

Module 7 Lesson 1: Solving Linear Systems by Graphing

Are You Ready? Possible Solutions

1. a. Algebraically determine both intercepts.

$$x + 2y = 4$$

y-intercept ($x=0$):

$$0 + 2y = 4$$

$$y = 2$$

The y-intercept is (0, 2).

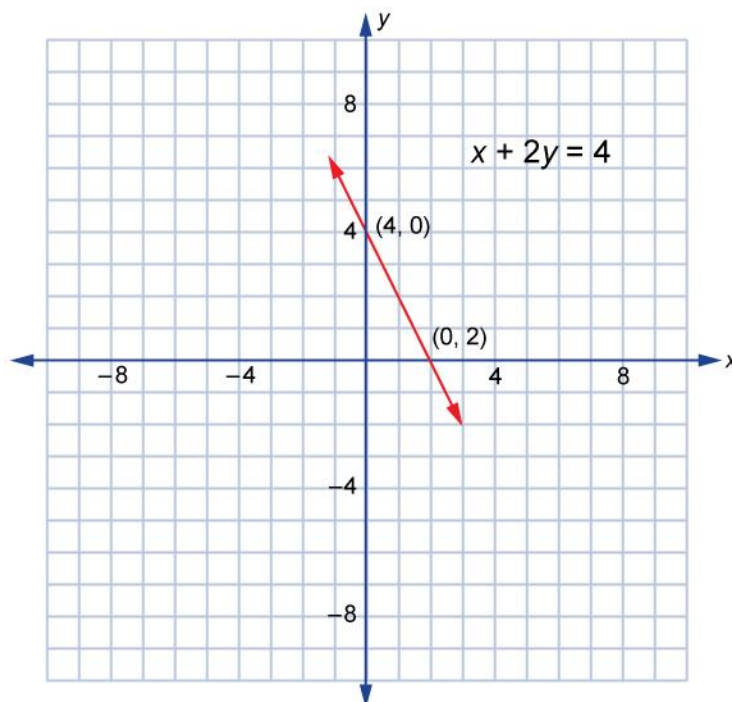
x-intercept ($y=0$):

$$x + 2(0) = 4$$

$$x = 4$$

The x-intercept is (4, 0)

- b. Your graph should look like the following. This shows a linear graph passing through intercepts (0, 2) and (4, 0).



- c. The slope is $-\frac{1}{2}$.

To find this you can do one of several things:

- i. Put the equation in slope y intercept form

$$x + 2y = 4 \quad \leftarrow \text{Subtract } x \text{ from each side.}$$

$$2y = -x + 4 \quad \leftarrow \text{Divide both sides by 2.}$$

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

In this $y = mx + b$ form, the coefficient of x is the slope.

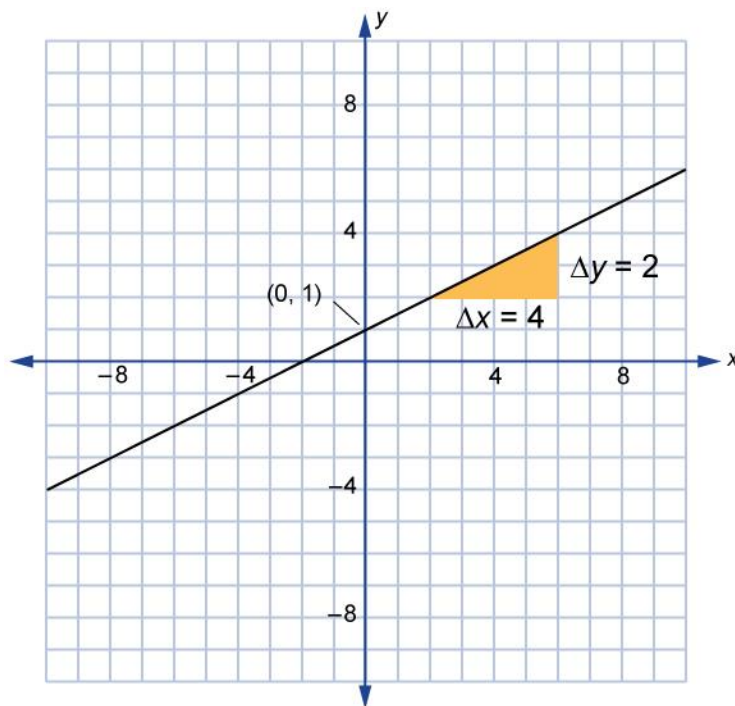
ii. Use the slope formula and the points $(0, 2)$ and $(4, 0)$

$$m = \frac{0 - 2}{4 - 0}$$

$$m = \frac{-2}{4}$$

$$m = -\frac{1}{2}$$

2. Your graph should look similar to the following. This shows a graph passing through the point $(0, 1)$. The rise and run are shown to be 2 and 4, respectively, based on a small right triangle placed with its hypotenuse on the graph. Note the triangle symbol is the symbol delta and means “change in”.



$$m = \frac{\Delta y}{\Delta x} \quad \leftarrow \text{Take values from the graph.}$$

$$= \frac{2}{4} \quad \leftarrow \text{Simplify.}$$

$$= \frac{1}{2}$$

The y-intercept (0, 1) of the graph indicates that $b = 1$. So, $y = \frac{1}{2}x + 1$.

b. i. $(-4, -1)$

LS	RS
y $= -1$	$\frac{1}{2}x + 1$ $= \frac{1}{2}(-4) + 1$ $= -2 + 1$ $= -1$
LS	= RS

ii. $(7, 4.5)$

LS	RS
y $= 4.5$	$\frac{1}{2}x + 1$ $= \frac{1}{2}(7) + 1$ $= 3.5 + 1$ $= 4.5$
LS	= RS

3. a. $3x - 2y = 12$ ← Add $2y$ to both sides.
 $3x = 2y + 12$ ← Subtract 12 from both sides.
 $3x - 12 = 2y$ ← Switch the sides of the equation.
 $2y = 3x - 12$ ← Divide by 2.
 $y = \frac{3}{2}x - 6$

b. $-4x - 5y + 10 = 0$ ← Add $4x$ to both sides.
 $-5y + 10 = 4x$ ← Subtract 10 from both sides.
 $-5y = 4x - 10$ ← Divide by -5 .
 $y = -\frac{4}{5}x + 2$

4. a. Sub in 3 for x and -1 for y and see if both sides equal

LS	RS
$2x + 3y - 4$	0
$= 2(3) + 3(-1) - 4$	
$= 6 - 3 - 4$	
$= -1$	
LS	RS

$\neq$

- b. Sub in 3 for x and -1 for y and see if both sides equal

LS	RS
$x - 5y$	8
$= (3) - 5(-1)$	
$= 8$	
LS	RS

$=$