Math 9 – Unit 7: Coordinate Geometry Name: _____

Lesson #2: Graphing Linear Relationships Date: May 13

Learning Goal: We are learning to create a table of values from a linear equation and use that table to create a list of ordered pairs that can be plotted on a coordinate grid.

Once again, we will begin with some new vocabulary:

Independent Variable
↳ a variable which acts as the input value in a relationship.
↳ it is the variable used to determine other information.
↳ the x-coordinate, x-axis

(x, y)

Dependent Variable
↳ a variable which changes based on an input value.
↳ the information you are trying to determine.
↳ y-coordinate / y-axis

Linear Relationship
A relationship between the dependent & independent variables which results in a straight line.

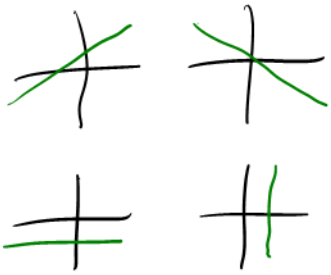


Table of Values
A table/chart used to organize the linear relationship.

The goal for today's lesson is to graph a linear relationship using this algorithm:

1. **Rearrange the equation so it is dependent variable = everything else (or y=_____)** $y = mx + b$
2. **Create a Table of Values and choose an appropriate set of x-coordinates.**
3. **Use that set and calculate the corresponding y-coordinates.**
4. **Create the point (x,y).**
5. **Plot the points.**
6. **Draw a line through the points (do not just connect them).**

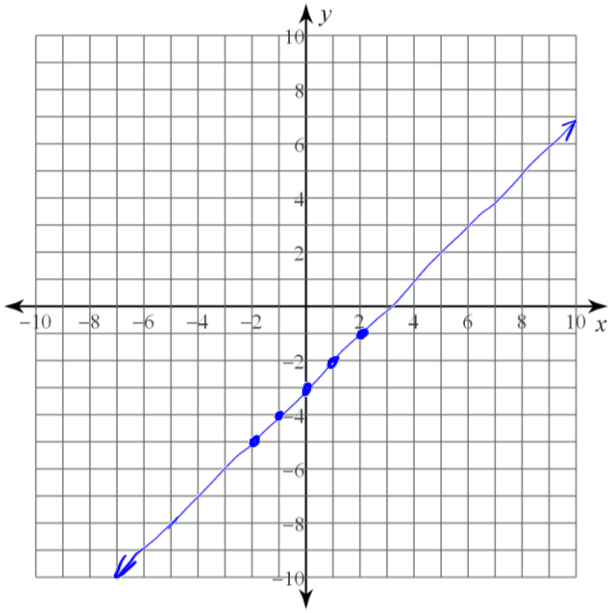
Your table of values should look like this:

x	y	(x,y)
Set of x-coordinates	Corresponding y-coordinates	Set of points to plot

Examples:

1. $y = x - 3$

x	$y = x - 3$	(x, y)
-2	$(-2) - 3 = -5$	$(-2, -5)$
-1	$(-1) - 3 = -4$	$(-1, -4)$
0	$(0) - 3 = -3$	$(0, -3)$
1	$(1) - 3 = -2$	$(1, -2)$
2	$(2) - 3 = -1$	$(2, -1)$



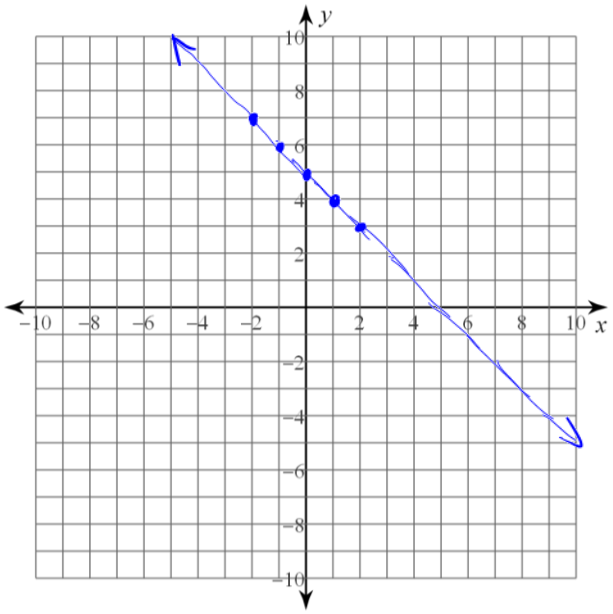
* If y is positive, leave it alone.

