7A.9
Linear Functions

NOTES

Name:_____

A **linear function** is a function that can be represented on a graph by a straight line.

A **linear equation** in two variables is an equation in which the variables appear in separate terms and neither variable contains an exponent other than 1.

Examples: $y = 3x + 2$, $\frac{2}{3}x - 4y = 16$, $y = -2x$
Non-Examples: $y = x^2$, $xy - 1 = 0$, $y = 2x^2 + 7x + 3$

Linear equations are easiest to graph when they are written in **slope-intercept form**: $y = mx + b$ where x and y are variables and m and b are constants.

The solutions to a linear equation are written as ordered pairs. To determine solutions of an equation with two variables, first choose any value for the first variable, x.

Then substitute that value into the equation for x and solve to find the corresponding value of y. Do this for at least three different values of x. Make a table to organize the ordered pairs that are solutions of the equation.

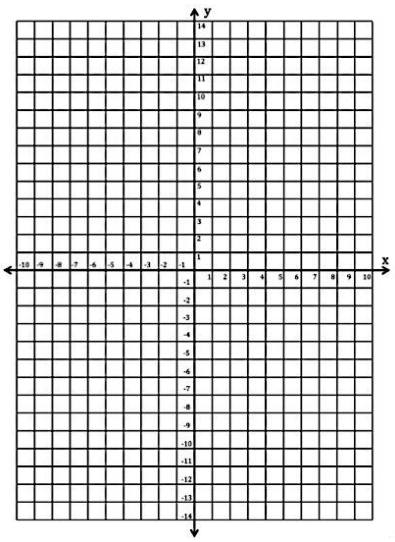
Make a table of three solutions for each equation below. Then graph the equation.

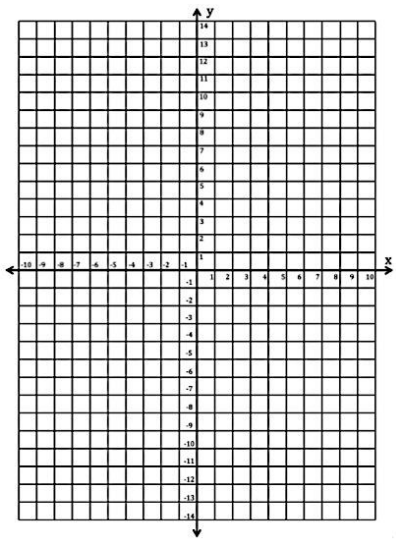
$y = 3x$ $\qquad$ $y = \frac{1}{2}x$ $\qquad$ $y = -3x - 2$

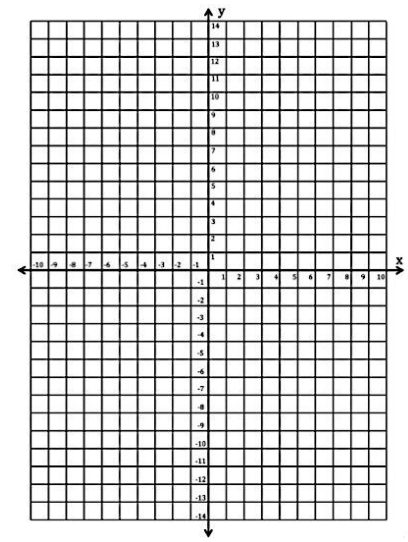
x	y	(x, y)

x	y	(x, y)

x	y	(x, y)







How many possible solutions (ordered pairs) are there for a linear equation?

Use interval notation to express the domain and range for each of the linear equations we just graphed.

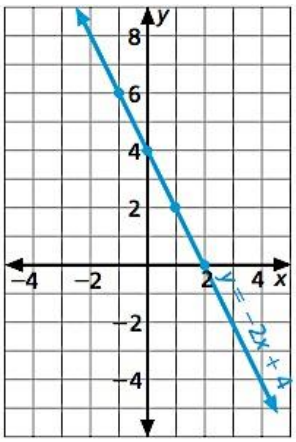
The points where a line crosses an axis is called an **intercept**.

The **x-intercept** is the x-coordinate of the point (x, 0) where the line crosses the x-axis. In the example below, the x-intercept is 2 because the line crosses the x-axis at (2, 0).

The **y-intercept** is the y-coordinate of the point (0, y) where the line crosses the y-axis. In the example below, the y-intercept is 4 because the line crosses the y-axis at (0, 4).

$$y = -2x + 4.$$

x	y	(x, y)
-1	6	$(-1, 6)$
0	4	$(0, 4)$
1	2	$(1, 2)$



Find the x-intercept and y-intercept of each equation.

$y = 5x - 3$

$y = \frac{2}{3}x - 2$

$y = -3x + 2$

$y = -\frac{1}{2}x - 2$

$y = 3x - 1$

$y = \frac{2}{3}x - 8$