

3.2: Linear Equations in 2 variables (cont'd)

3.2.3

Note Title

2/5/2015

Ex: Graph the equation $-3x + 2y = -4$. Use the given coordinates to create solutions.

x	y
2	
4	
	5
	-2

or $(2, \quad), (4, \quad), (\quad, 5), (\quad, -2)$

$$\begin{aligned} x=2 \quad & -3x + 2y = -4 \\ & -3(2) + 2y = -4 \\ \text{solve for } y: \quad & -6 + 2y = -4 \end{aligned}$$

$$2y = 2$$

$$\frac{2y}{2} = \frac{2}{2}$$

$$y = 1$$

ordered pair: $(2, 1)$

$$\begin{aligned} x=4 \quad & -3x + 2y = -4 \\ & -3(4) + 2y = -4 \\ & -12 + 2y = -4 \end{aligned}$$

$$y=5 \quad -3x + 2y = -4$$

$$y=-2 \quad -3x + 2y = -4$$

$$-3x + 2(-2) = -4$$

$$-3x - 4 = -4$$

$$-3x = 0$$

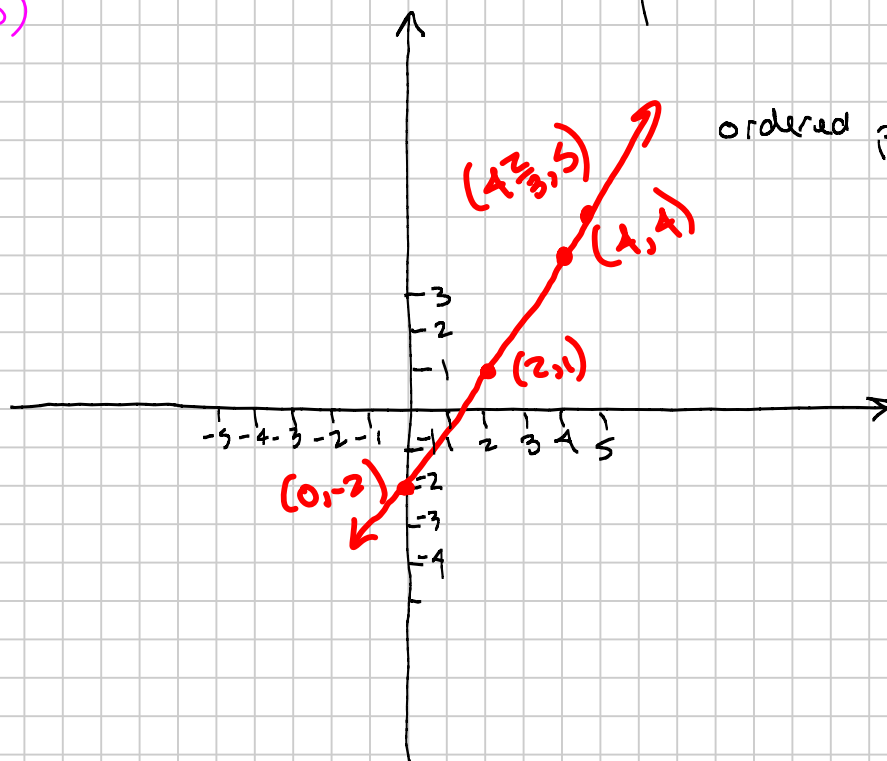
$$\frac{-3x}{-3} = \frac{0}{-3}$$

$$x = 0$$

ordered pair: $(0, -2)$

x	y
2	1
4	1
$\frac{4}{3}$	5
0	-2

$\Rightarrow (\frac{4}{3}, 5)$



Example: Find at least 5 ordered pair solutions.
Graph the line.

3.2.4

$$-y - 2x = -6$$

$x = -2$

$$-y - 2(-2) = -6$$

$$-y + 4 = -6$$

$$-y = -10$$

$$\frac{-y}{-1} = \frac{-10}{-1}$$

$$y = 10$$

$$(-2, 10)$$

$$x = 4 \Rightarrow -y - 2(4) = -6$$

$$-y - 8 = -6$$

$$-y = 2$$

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

$$y = -2$$

$$(4, -2)$$

$y = -3$

$$-y - 2x = -6$$

$$-(-3) - 2x = -6$$

$$3 - 2x = -6$$

$$-2x = -9$$

$$\frac{-2x}{-2} = \frac{-9}{-2}$$

$$x = \frac{9}{2} = 4\frac{1}{2}$$

$$(4\frac{1}{2}, -3)$$

$y = 2$

$$-y - 2x = -6$$

$$-2 - 2x = -6$$

$$-2x = -4$$

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

$$x = 2$$

$$(2, 2)$$

other points:

