Algebra 1: Unit 4 Problem Set C

Mr. Chamberlain

Name _____SELECTED ANSWERS_____

Date _____ Period _____

SHOW YOUR WORK for each of the problems.

USE A RULER FOR ALL GRAPHS!

FYI

THE INCREDIBLE GROWING LINEAR EQUATIONS TOOLKIT!!

When presented with a linear equation in the form $Ax + By = C$ (a.k.a. "standard form") such as:

$$2x - 3y = 12$$

we should now feel comfortable with **three options** available to graph the equation.

a) The "intercepts" method. Simply set up a quick *x*-*y* table ("tic-tac-toe" style) and find the *x*- and *y*- intercepts by substituting 0 for each variable and solving for the other. Two points make a line, right??!!

x	***y***
0	
	0

b) Solve for "*y*=" which we should now recognize as "slope-intercept" form. This method will yield the ***y*-intercept** (an easily graph-able point) and the **SLOPE**, which we can use to ***STAIR STEP*** your way through the coordinate plane using the y-intercept as the starting point.

$$y = mx + b$$

n.b. this should be committed to memory by now...

c) … or we can "grunt it out" using an *x*-*y* table of values and picking a sampling of *x* values that will yield corresponding *y* values. But why use this method when we, as able-minded mathematicians, can use method 1) or 2) above? Remember to pick positives and negative x values if you use this method.

x	$y = \frac{2}{3}x - 4$	***y***	***(x , y)***
-6			
-3			
0			
3			
6			

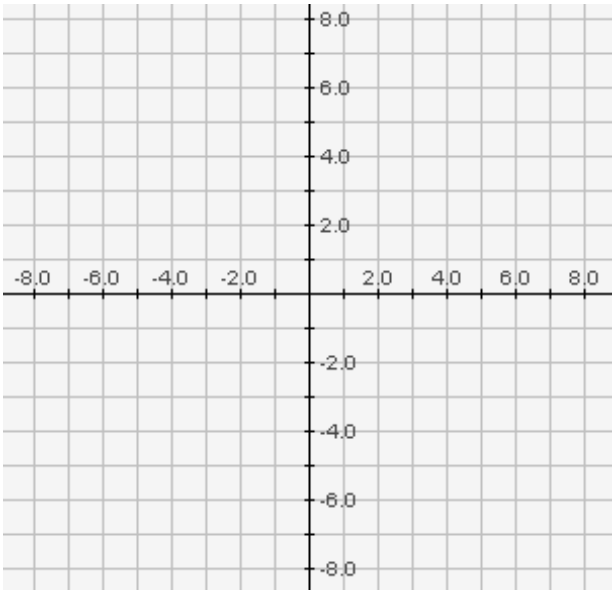
You **MUST** be comfortable with all three of these options as we move forward in our coursework. Ask your table-mates or your friendly neighborhood Algebra teacher if you have any questions.

Cuz, some funky stuff awaits. Turn the page!!

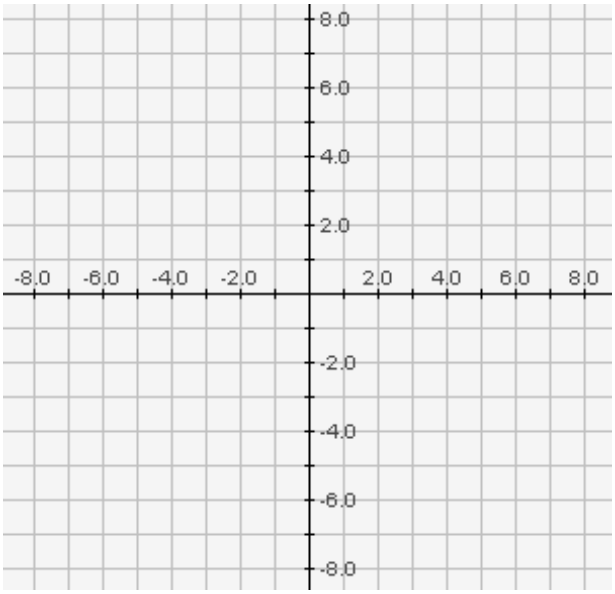
1. Use a table of values to graph:

