MTH1W – Unit 6: Coordinate Geometry

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Lesson #2: Graphing Linear Relationships

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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

- the x-variable
- the variable that affects the outcome
- the input

ex: distance to target

Dependent Variable

- the y-variable
- the result or outcome/output

ex: bullet travel time.

Linear Relationship

- a relationship between the independent and dependent variables which result in a straight line.

Table of Values

- a chart which organize the x and y-values into ordered pairs.

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=_____)**
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).**

use 2, 1, 0, -1, -2.

but sometimes we need to scale them up.

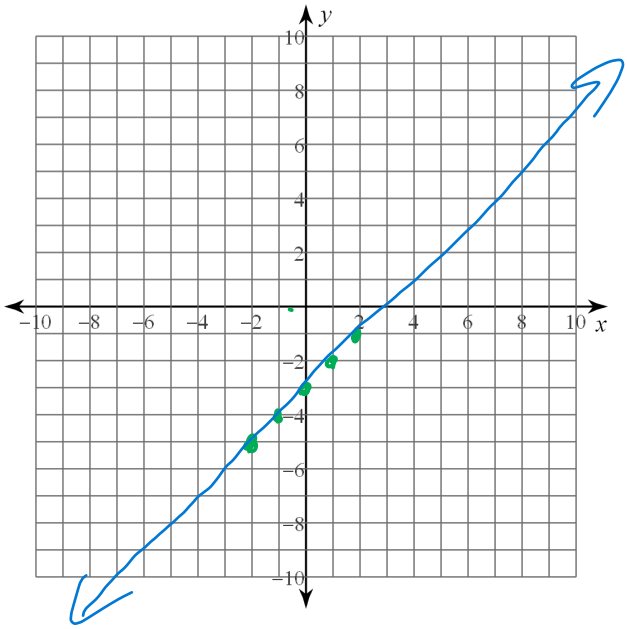
Your table of values should look like this:

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

Examples:

1. $y = x - 3$

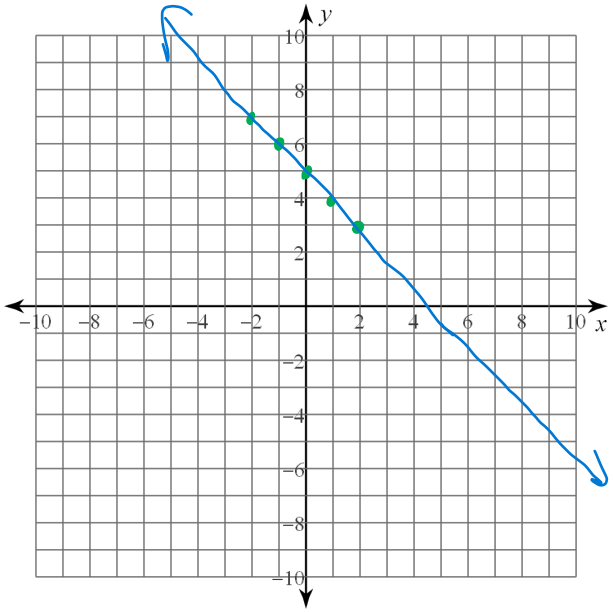
x	$y = x - 3$	(x, y)
2	$(2) - 3 = -1$	$(2, -1)$
1	$(1) - 3 = -2$	$(1, -2)$
0	$(0) - 3 = -3$	$(0, -3)$
-1	$(-1) - 3 = -4$	$(-1, -4)$
-2	$(-2) - 3 = -5$	$(-2, -5)$



2. $x + y = 5$

$y = 5 - x$ or $y = -x + 5$

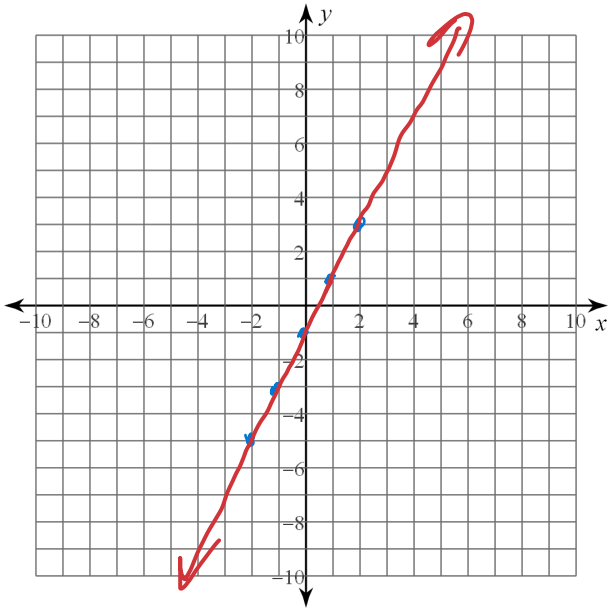
x	$y = 5 - x$	(x, y)
2	$5 - (2) = 3$	$(2, 3)$
1	$5 - (1) = 4$	$(1, 4)$
0	$5 - (0) = 5$	$(0, 5)$
-1	$5 - (-1) = 6$	$(-1, 6)$
-2	$5 - (-2) = 7$	$(-2, 7)$