$$(1, 4)$$

$$(-7, 10)$$

$$(-4, 1)$$

$$(4, -2)$$

$$(6, -6)$$

$$(0, 6)$$

$x = -4$

$$-y - 2x = -6$$

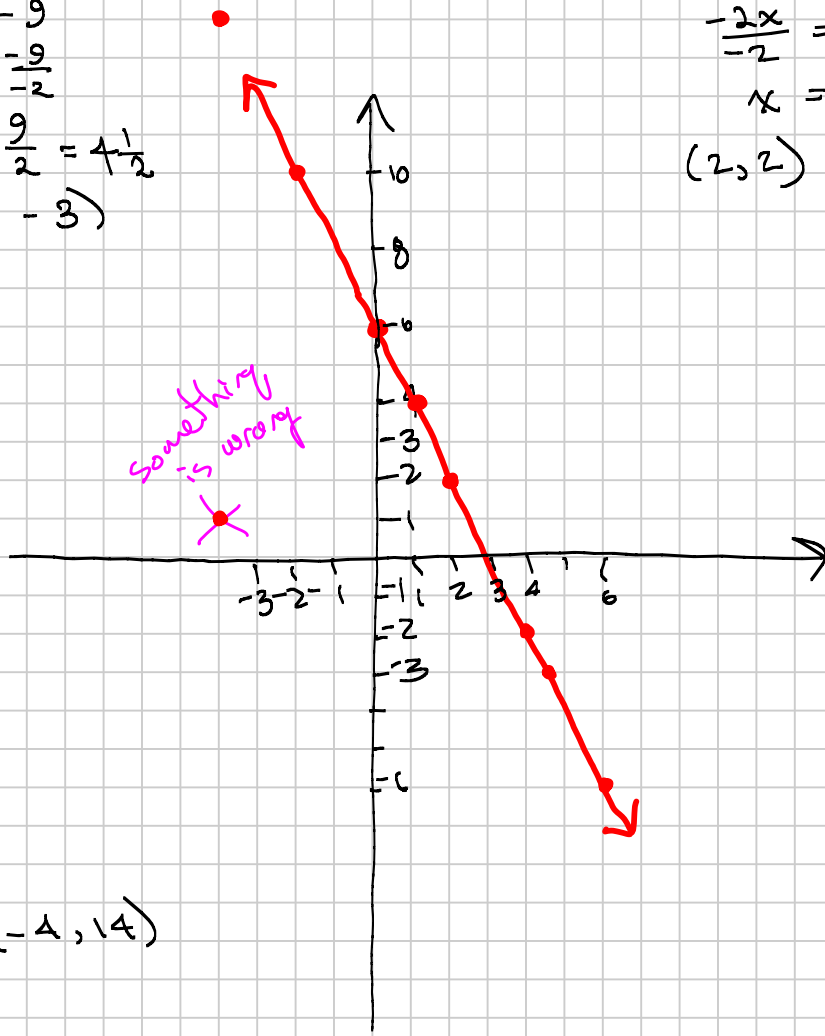
$$-y - 2(-4) = -6$$

$$-y + 8 = -6$$

$$-y = -14$$

$$y = 14$$

$$(-4, 14)$$



Ex. Solve the equation for y first.
Then find solutions and graph.

