Warm-up 2/26/15:

Write the equation of the line in slope intercept form.

$y=mx+b$

1. $m=-\frac{4}{7}$, and $(-21,-2)$ (x, y)

$-2=\frac{-4}{7}(-21)+b$

$-2=12+b$

$-12 \quad -12$

$b=-14$

$y=\frac{-4}{7}x-14$

2. $(-8,-18)$ and $(-3,-3)$

$m=\frac{-18-(-3)}{-8-(-3)}=\frac{-15}{-5}=3$

$-18=3(-8)+b$

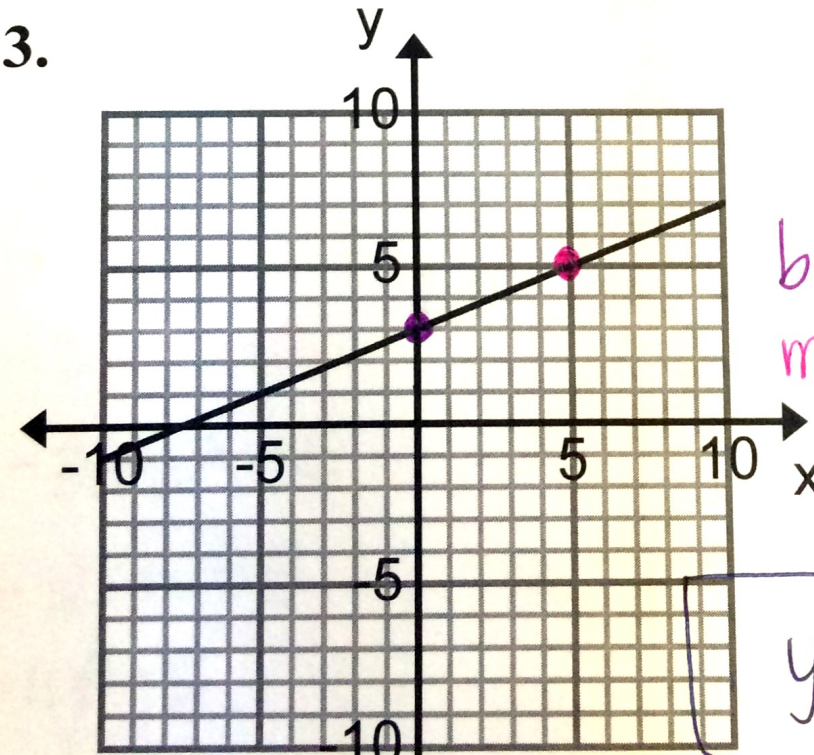
$-18=-24+b$

$+24 \quad +24$

$6=b$

$y=3x+6$

3.



$b=3$

$m=\frac{\text{rise}}{\text{run}}=\frac{2}{5}$

$y=\frac{2}{5}x+3$

- **Systems of Two Linear Equations:**
  Graphing or looking for the solution of 2 equations at the same time.

- **A Solution of a System:**
  is a coordinate point
  (x, y)

Example 1: Checking Solutions of Linear System

Check whether the two points listed are solutions of the following system. A: No | B: yes

$$\begin{cases} x - 3y = -5 \\ -2x + 3y = 10 \end{cases}$$

A. $(1, 4)$ NO

B. $(-5, 0)$ yes

A

x y
(1, 4)

