PA Notes Name: _____
Week 10: 8.2 / 8.3

LINEAR EQUATIONS IN TWO VARIABLES 8.2

Vocab:

- $2x - y = 5$ is an example of an equation in two _____.
- The _____ of an equation in x and y is an ordered pair (____,____) that produces a true statement when the _____ of x and y are substituted into the equation.

Example 1: Checking Solutions -- You can check to see if an ordered pair is a _____ by substituting in the x and y value into the equation. Check to see if it makes a true statement.

1. Tell whether the ordered pair is a solution of $2x - y = 5$

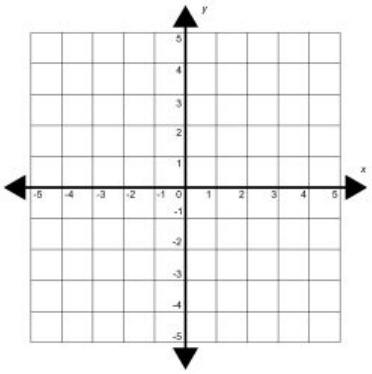
   a. (1 , -3) b. (4 , 7)

Example 2: Graphing a Linear Equation -- If you graph solutions of the equation in two variables and the graph forms a _____, then the equation is called a **linear equation**.

1. Graph $y = 2x - 1$

   Step 1: Make a table of solutions:

x					
y					



Step 2: Choose 2 negative numbers, zero, and 2 positive numbers for x.

Step 3: Substitute your values for x in the equation to find each y value.

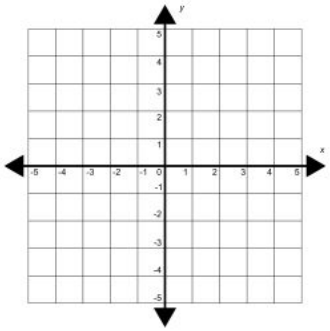
Step 4: List the solutions as ordered pairs: _____

Step 5: Graph the ordered pairs. Connect the points. This line is the graph of $y = 2x - 1$

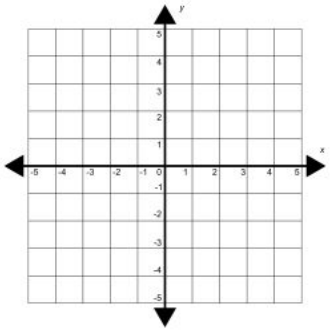
Example 3: Graphing Horizontal and Vertical Lines

1. Graph $y = 3$ and $x = -2$

   a. The graph of the equation $y = 3$ is a _____ line through (0 , 3). It means that no matter what value x equals, y will always be 3.

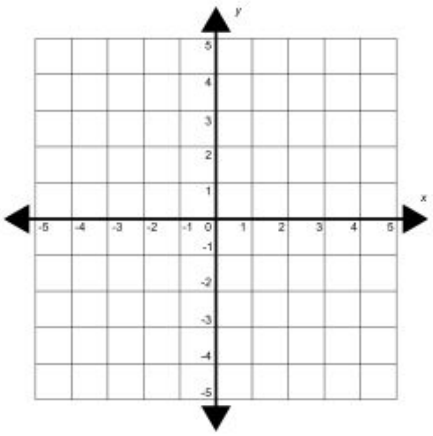
   b. The graph of the equation $x = -2$ is a _____ line through (-2 , 0). It means that no matter what value y equals, x will always be -2.

Example 4: Writing an Equation in Function Form -- Function form is when an equation is solved for _____. It is helpful to put an equation in function form before graphing it. In general, a linear equation is a function **unless** its graph is a _____ line. (Ex. 3, b.)

1. Write $x + 2y = 6$ in function form. Then graph the equation.
   a. Step 1: Solve for y

   b. Step 2: To graph, use its function form to make a table of solutions. Then graph the points from the table and draw a line through the points.



x					
y					

Practice:

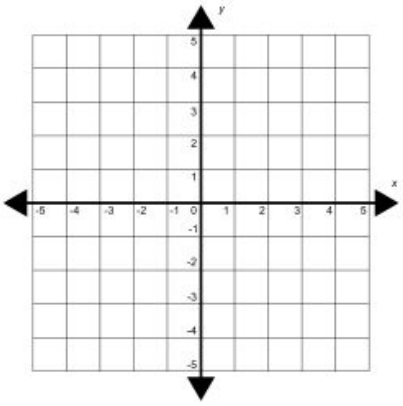
1. Tell whether the ordered pair is a solution of $3x + 2y = -8$

   a. (0 , 4) b. (-2 , -1) c. (10 , -19)

2. Graph the equations:

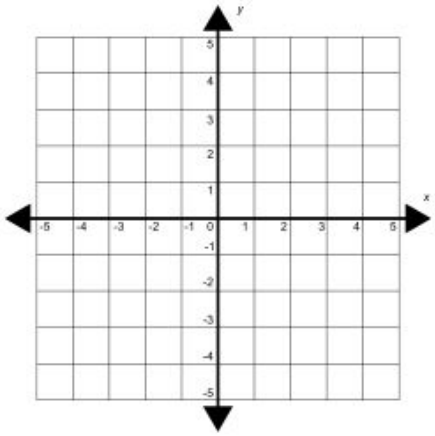
   a. $y = 2x$

x					
y					



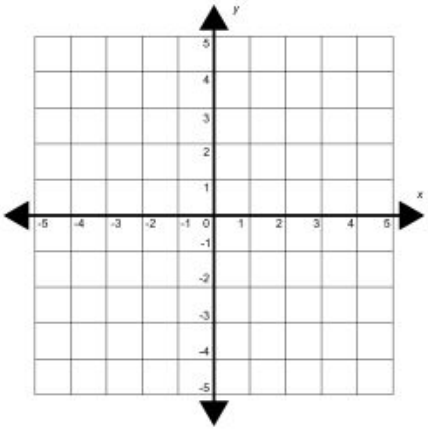
   b. $y = -x + 3$

x					
y					



   c. $y = \frac{1}{2}x + 1$

x					
y					

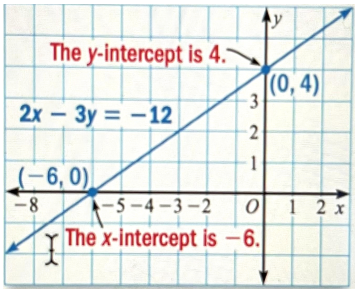


USING INTERCEPTS 8.3

Vocab:

1. x-intercept: the x-coordinate of a point where the _____ crosses the ____-axis
2. y-intercept: the y-coordinate of a point where the _____ crosses the ____-axis

* In the graph, $2x - 3y = -12$ is graphed.
  Where it crosses the x-axis is the *x-intercept*
  and where it crosses the y-axis is the *y-intercept*.



** Finding Intercepts **

To find the x-intercept:	Substitute _____ in for y in the equation and solve for _____
To find the y-intercept:	Substitute _____ in for x in the equation and solve for _____

Example 1: Finding Intercepts of a Graph

1. Find the intercepts of the graph of $3x - 2y = 6$

   a. To find the x-intercept, let y = 0 and solve for x

      Step 1: Write the equation

      Step 2: Substitute 0 for y

      Step 3: Solve for x

      Step 4: The x-intercept is _____

   b. To find the y-intercept, let x = 0 and solve for y

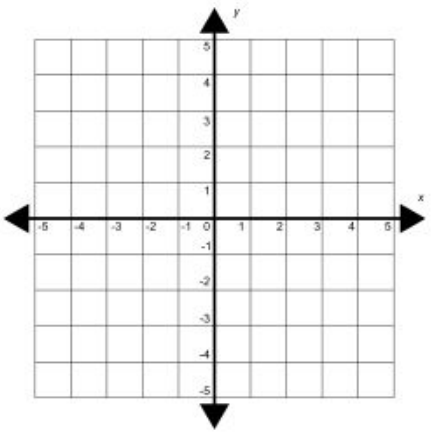
      Step 1: Write the equation

      Step 2: Substitute 0 for x

      Step 3: Solve for y

      Step 4: The y-intercept is _____

Example 2: Using Intercepts to Graph a Linear Equation



1. Graph the equation $3x - 2y = 6$ from Example 1.

   The x-intercept is _____, so plot the point (____,____)

   The y-intercept is _____, so plot the point (____,____)

   Draw a line through the points.

Example 3: Writing and Graphing an Equation -- You are canoeing along a 12 mile stretch of river. You travel 4 miles per hour when paddling and 2 miles per hour when drifting. Write and graph an equation describing your possible paddling and drifting times for the trip. Give 3 possible combinations of paddling and drifting times.

1. To write an equation, let x be the paddling time and y be the drifting time. Let's see it written verbally:

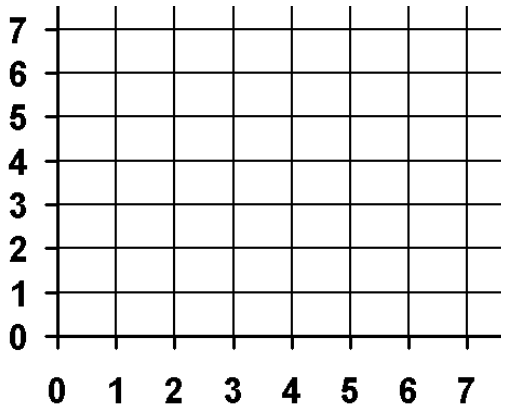
<u>Paddling distance</u>				<u>Drifting distance</u>				
paddling rate	•	paddling time	+	driving rate	•	drifting time	=	total distance

   Now write an equation from this: _____

2. To graph the equation, find and use the intercepts:

   Find the x-intercept:
   4x + 2**y** = 12

   Find the y-intercept:
   4**x** + 2y = 12



3. Three points on the graph are

   (____, ____) -- not paddle at all and drift for 6 hours

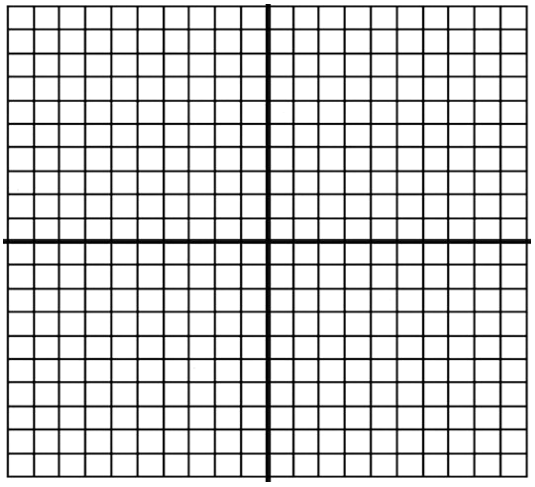
   (____ , ____) -- paddle for 2 hours and drift for 2 hours

   (____ , ____) -- paddle for 3 hours and not drift at all

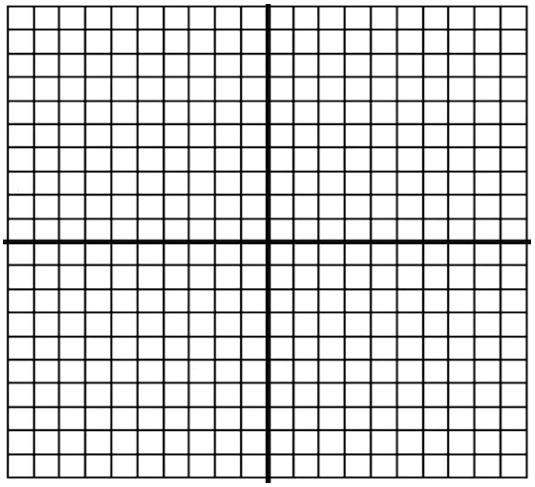
Practice:

1. Find the intercepts of the equations graph. Then graph the equation.

a. $x - 2y = -2$



b. $4x + 3y = 12$



c. $y = -2x - 8$