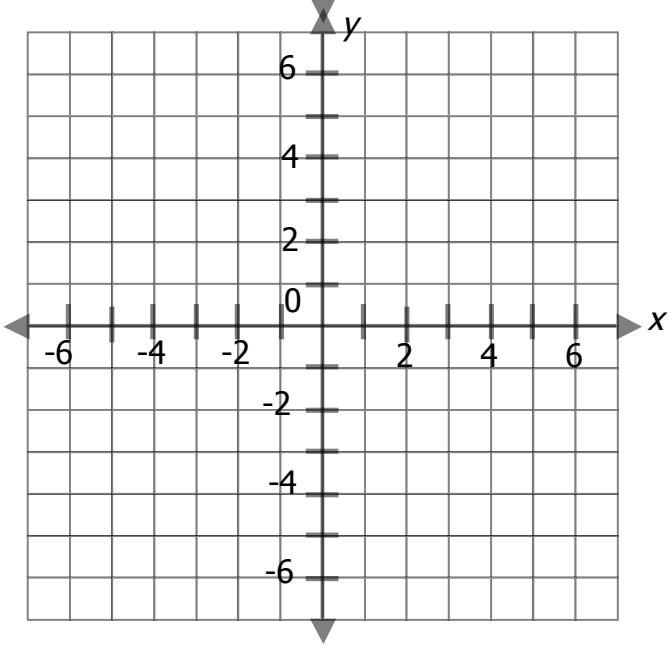
If the sign is ≤ or ≥, use a _____ line.

Step 3: Choose a point on the graph and plug it in to see if you should shade in that region.