a) $y = |x|$

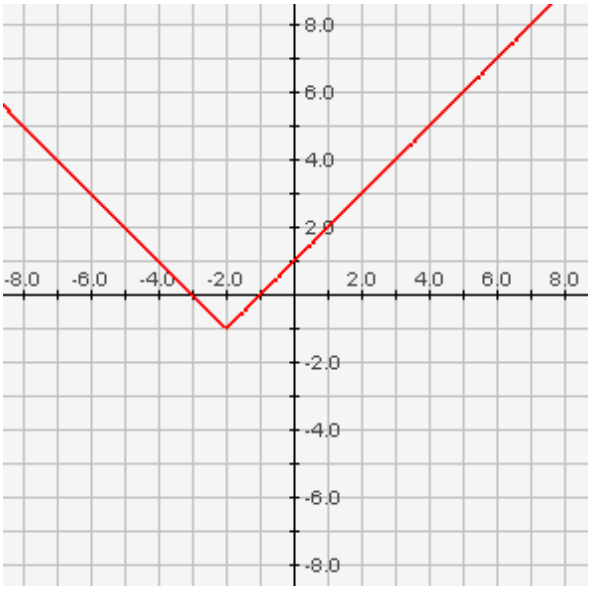
x		y	(x, y)



b) $y = -|x|$

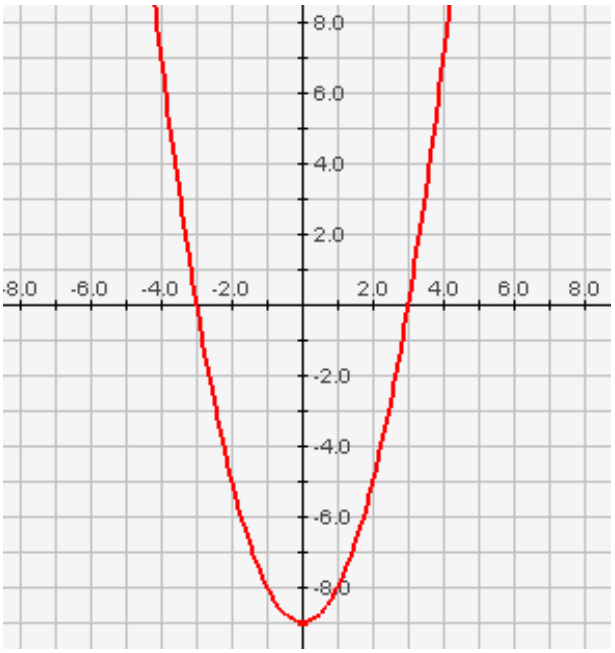


c) $y = |x+2| - 1$

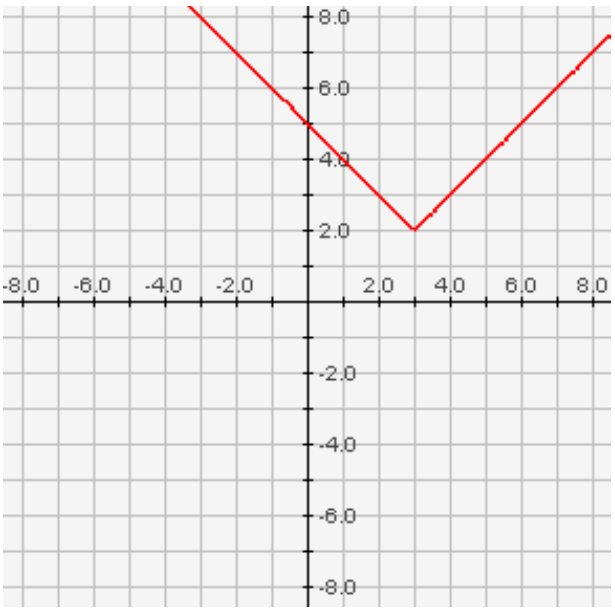


2. Use a table of values to graph:

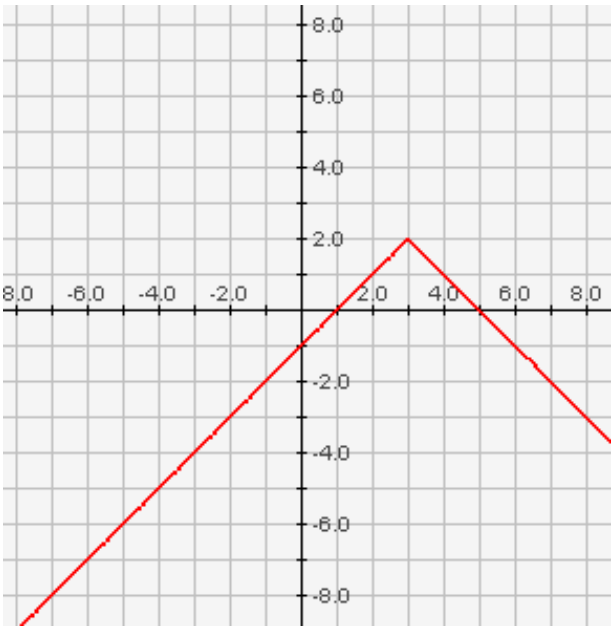
a) $y = x^2 - 9$



b) $y = |x - 3| + 2$



c) $y = -|x - 3| + 2$



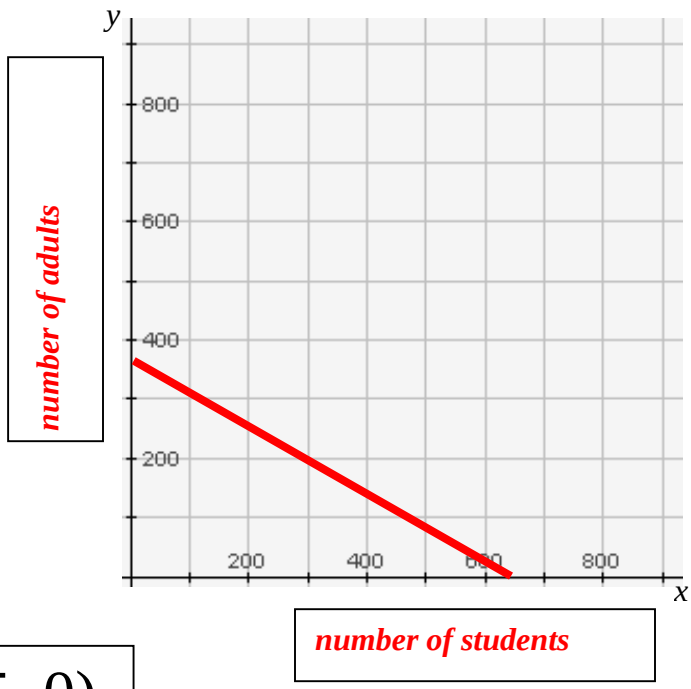
3. Last Friday night, a total of $1875 was paid at the gate of the high school football game. Student tickets were sold for $3.00 and adult tickets for $5.00.

Hint: *You'll be writing an equation in standard form. WHAT is equal to $1875?*

a) Write an equation that describes this situation in terms of number of students, *x*, and number of adults, *y*.

$$3x + 5y = 1875$$

b) Using your equation, find the *x*- and *y*-intercepts. Sketch a graph of the line that shows ALL of the possible combinations of ticket sales to students and adults. LABEL THE AXES accordingly.



$$x-\text{intercept} \quad (625, 0)$$
$$y-\text{intercept} \quad (0, 375)$$

c) Convert the equation to slope-intercept form:

$$y = -\frac{3}{5}x + 375$$

d) In the context of this problem, use your own words to describe the meaning of the:

x-intercept: ***this represents the possibility that the attendance at the game was ALL students and NO adults***

y-intercept:

Recall $\text{Slope} = \dfrac{\text{RISE}}{\text{RUN}} = \dfrac{\text{vertical change}}{\text{horizontal change}} = m = \dfrac{y_2 - y_1}{x_2 - x_1}$

The slope of a **HORIZONTAL** line is always = 0.