$x - 3y = -5$

$1 - 3(4) = -5$

$1 - 12 = -5$

$-11 \neq -5$

NO

B

$(-5, 0)$

$x - 3y = -5$

$-5 - 3(0) = -5$

$-5 = -5$

yes

$-2x + 3y = 10$

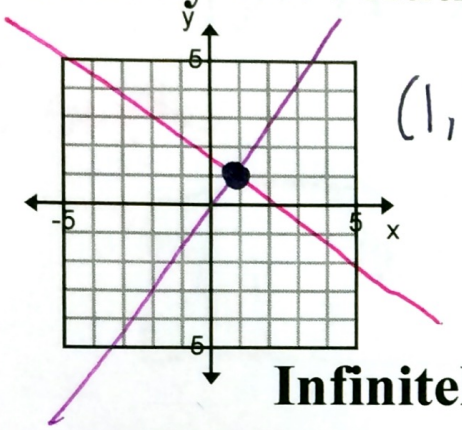
$-2(-5) + 3(0) = 10$

$10 + 0 = 10$

yes

Number of Solutions of a Linear System

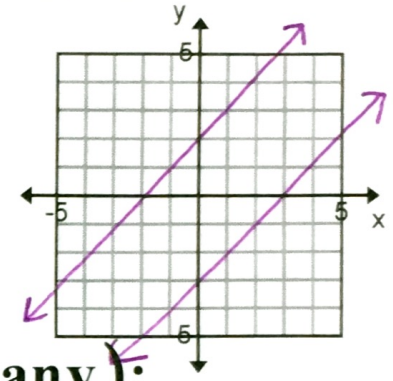
Exactly one solution:



(1, 1)

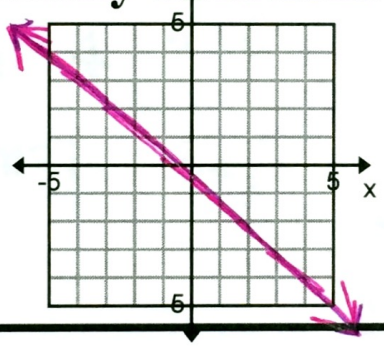
No Solution:

parallel



Infinitely many Solutions (∞ many):

∞ = infinity

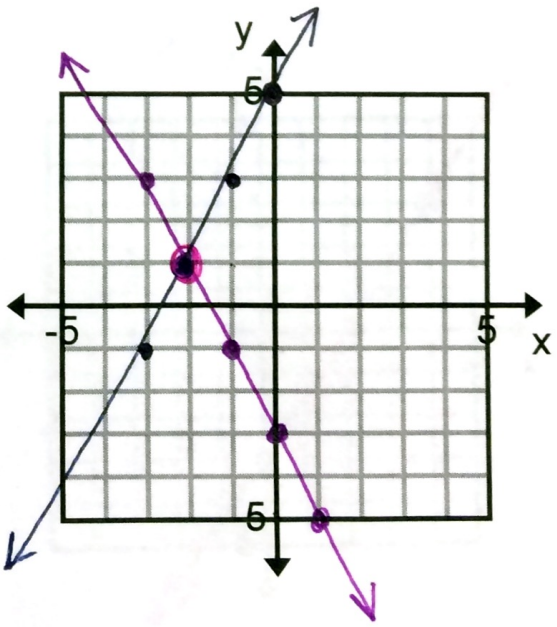


Ex. 2: Solve the system using a graph.

$$\begin{cases} y = -2x - 3 \\ y = 2x + 5 \end{cases}$$

$y = -2x - 3$: m = −2, b = −3

$y = 2x + 5$: m = 2, b = 5



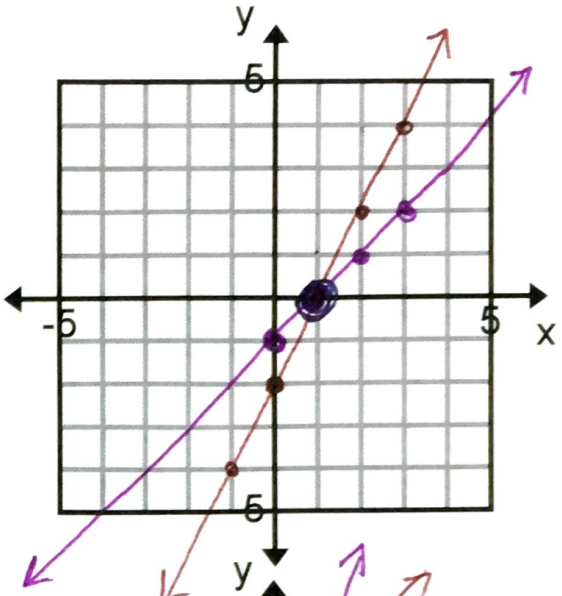
1. Graph the lines
2. Find their intersection.

(−2, 1)

Solve the system using a graph.

