

# Algebra 1: Unit 4 Problem Set C

Mr. Chamberlain

Name \_\_\_\_\_

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			

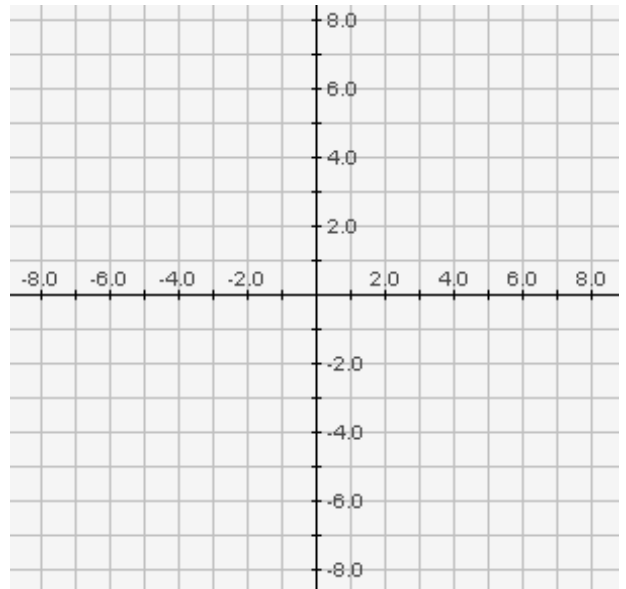
You **MUST** be comfortable with all three of these options as we move forward in our coursework. Ask your table-mates or your friendly neighborhood Algebra teacher if you have any questions.