The slope of a **VERTICAL** line is undefined.
n.b. remember, division by zero is a no-no!

A line with a ***positive*** slope ***rises*** from left to right in the coordinate plane.

A line with a ***negative*** slope ***falls*** from left to right in the coordinate plane.

4. Find the slope of the lines through the following pairs of points.
Label all of your $(x_1, y_1) \& (x_2, y_2)$'s.

a) $(3, 6)$ $(-4, 27)$

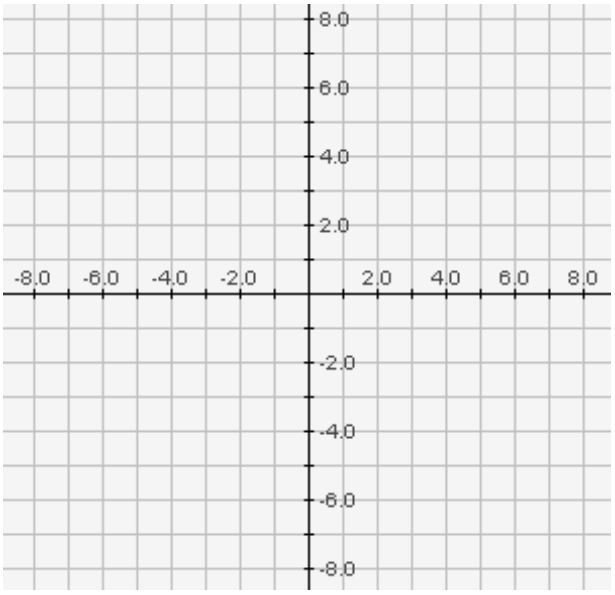
$$\frac{27-6}{-4-3} = \frac{21}{-7} = -3$$

b) $(23, -56)$ $(-17, 144)$

$$\frac{144-(-56)}{-17-23} = \frac{200}{-40} = -5$$

c) $(2, -\frac{1}{4})$ $(7, \frac{5}{4})$

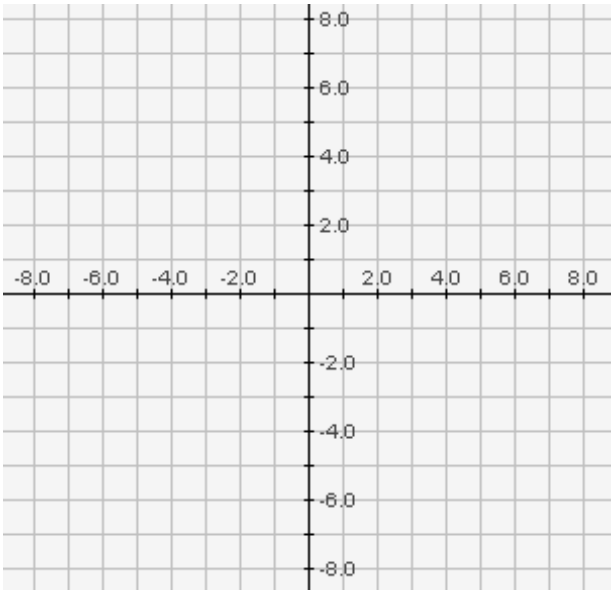
$$\frac{\frac{5}{4}-(-\frac{1}{4})}{7-2} = \frac{\frac{6}{4}}{5} = \frac{6}{20} = \frac{3}{10}$$