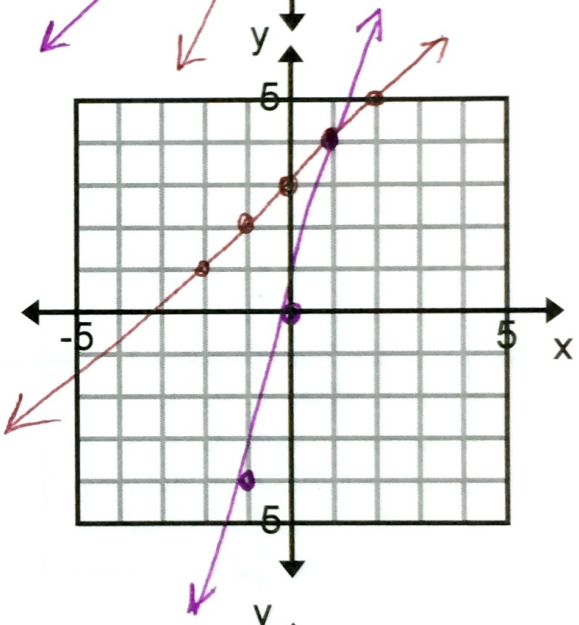
Ex. 3: $\begin{cases} y = x - 1 \\ y = 2x - 2 \end{cases}$ $m = 1$ $b = -1$; $m = 2$ $b = -2$

① Graph



(1, 0)

Ex. 4: $\begin{cases} y = 4x \\ y = x + 3 \end{cases}$ $m = 4$ $b = 0$; $m = 1$ $b = 3$

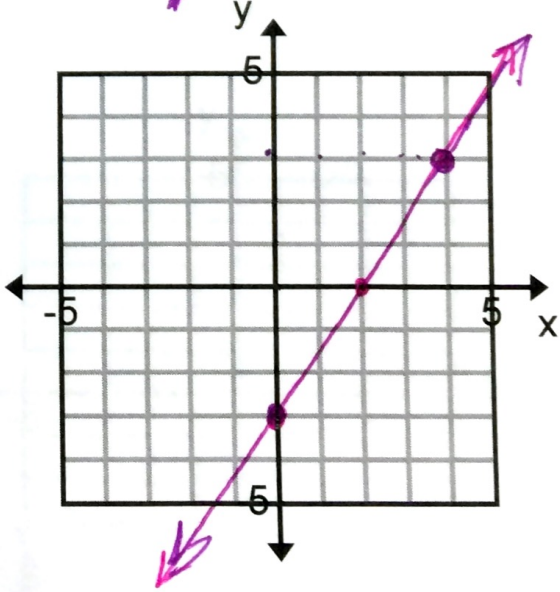


(1, 4)

Ex. 5:

$\begin{cases} y = \frac{3}{2}x - 3 \\ y = \frac{6}{4}x - 3 \end{cases}$ $m = \frac{3}{2}$ $b = -3$; $m = \frac{6}{4}$ $b = -3$

$\frac{3}{2}$



∞ many

Solve the system using a graph.