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

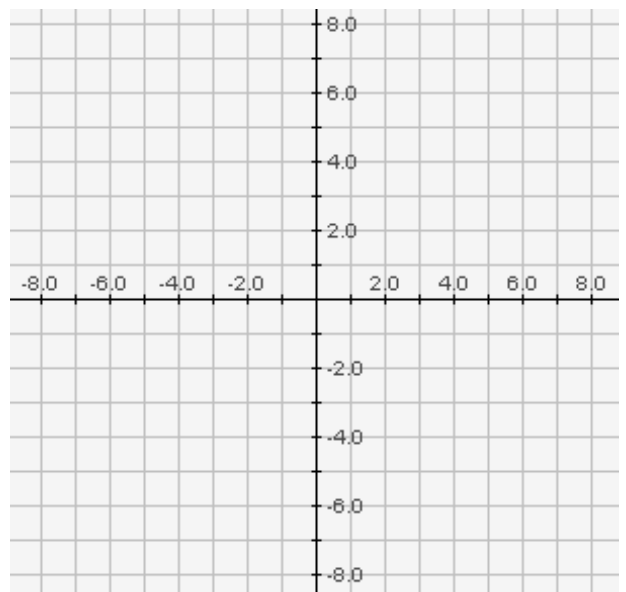


2. Use a table of values to graph:

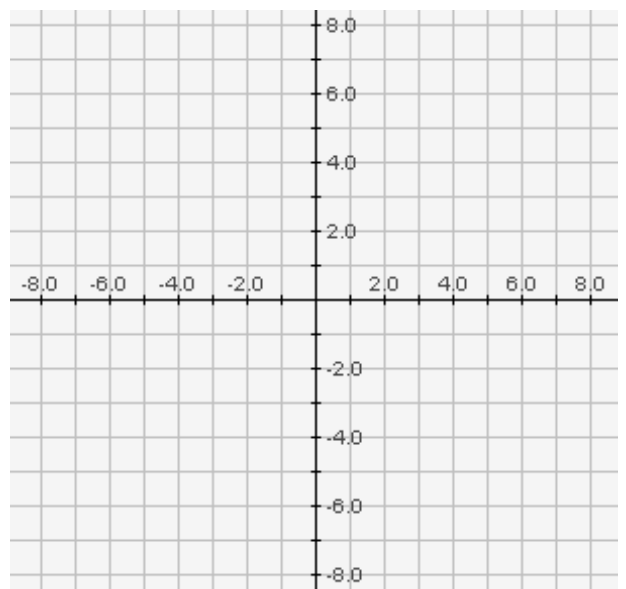
a)  $y = x^2 - 9$



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



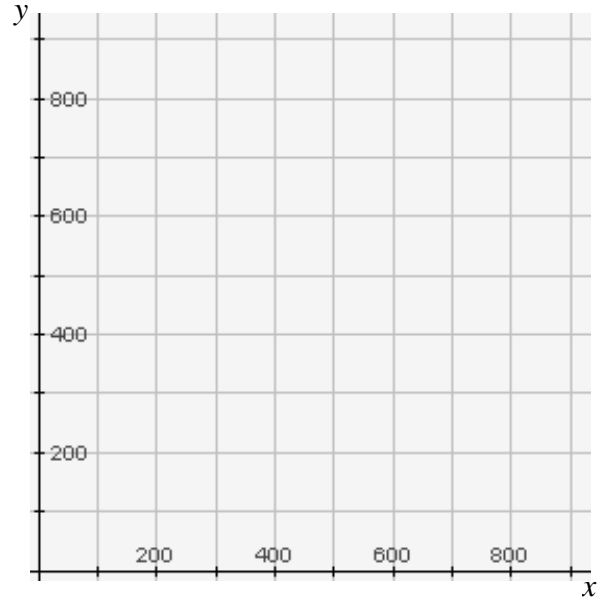
c)  $y = -|x - 3| + 2$



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,  $y$ .
- 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.



- c) Convert the equation to slope-intercept form:
- d) In the context of this problem, use your own words to describe the meaning of the:
- $x$ -intercept:
- $y$ -intercept:

**Recall**

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

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.

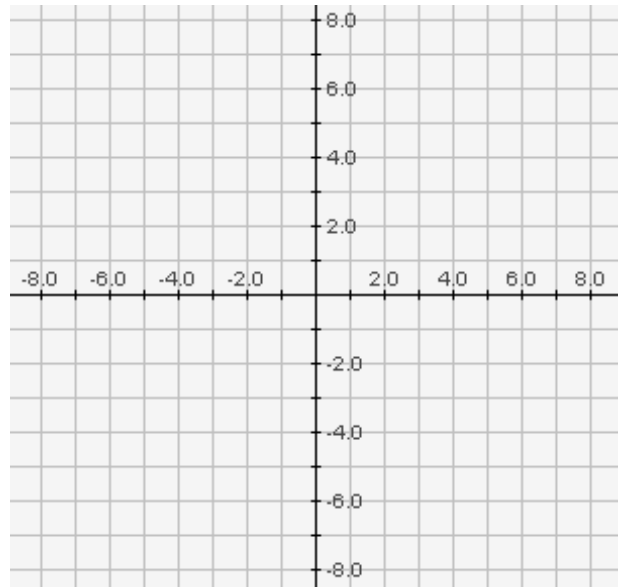
A line with a *negative* slope *falls* from left to right in the coordinate plane.