5. Find the slope of the lines through the following pairs of points.
Label all of your $(x_1, y_1) \& (x_2, y_2)$'s..

a) $(4, -3)$ $(-11, -3)$

Horizontal Line y=-3: Slope = 0

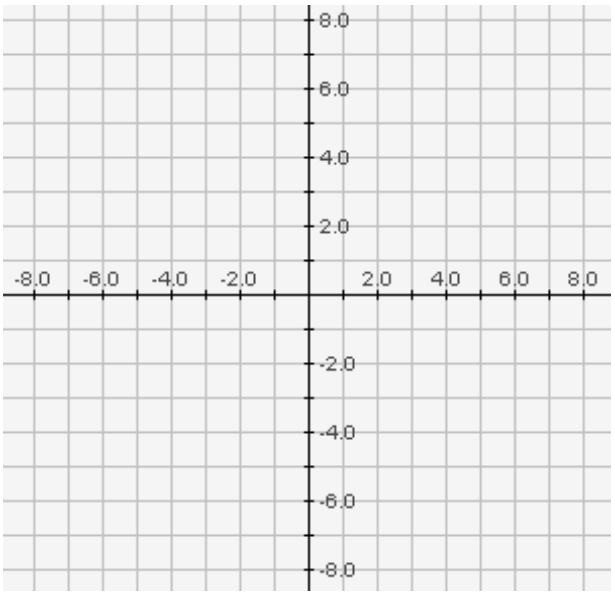


b) $(-8, -9)$ $(-8, 7)$

Vertical Line x=-8: Slope is undefined

c) $(-3, -\frac{2}{7})$ $(-3, \frac{3}{4})$

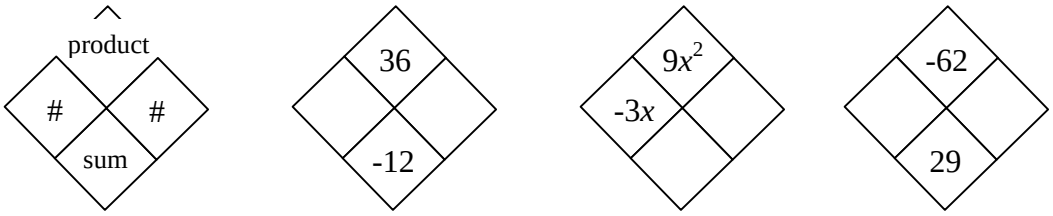
Vertical Line x=-3: Slope is undefined



d) $(-\frac{3}{5}, 6)$ $(-3, 6)$

Horizontal Line y=6: Slope = 0

6. Solve each of the following diamond problems:



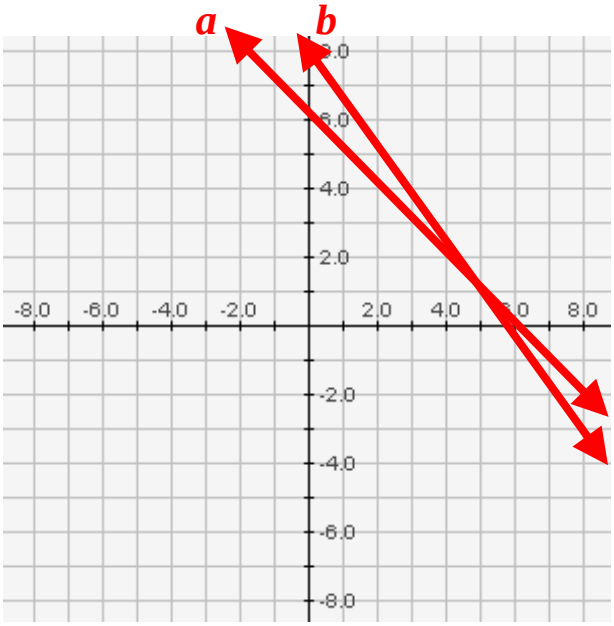
7. Sketch a graph of the following equations using the "intercepts" method.