3. $2x - y = 1$

$2x - 1 = y$

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

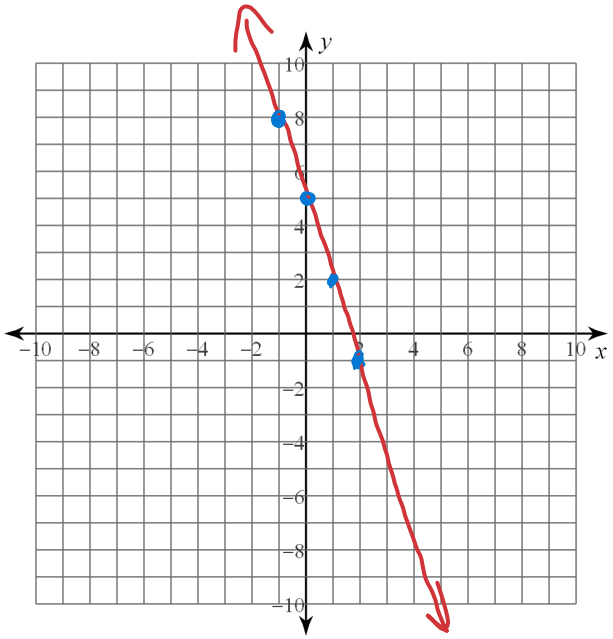


4. $6x + 2y - 10 = 0$

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

$y = -3x + 5$ or $y = 5 - 3x$

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



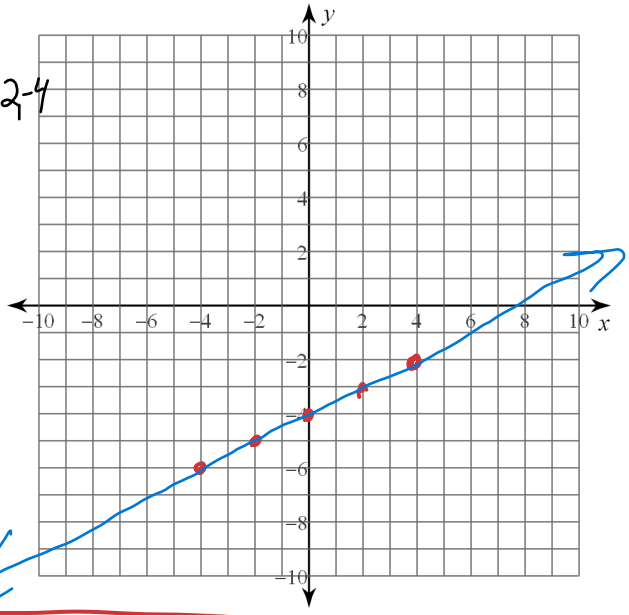
oh no!

when there is a fraction, multiply the standard x's by the denominator.

→ 2, 1, 0, -1, -2 ⇒ 4, 2, 0, -2, -4

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

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



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

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

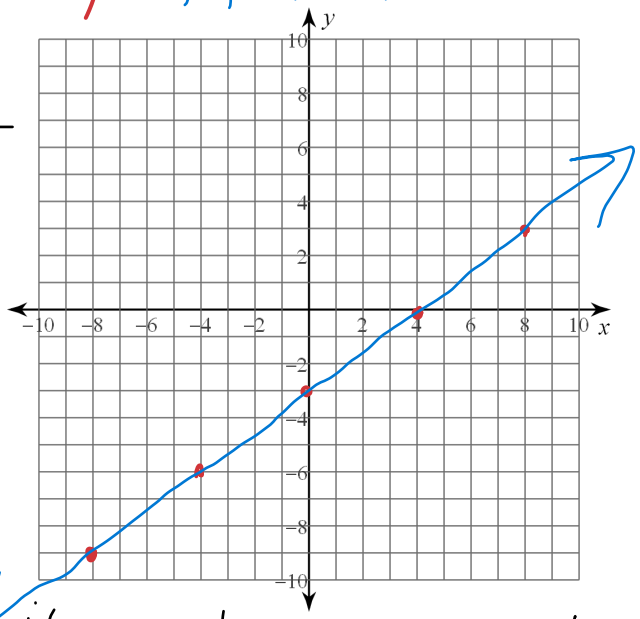
6. $3x - 4y = 12$

2, 1, 0, -1, -2

× 4

8, 4, 0, -4, -8

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



How: top times x divide bottom

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