MTH1W – Unit 6: Coordinate Geometry

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Lesson #2: Graphing Linear Relationships

Date: Feb 16, 2023

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
- ex: the distance to target
- 1st measurement
- input

Dependent Variable

- the y-variable
- 2nd measurement
- 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 organizes 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).**

Your table of values should look like this:

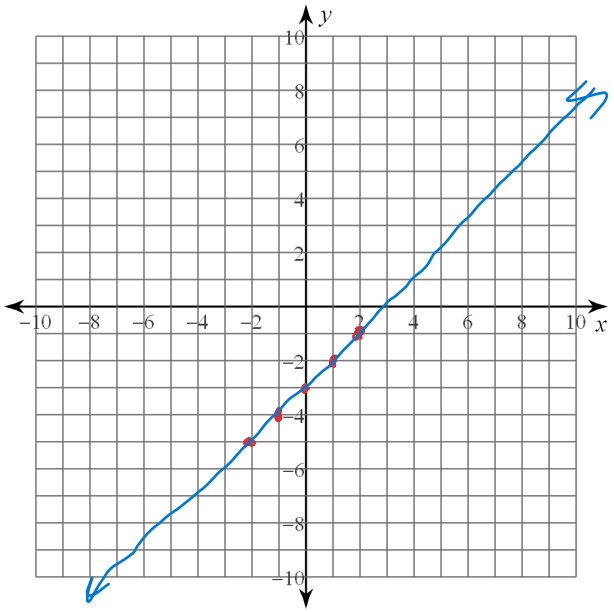
x	y	(x,y)
Set of x-coordinates	Corresponding y-coordinates	Set of points to plot

→ use x's -2, -1, 0, 1, 2.

Examples:

1. $y = x - 3$

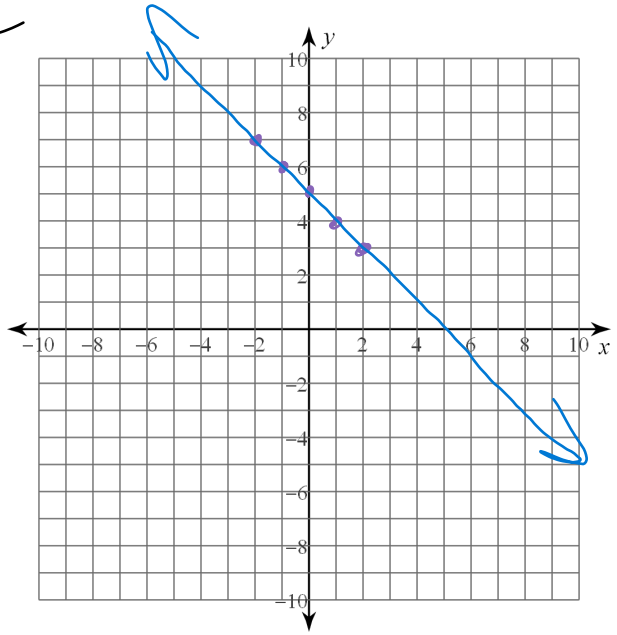
x	$y = x - 3$	(x, y)
2	$(2) - 3 = -1$	$(2, -1)$
1	$(1) - 3 = -2$	$(1, -2)$
0	$(0) - 3 = -3$	$(0, -3)$
-1	$(-1) - 3 = -4$	$(-1, -4)$
-2	$(-2) - 3 = -5$	$(-2, -5)$



2. $x + y = 5$

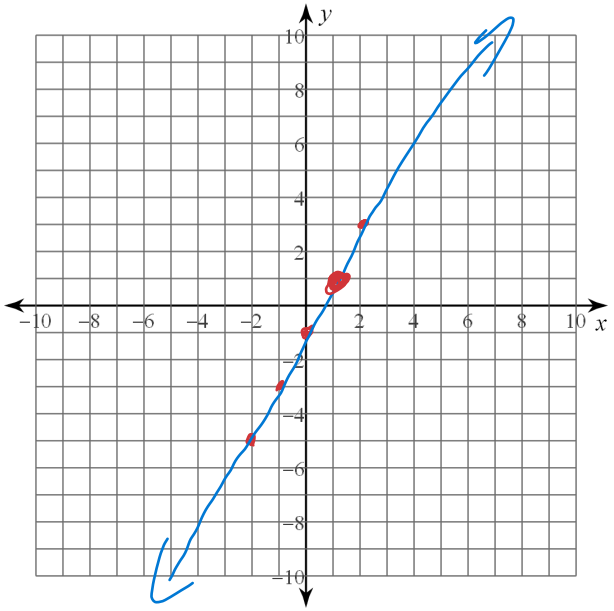
$y = 5 - x$ or $y = -x + 5$

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



3. $2x - y = 1$ $\quad 2x - 1 = y$

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	$2(-2) - 1 = -5$	$(-2, -5)$