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

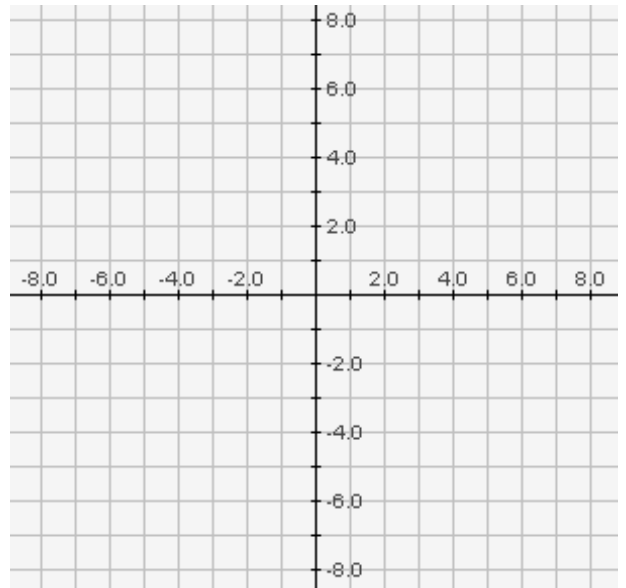
b)  $(23, -56)$   $(-17, 144)$

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

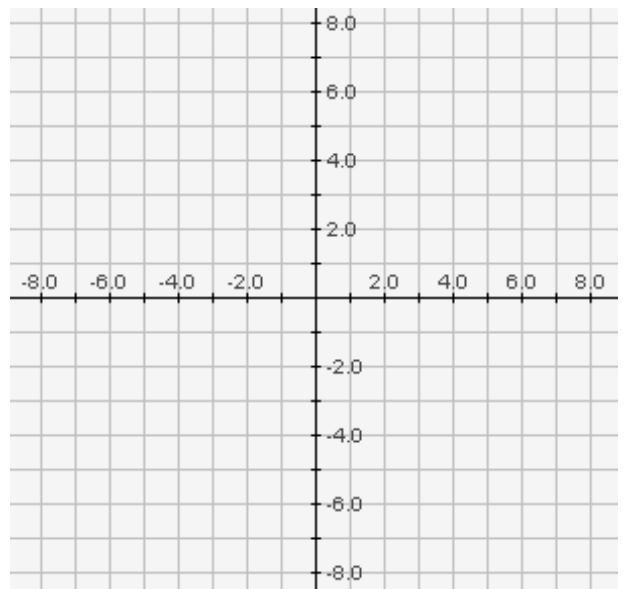


5. Find the slope of the lines through the following pairs of points.  
Label all of your  $(x_1, y_1)$  &  $(x_2, y_2)$ 's.

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



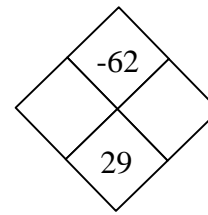
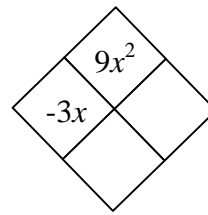
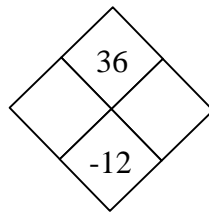
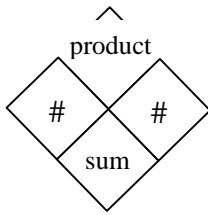
b)  $(-8, -9)$   $(-8, 7)$