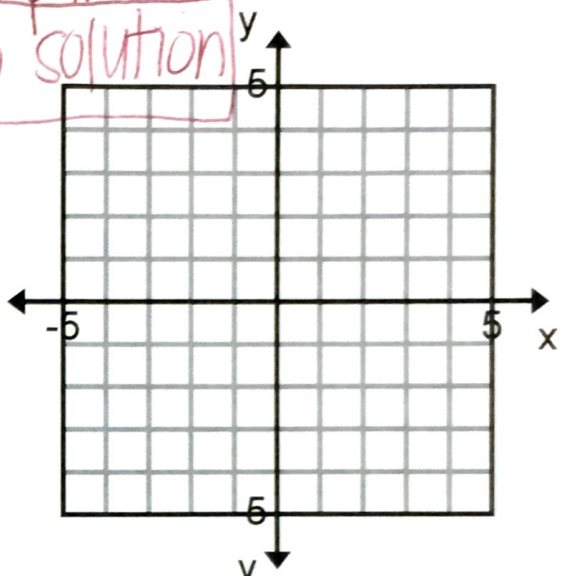
parallel
NO solution

Ex. 6: $y=mx+b$

$$\begin{cases} 2x-y=-1 & y=2x+1 \\ 4x-2y=6 & y=2x-3 \end{cases}$$

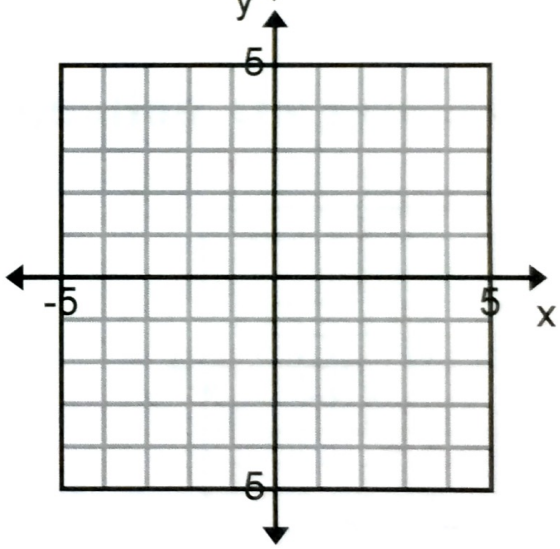
$2x-y=-1$
$-2x \quad -2x$
$-y=-2x-1$
$-1 \quad -1 \quad -1$

$4x-2y=6$
$-4x \quad -4x$
$-2y=-4x+6$
$\frac{-2y}{-2}=\frac{-4x+6}{-2}$
$y=2x-3$



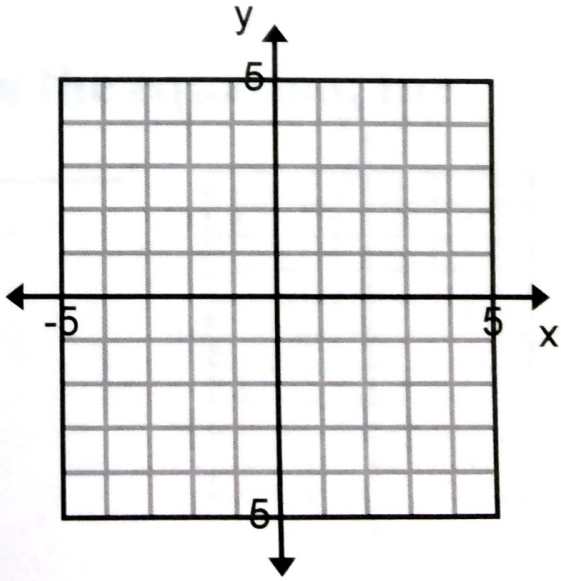
Ex. 7:

$$\begin{cases} y=4 \\ y=\frac{5}{3}x-1 \end{cases}$$



Ex. 8:

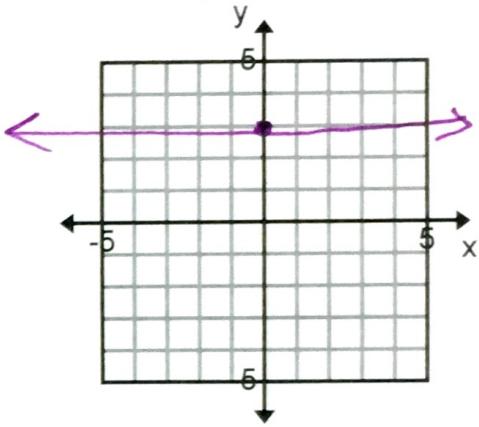
$$\begin{cases} y=-3x-2 \\ x=-1 \end{cases}$$



Review of Horizontal & Vertical Lines:

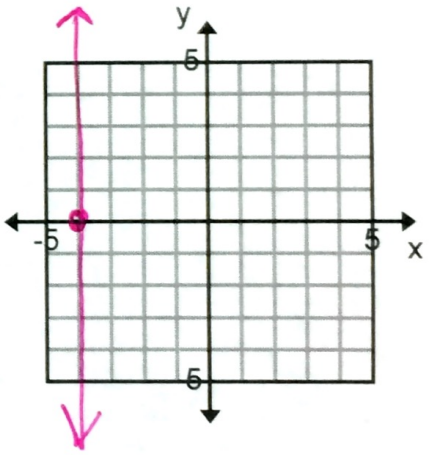
When there is ONLY a *y* in the equation, the graph of the line is horizontal.

Ex. 9: $y = 3$



When there is ONLY an *x* in the equation, the graph of the line is vertical.

Ex. 10: $x = -4$



When there is both an *x* and a *y* in the equation, the graph of the line is diagonal.

Ex. 11: $y = 3x$