a) $x + y = 6$

$x-$intercept (6, 0)
$y-$intercept (0, 6)

b) $4x + 3y = 24$

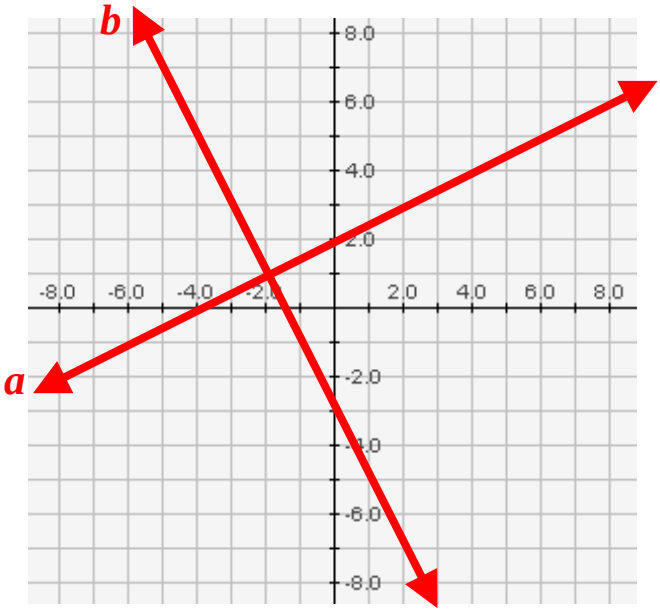
$x-$intercept (6, 0)
$y-$intercept (0, 8)



8. Sketch a graph of the following equations using slope-intercept method.

a) $y = \frac{1}{2}x + 2$

b) $y = -2x - 3$



9. Evaluate: $6\left[4^2-2(3+2)\right]\div 3+3^2$

= 21

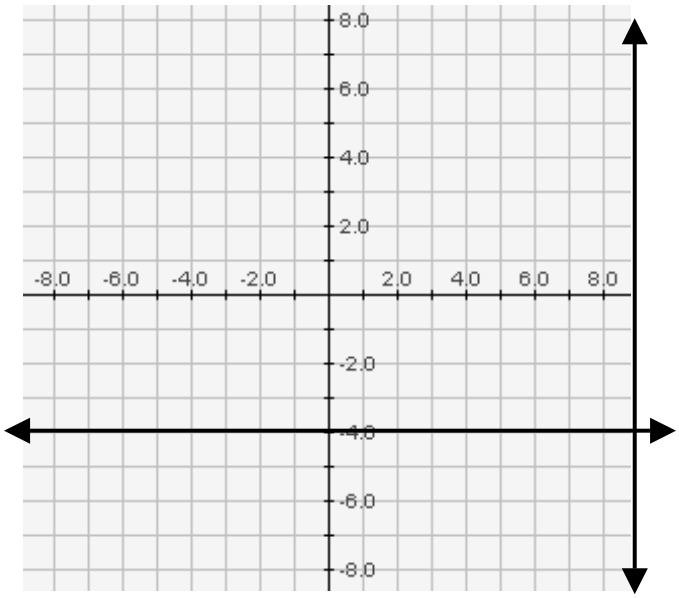
10. Write the equations of the horizontal and vertical lines passing through the point (9, -4). Identify the slope of each line.

Vertical Line Equation: $x=9$

Vertical Line Slope: Undefined

Horizontal Line Equation: $y=-4$

Horizontal Line Slope: m=0



11. Frelinghuysen Middle School raised $1664 selling t-shirts and sweatshirts as a fundraiser. If t-shirts sold for $8 and sweatshirts sold for $16, write an equation that describes this fundraising effort. Sketch a graph that shows ALL of the possible combinations of t-shirt and sweatshirt sales.

a) Write an equation that describes this situation in terms of the possible number of t-shirts sold, x, and possible number of sweatshirts sold, y.

$$8x + 16y = 1664$$

b) Using your equation, find the x- and y-intercepts. Sketch a graph of the line that shows ALL of the possible combinations of sales of t-shirts and sweatshirts that could be sold to earn the $1660. LABEL THE AXES accordingly.

$x-$intercept (208, 0)

$y-$intercept (0, 104)

c) Convert the equation to slope-intercept form:

$$y = -\frac{1}{2}x + 104$$

d) In the terms of this problem, use your own words to describe the meaning of the:

x-intercept: ***this point represents the possibility that ALL of the sales were t-shirts and that NO sweatshirts were sold***

y-intercept: ***this point represents the possibility that ALL of the sales were sweatshirts and that NO t-shirts were sold***