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

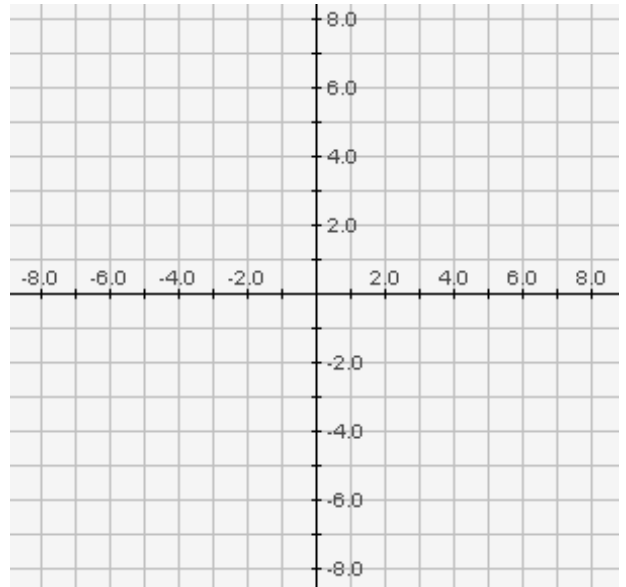
d)  $(-\frac{3}{5}, 6)$   $(-3, 6)$

6. Solve each of the following diamond problems:



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

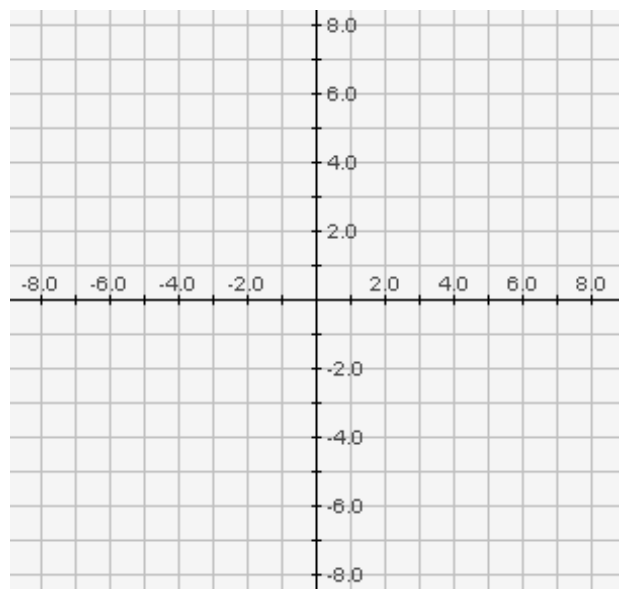
a)  $x + y = 6$



b)  $4x + 3y = 24$

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

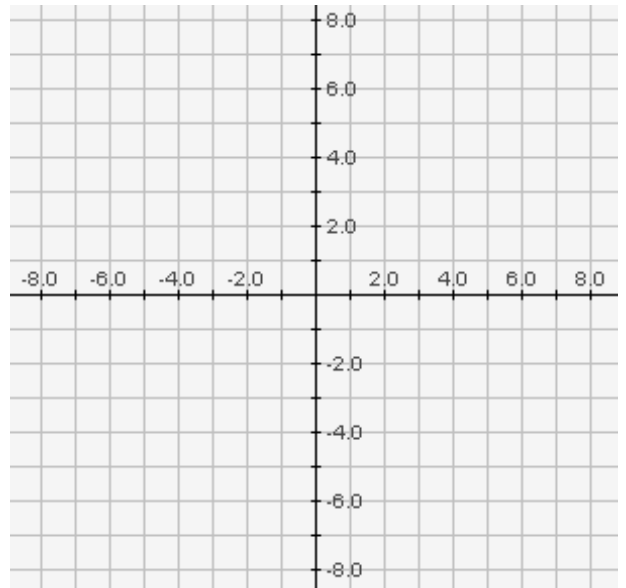
a)  $y = \frac{1}{2}x + 2$



b)  $y = -2x - 3$

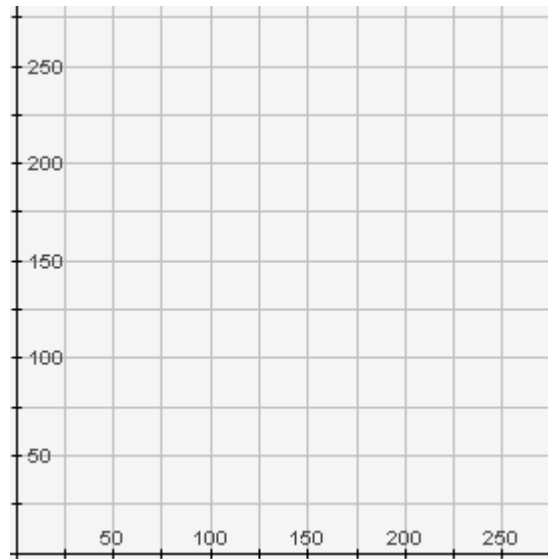
9. Evaluate:  $6[4^2 - 2(3 + 2)] \div 3 + 3^2$

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



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,  $y$ .
- 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.



- c) Convert the equation to slope-intercept form:
- d) In the terms of this problem, use your own words to describe the meaning of the:
- $x$ -intercept:
- $y$ -intercept: