

Monday, February 3, 2020

Graphing Linear Relationships Review

The Equation of a Line:

Standard Form: $Ax + By + C = 0$
*A has to be a positive whole number.

Slope - y - Intercept Form: $y = mx + b$
(x, y) - any point on the line
m - slope
b - y - intercept



Why do we need to graph??

Graphing gives us a visual representation of the relation that we are working with. It can help us to judge the reasonableness of an answer, and in many cases it can help us to find the correct answer more efficiently. Specifically for this class, being able to graph will reduce the chances of algebraic errors because it eliminates the need to 'memorize' formulas and lets you see WHY you are doing what you are doing. Give it a chance!

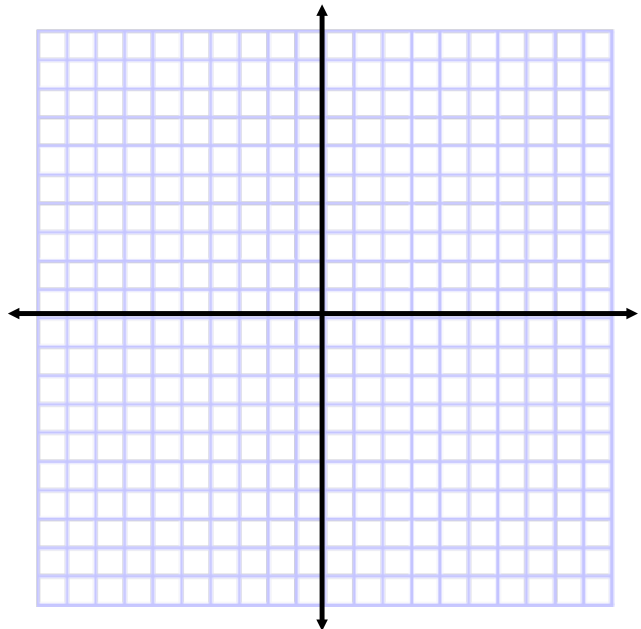
A Quick Review of the Cartesian Plane

Label the x and y axes.

Plot the following points.

$(-2, 2)$, $(5, -6)$, $(7, 1)$, $(-4, -1)$

- You MUST place brackets around ordered pairs
- Ordered pairs are always listed alphabetically (x, y)
- $(0, 0)$ is also called the origin



Approaches to Graphing

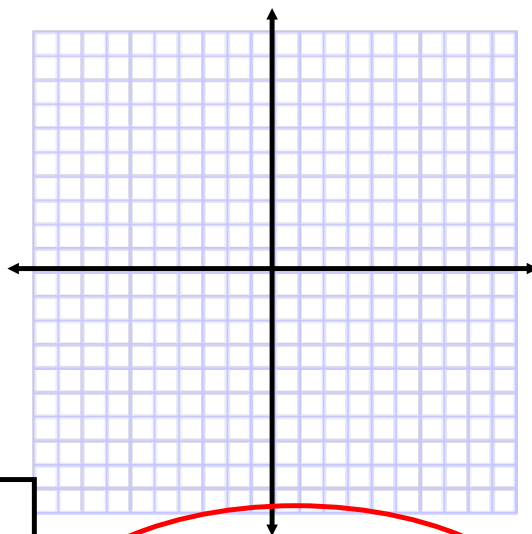
1) Table of Values

- Substitute values of your choice (usually -2, -1, 0, 1, 2) in for x in the equation.
- Solve the equation for y. (Remember, this means do BEDMAS backwards!)
- Place the x and y values together to form an ordered pair, (x, y).
- Plot the ordered pairs on your grid.

Example:

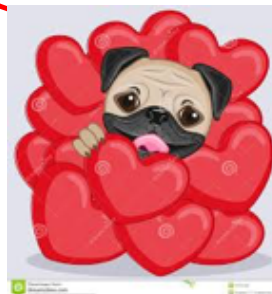
Graph $3x + 2y = 4$ using a table of values.

x	y	(x, y)



Rough Work:

First Differences are equal for linear relationships - so your y-values will follow an addition/subtraction pattern!

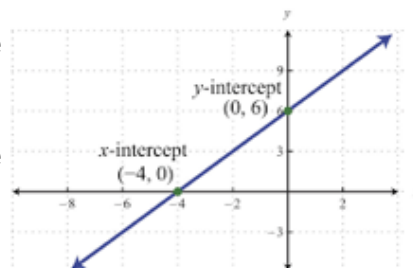


2) Using x and y - Intercepts

This is much faster than a table of values if you are dealing with a linear relation.

x - intercept - the point where a graph crosses the x - axis ($y = 0$)

y - intercept - the point where a graph crosses the y - axis ($x = 0$)

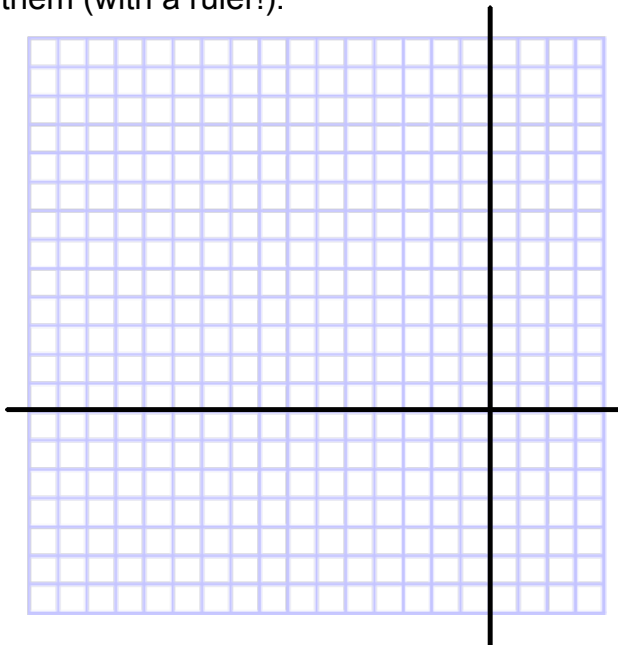


To graph using this information:

- Find the x - intercept by letting $y = 0$ in the equation of the line. **This gives you a point, $(a, 0)$.**
- Find the y - intercept by letting $x = 0$ in the equation of the line. **This gives you a point, $(0, b)$.**
- Plot the two points and connect them (with a ruler!).

Example:

Graph $3x - 9y = -36$ using intercepts.



3) Using Slope and the y - Intercept

ALWAYS do this if your equation is of the form $y = mx + b$.

To graph using slope and y - intercept:

- Rearrange the equation so that it is in $y = mx + b$ form (if necessary). Remember that terms switch signs if they switch sides!
- Plot the y - intercept (0, b).
- Count out the slope ($m = \frac{\text{rise}}{\text{run}}$) from this point.
- Plot a point there and connect it to the y-intercept.

Example: Rewrite each equation in slope y - intercept form, and then graph the line.

a) $-9x + 3y = 18$

b) $-2y = x + 8$

Food for Thought:

1. Graph $y = 4$. What type of line is this?

2. Graph $x = -2$. What type of line is this?

3. Draw a horizontal line with a y-intercept of 3. What is its equation?

4. Draw a vertical line with an x-intercept of -4. What is its equation?