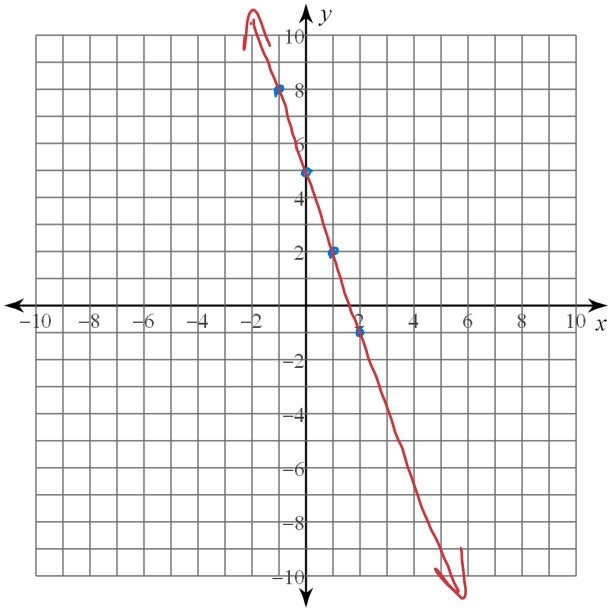


4. $6x + 2y - 10 = 0$

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

$$y = -3x + 5$$

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	$-3(-2) + 5 = 11$	$(-2, 11)$



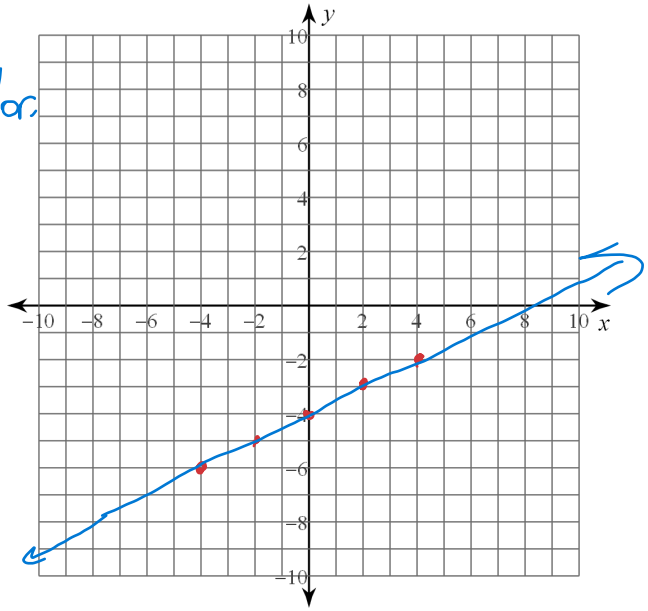
✱ When you have a fraction, use multiples of the denominator.

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

↳ multiply −2, −1, 0, 1, 2 by the denominator

double the usual x's

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)



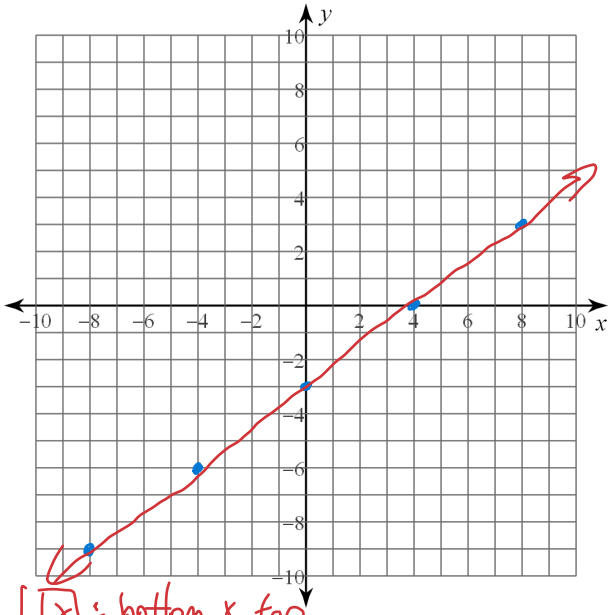
6. $3x - 4y = 12$

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

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

4 times 2, 1, 0, −1, −2

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)



x ÷ bottom x top

8 ÷ 4 x 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