2. $x + y = 5$

$-x \quad -x$

$y = 5 - x$

x	$y = 5 - x$	(x, y)
-2	$5 - (-2) = 7$	$(-2, 7)$
-1	$5 - (-1) = 6$	$(-1, 6)$
0	$5 - (0) = 5$	$(0, 5)$
1	$5 - (1) = 4$	$(1, 4)$
2	$5 - (2) = 3$	$(2, 3)$



*If y is negative, move it! AND move the other stuff away.

3. $2x - y = 1$

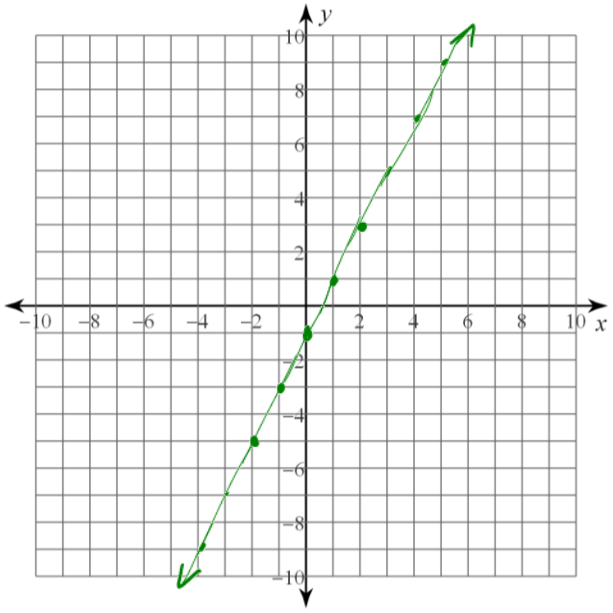
$+y \quad +y$

$2x = 1 + y$

$-1 \quad -1$

$2x - 1 = y$ OR $y = 2x - 1$

x	$y = 2x - 1$	(x, y)
-2	$2(-2) - 1 = -5$	$(-2, -5)$
-1	$2(-1) - 1 = -3$	$(-1, -3)$
0	$2(0) - 1 = -1$	$(0, -1)$
1	$2(1) - 1 = 1$	$(1, 1)$
2	$2(2) - 1 = 3$	$(2, 3)$