3.2.5

$$6x + 2y = -10$$

Solve for y : $6x + 2y = -10$
 $\quad \quad \quad -6x \quad \quad \quad -6x$

$$2y = -6x - 10$$

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

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

$$y = -3x - 5$$

$$(4, -17)$$

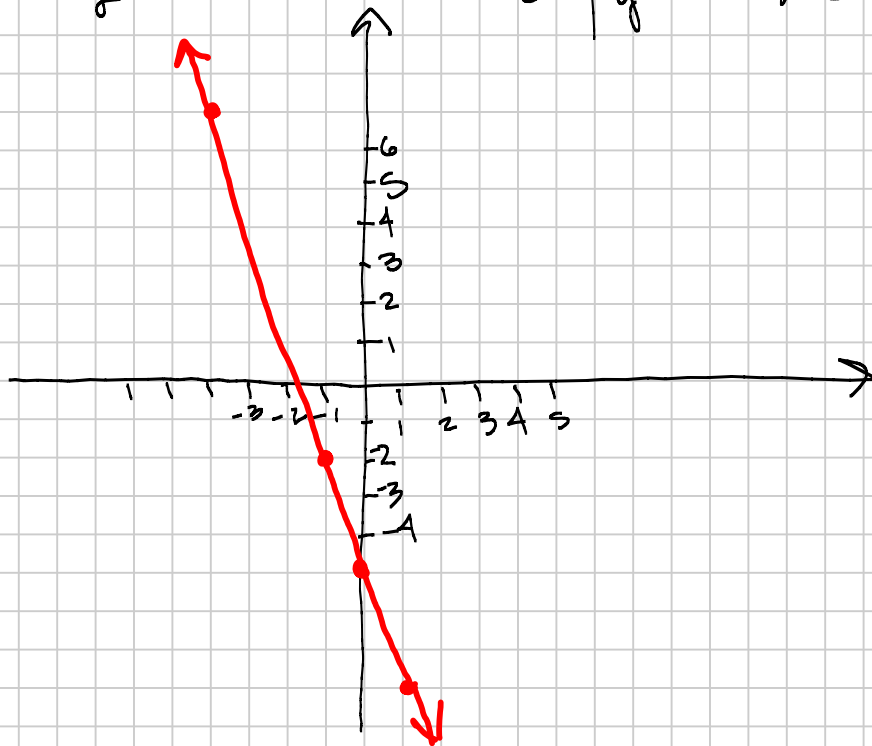
$$(-4, 7)$$

$$(1, -8)$$

$$(-1, -2)$$

$$(0, -5)$$

x	$y = -3x - 5$
4	$y = -3(4) - 5 = -12 - 5 = -17$
-4	$y = -3(-4) - 5 = 12 - 5 = 7$
1	$y = -3(1) - 5 = -3 - 5 = -8$
-1	$y = -3(-1) - 5 = 3 - 5 = -2$
0	$y = -3(0) - 5 = 0 - 5 = -5$



Intercepts:

x-intercept: a point where the graph intersects the x -axis.
(has the form $(a, 0)$ or just a)

y-intercept: a point where the graph intersects the y -axis.
(has the form $(0, b)$ or just b)



How to find intercepts:

3.2.6

- * To find the x -intercept, set $y=0$ and solve for x .
- * to find the y -intercept, set $x=0$ and solve for y .

Ex: Find the intercepts and graph the line.

$$4x - 3y = 20$$

Find x -intercept:

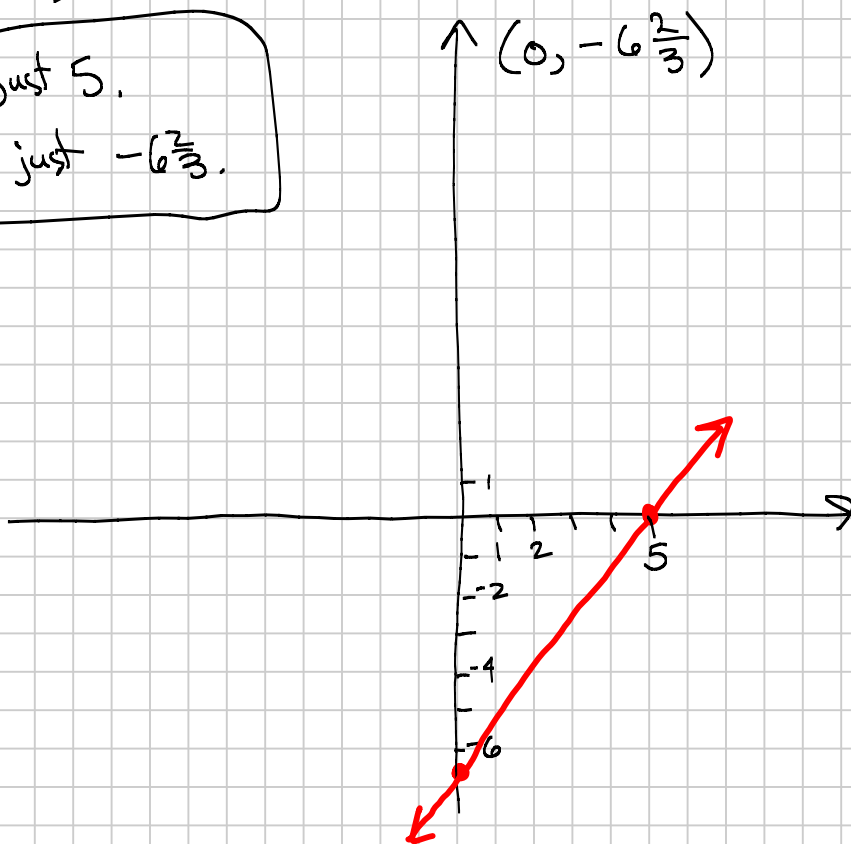
$$\begin{aligned}\text{Set } y=0: \quad 4x - 3(0) &= 20 \\ 4x - 0 &= 20 \\ 4x &= 20 \\ \frac{4x}{4} &= \frac{20}{4} \\ x &= 5 \\ (5, 0)\end{aligned}$$

