Lesson 7: Graphing Linear equations in 2 variables by setting up a table of values

What is an equation in 2 variables?
- There are 2 unknowns, x and y

ex: $3x = y + 5$

★ notice, we can find what one variable is in terms of the other. Conventionally, we find y in terms of x

So...

$3x = y + 5$
$-5 \quad -5$
$3x - 5 = y$

Here y depends on x since it is in terms of x. So y is called dependent variable.

x is thus independent.

Why do we do this?
- We graph on our coordinate system, for which we need to know the x and y coordinates of each point. Thus, x can be anything (independent) and the corresponding y can be calculated from the equation.

ex: $y = 5x - 9$

if $x = 0$, $y = 5(0) - 9 = 0 - 9 = -9$

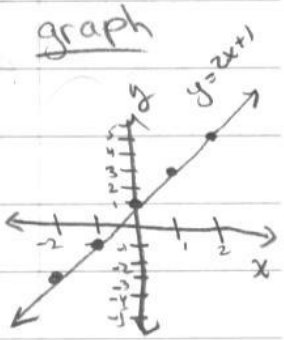
So our point is $(x, y) = (0, -9)$

A table of values is just a few x-values and their corresponding y-values. To graph a line, we only need 2 points, but to make sure we're correct, let's try 5.

ex. $y = 2x + 1$

x	$y = 2x+1$	y	points
-2	$y = 2(-2)+1 = -3$	-3	$\rightarrow (-2,-3)$
-1	$y = 2(-1)+1 = -1$	-1	$\rightarrow (-1,-1)$
0	$y = 2(0)+1 = 1$	1	$\rightarrow (0,1)$
1	$y = 2(1)+1 = 3$	3	$\rightarrow (1,3)$
2	$y = 2(2)+1 = 5$	5	$\rightarrow (2,5)$

graph



although it doesn't matter which x-values you use, since our axes are centered at 0, I make my values centered at 0 too.

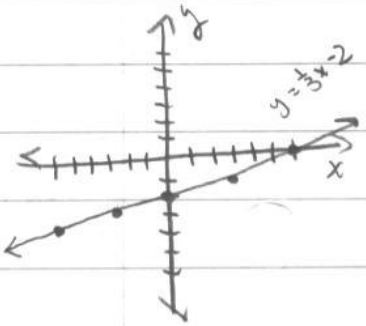
Why do we connect the points? There are y values for x values that we didn't list.

* A graph is the set of all points that satisfy our equation.

ex: $y = \frac{1}{3}x - 2$

x	$y = \frac{1}{3}x - 2$	y	points
-6	$y = \frac{1}{3}(-6) - 2 = -4$	-4	$\rightarrow (-6,-4)$
-3	$y = \frac{1}{3}(-3) - 2 = -3$	-3	$\rightarrow (-3,-3)$
0	$y = \frac{1}{3}(0) - 2 = -2$	-2	$\rightarrow (0,-2)$
3	$y = \frac{1}{3}(3) - 2 = -1$	-1	$\rightarrow (3,-1)$
6	$y = \frac{1}{3}(6) - 2 = 0$	0	$\rightarrow (6,0)$

graph



recall $\frac{1}{3}x$ is the same as x divided by 3. Since x can be anything, pick values that are divisible by 3 to avoid dealing with fractions

ie: $\frac{1}{3}(6) = \frac{6}{3} = 2$