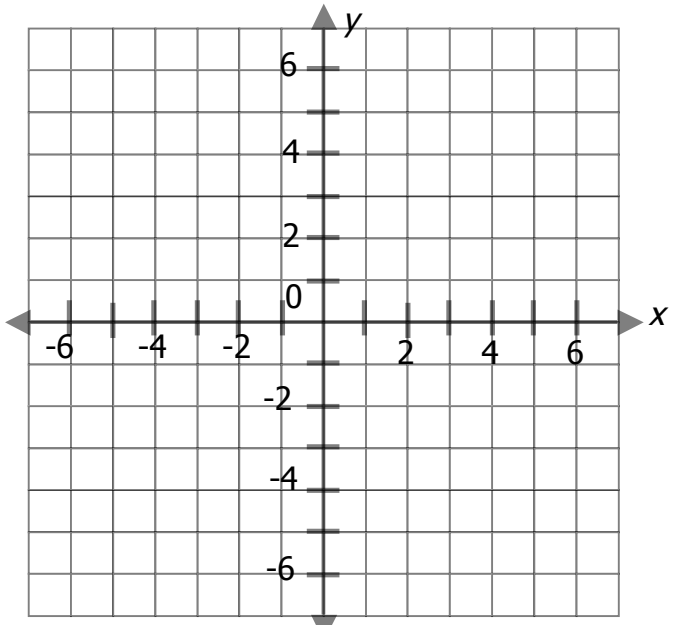
1.) $y \leq x + 3$



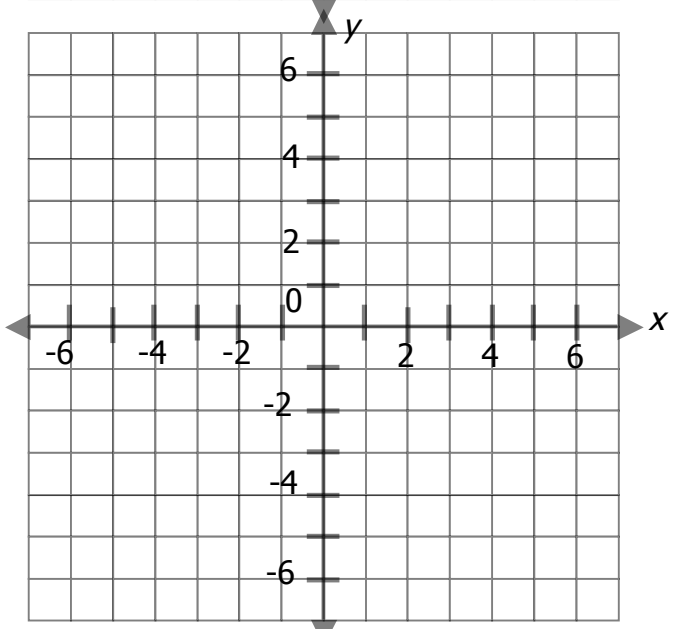
2.) $2y > 5x - 4$



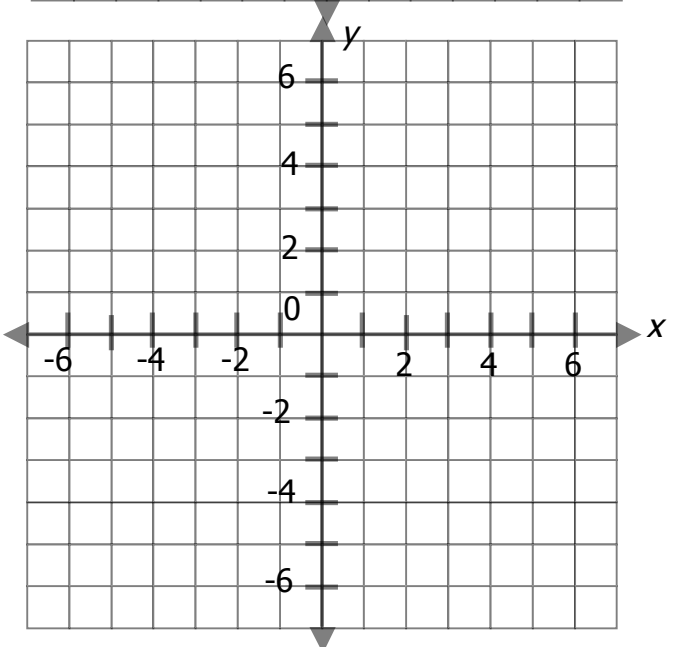
3.) $4x - 3y < 9$



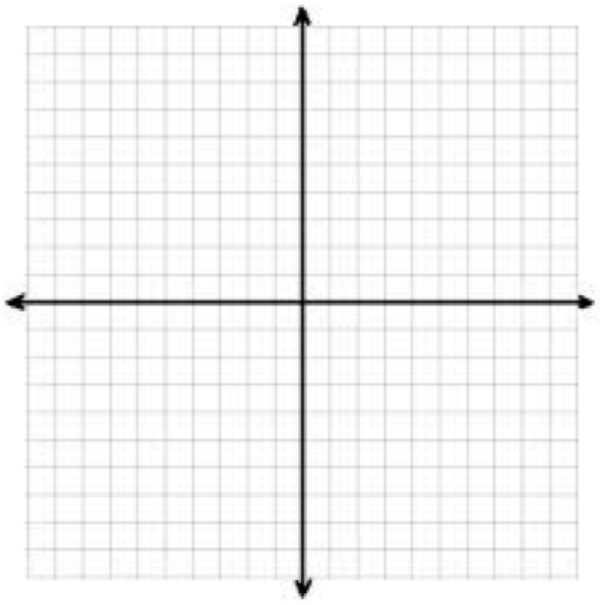
4.) $y > 3$



5.) $x \leq -1$



6.) What pairs of numbers satisfy the statement: The sum of two numbers is less than 10? Create an inequality with two variables to represent this situation and graph the solution set.

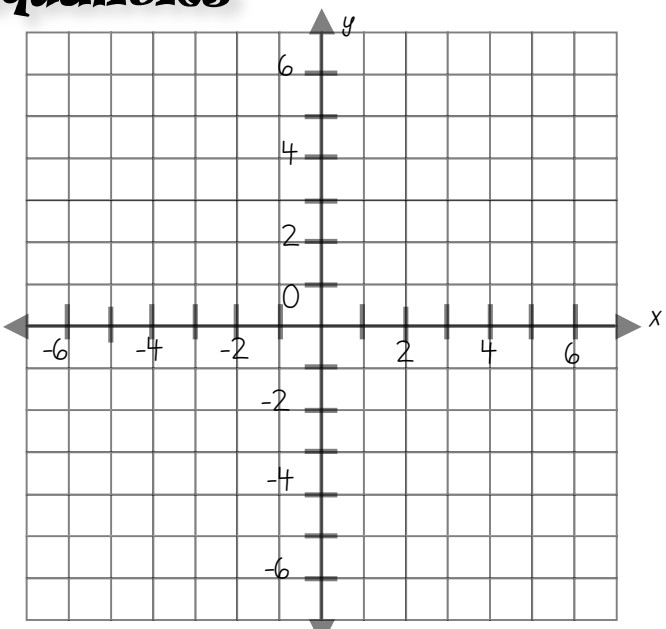


Notes 5.4 - Systems of Inequalities

1.) $y < 2x - 3$

$y \geq -\frac{2}{3}x + 2$

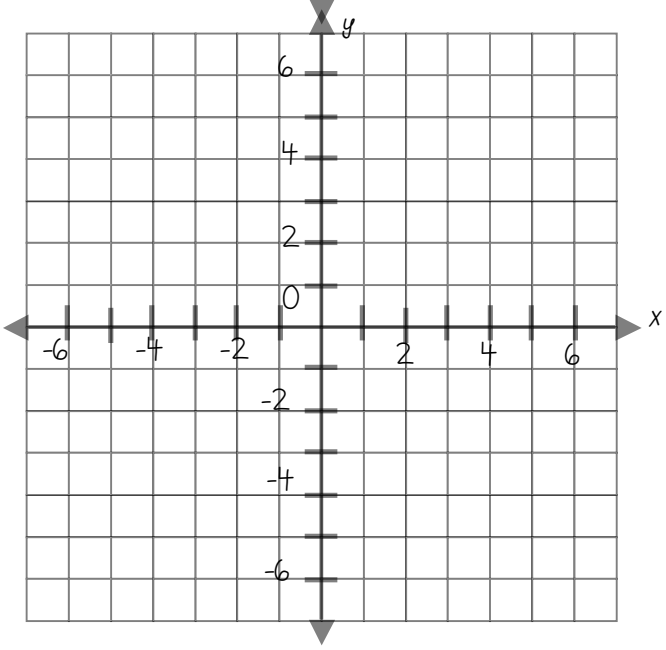
What is one point that will satisfy the solution? _____