Find the y -intercept:

$$\begin{aligned}\text{Set } x=0: \quad 4(0) - 3y &= 20 \\ 0 - 3y &= 20 \\ -3y &= 20 \\ \frac{-3y}{-3} &= \frac{20}{-3} \\ y &= -\frac{20}{3}\end{aligned}$$

$$\begin{array}{r} 3 \overline{) 20} \\ 18 \\ \hline 2 \end{array}$$

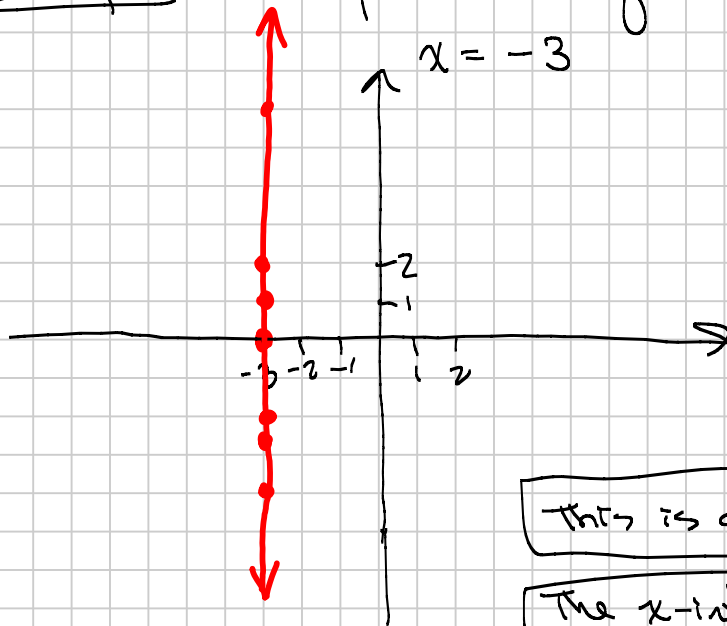
x -intercept is $(5, 0)$ or just 5.
 y -intercept is $(0, -6\frac{2}{3})$ or just $-6\frac{2}{3}$.



Horizontal and Vertical Lines

3.2.7

Example: Graph the equation.

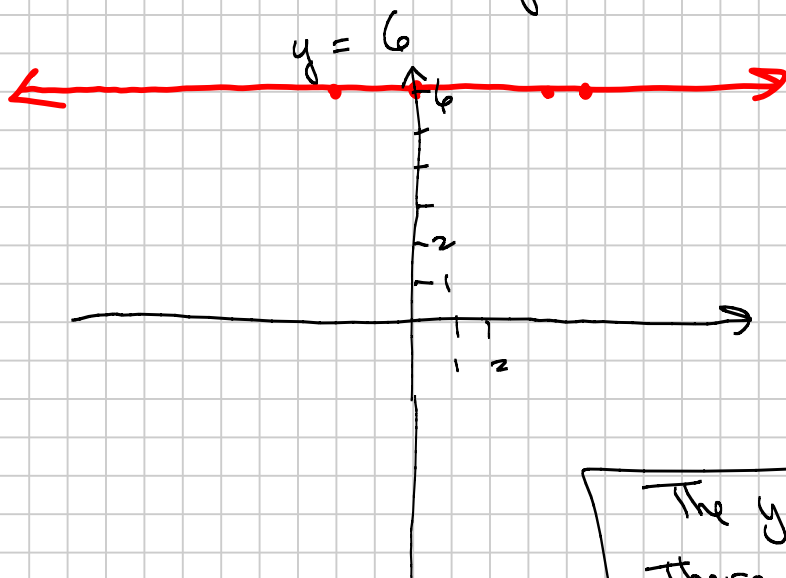


- $(-3, 0)$
- $(-3, 1)$
- $(-3, 2)$
- $(-3, -2)$
- $(-3, -4)$
- $(-3, -2\frac{1}{8})$

This is a vertical line. $(-3, 6)$

The x-intercept is $(-3, 0)$. There is no y-intercept.

Ex: Graph the equation



- $(4\frac{1}{2}, 6)$
- $(3\frac{1}{2}, 6)$
- $(0, 6)$
- $(-2, 6)$

This is a horizontal line.

The y-intercept is $(0, 6)$.
There is no x-intercept.