4. $6x + 2y - 10 = 0$

$-6x \quad -6x$

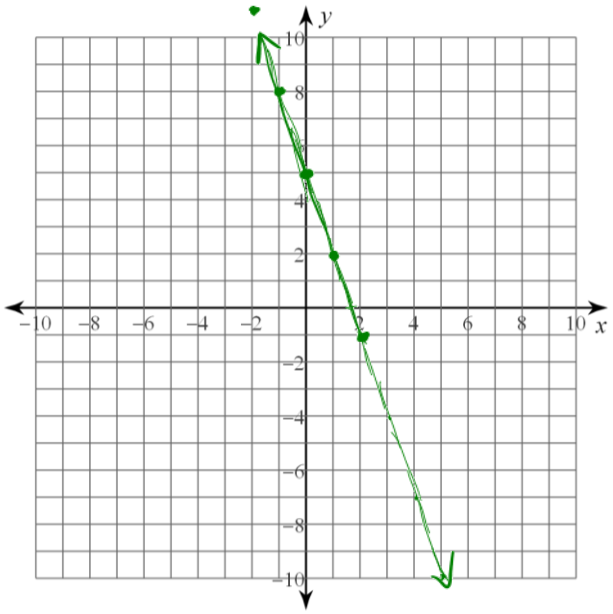
$2y - 10 = -6x$

$+10 \quad +10$

$\frac{2y}{2} = \frac{-6x + 10}{2}$

$y = -3x + 5$

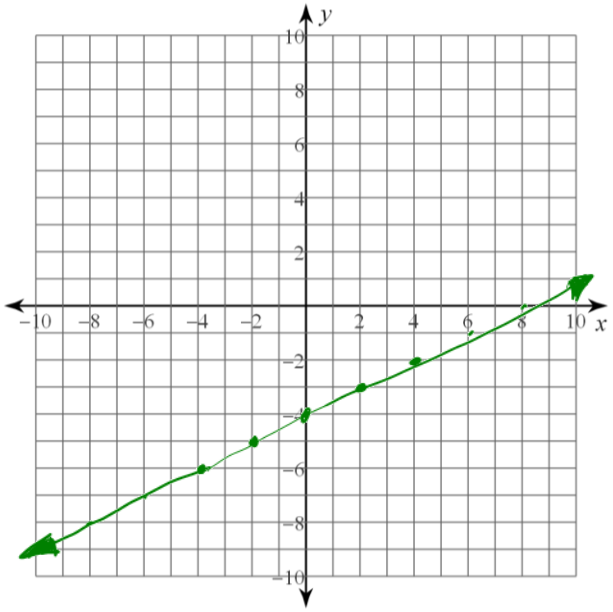
x	$y = -3x + 5$	
-2	$-3(-2) + 5 = 11$	$(-2, 11)$
-1	$-3(-1) + 5 = 8$	$(-1, 8)$
0	$-3(0) + 5 = 5$	$(0, 5)$
1	$-3(1) + 5 = 2$	$(1, 2)$
2	$-3(2) + 5 = -1$	$(2, -1)$



If there is a fraction in front of the x, multiply (-2, -1, 0, 1, 2) by the denominator. Use these as input values.

5. $y = \frac{1}{2}x - 4$

x	$y = \frac{1}{2}x - 4$	(x, y)
-4	$\frac{1}{2}\left(\frac{-4}{1}\right) - 4 = -6$	(-4, -6)
-2	$\frac{1}{2}\left(\frac{-2}{1}\right) - 4 = -5$	(-2, -5)
0	$\frac{1}{2}(0) - 4 = -4$	(0, -4)
2	$\frac{1}{2}\left(\frac{2}{1}\right) - 4 = -3$	(2, -3)
4	$\frac{1}{2}\left(\frac{4}{1}\right) - 4 = -2$	(4, -2)



6. $3x - 4y = 12$

$+4y \quad +4y$

$3x = 12 + 4y$

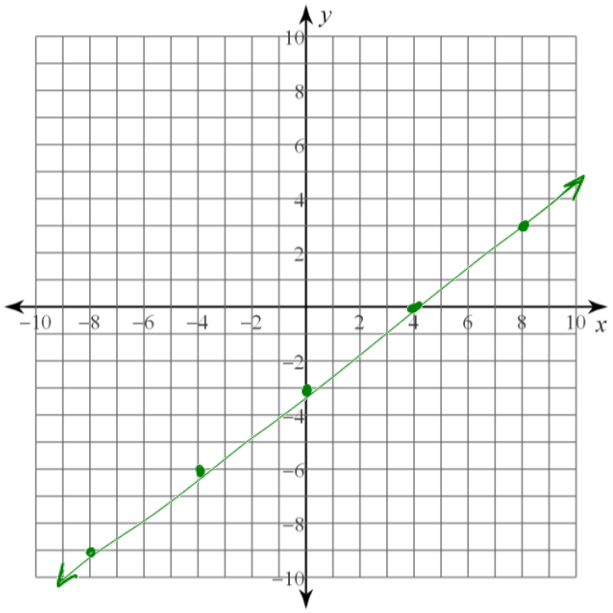
$-12 \quad -12$

$3x - 12 = 4y$

$\frac{3x}{4} - \frac{12}{4} = \frac{4y}{4}$

$\frac{3}{4}x - 3 = y$

x	$y = \frac{3}{4}x - 3$	(x, y)
-8	$\left(\frac{3}{4}\right)\left(\frac{-8}{1}\right) - 3 = -9$	(-8, -9)
-4	$\left(\frac{3}{4}\right)\left(\frac{-4}{1}\right) - 3 = -6$	(-4, -6)
0	$\left(\frac{3}{4}\right)(0) - 3 = -3$	(0, -3)
4	$\left(\frac{3}{4}\right)\left(\frac{4}{1}\right) - 3 = 0$	(4, 0)
8	$\left(\frac{3}{4}\right)\left(\frac{8}{1}\right) - 3 = 3$	(8, 3)



Success Criteria:

- I can rearrange a linear equation so that the "dependent variable = everything else"
- I can create a table of values and choose an appropriate set of x coordinates.
- I can use those x-coordinates to generate a set of y-coordinates
- I can create ordered pairs from the sets of x and y coordinates and graph my ordered pairs on a coordinate grid

y =