2.) $-2y < 3x - 4$

$3y + x \leq 3$

What is one point that will satisfy the solution? _____

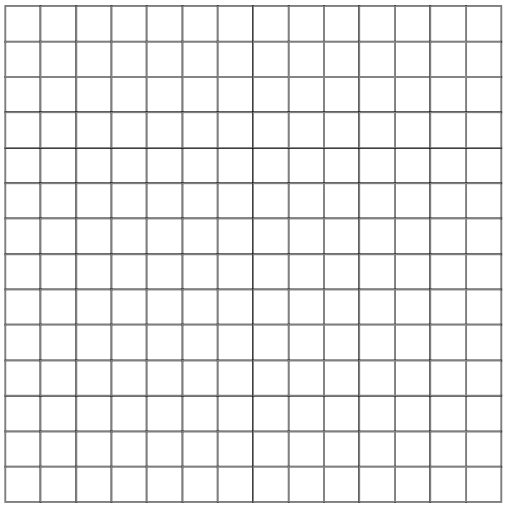


3.) A clothing manufacturer has 1000 yd. of cotton to make shirts and pajamas. A shirt requires 1 yd. of fabric and a pair of pajamas requires 2 yd. of fabric. It takes 2 hr. to make a shirt and 3 hr. to make the pajamas, and there are 1600 hr. available to make the clothing.

a.) What are the variables?

b.) What are the constraints?

c.) Write inequalities for the constraints.



d.) Graph the inequalities and shade the solution set.

e.) What does the shaded region represent?

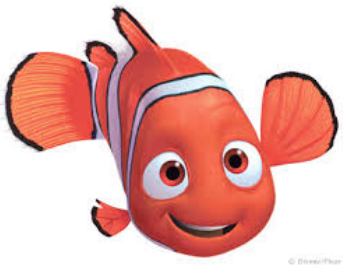
f.) Suppose he makes a profit of $10 on shirts and $18 on pajamas. How would he decide how many of each to make?

g.) How many of each should he make assuming he will sell all the shirts and pajamas he makes?

Notes 5.5 - Solving Equations Involving Absolute Value

Expressions with absolute values define an upper and lower range in which a value must lie. Expressions involving absolute value can be evaluated using the given value for the variable. For example, if a survey on the reading habits of people in the US resulted in 46% of people reading popular fiction, with an error of $\pm 3\%$, what percent of people could read popular fiction?

1.) Evaluate $|m+6|-14$ if m = 4.



2.) Evaluate $23-|3-4x|$ if x = 2.

3.) The margin of error in the example at the top of the page is an example of absolute value. Graphically represent the percentage of people that read popular fiction.

4.) Solve for x: $|x|=4$

Solve each equation. Then, graph the solution set.

5.) $|f+5|=17$

6.) $|b+1|=-3$

7.) Write an equation involving absolute value for a solution set of $\{11,19\}$.

8.) Solve: $|2x-3|-4=3$.

9.) Solve $|3x+2|=4x+5$.

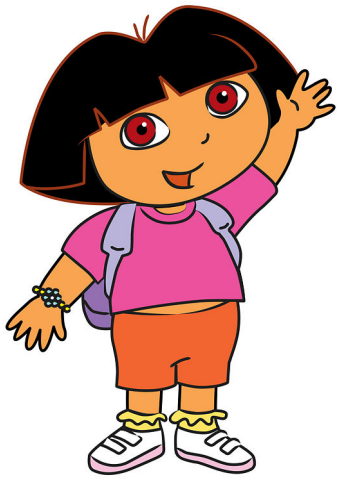
Notes 5.6 - Solving Inequalities Involving Absolute Value

1.) Consider the inequality $|x| \leq 4$. What values of x satisfy the inequality?

2.) Consider the inequality $|x| \geq 4$. What values of x satisfy the inequality?

Solve the following inequalities:

3.) $|x - 3| \leq 5$

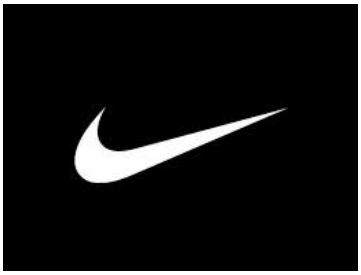


4.) $|x - 20| > 5$

5.) $|3 + x| - 4 < 0$

6.) $5 < |x + 1| < 7$

7.) $|x + 4| > -3$



8.) $|x + 1| < -6$

9.) At the Brooks Graphic Company, the average starting salary for a new graphic designer is $37,600, but the actual salary could differ from the average by as much $2590.

a.) Write an absolute value inequality to describe this situation.

b.) Solve the inequality to find the range of the starting salaries.