What you will learn about:
Solving Systems of Linear Equations by Graphing

Solution to System of Equations

Are the values of the variables that make all the equations true. A solution of a system of two linear equations is represented by an ordered pair (x, y).

Consider the system below:

$3x - y = 7$
$x - 2y = 4$

Yes solution

Is the ordered pair (2, -1) a solution?

$3(2)-(-1)=7$
$6+1=7$
$7=7$

$2-2(-1)=4$
$2+2=4$
$4=4$

Is the ordered pair (3, 2) a solution?

$3(3)-2=7$
$9-2=7$
$7=7$

Not solution

$3-2(2)=4$
$3-4=4$
$-1\neq 4$

Determine whether the ordered pair is a solution to the system

$$\begin{cases} x - y = -1 \\ 2x - y = -5 \end{cases}$$

a) (-2, -1)

$2(-2)-(-1)=-5$
$-4+1=-5$
$-3\neq -5$

$-2-(-1)=-1$
$-2+1=-1$
$-1=-1$

No

b) (-4, -3)

Yes solution

$-4-(-3)=-1$
$-4+3=-1$
$-1=-1$

$2(-4)-(-3)=-5$
$-8+3=-5$
$-5=-5$

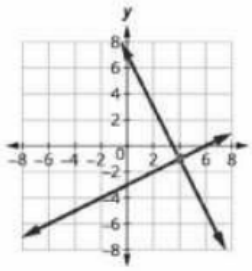
Determine whether the ordered pair is a solution to the system

$$\begin{cases} x - y = -1 \\ 2x - y = -5 \end{cases}$$

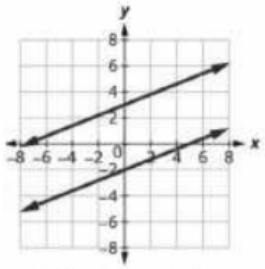
a) (2, -2)

b) (-2, 2)

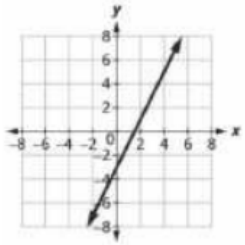
Solving Systems by Graphing



The lines intersect.
Intersecting lines have one point in common.
There is one solution to this system.



The lines are parallel.
Parallel lines have no points in common.
There is no solution to this system.



Both equations give the same line.
Because we have just one line, there are infinitely many solutions.

→ Point of Intersection

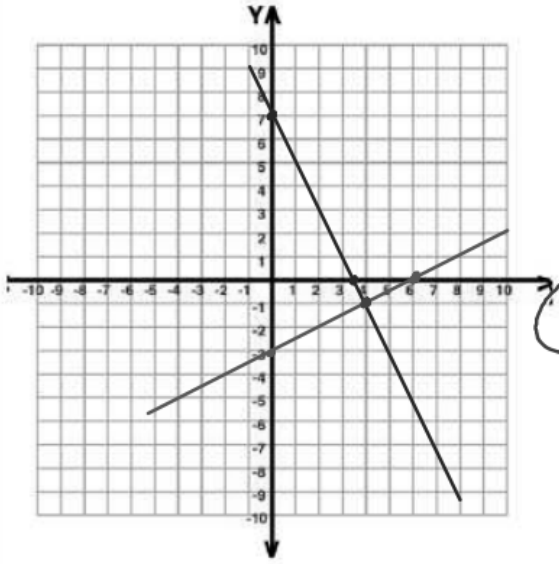
Solve the system by graphing: $\begin{cases} 2x + y = 7 \\ x - 2y = 6 \end{cases}$

$x\text{-}\frac{C}{A} = \frac{7}{2} = 3.5$

$y = \frac{C}{B} = \frac{7}{1} = 7$

$x = \frac{C}{A} = \frac{6}{1} = 6$

$y = \frac{C}{B} = \frac{6}{-2} = -3$



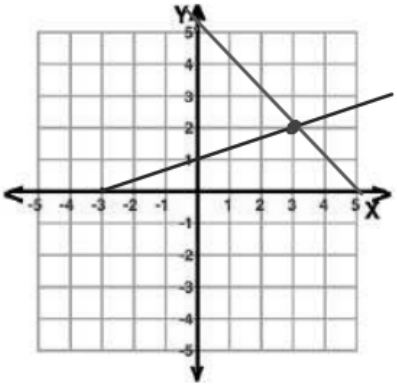
(4, -1)

$Ax + By = C$

$x = \frac{-3}{1} = -3$

$y = \frac{-3}{-3} = 1$

Solve the system by graphing: $\begin{cases} x - 3y = -3 \\ x + y = 5 \end{cases}$



(3, 2)

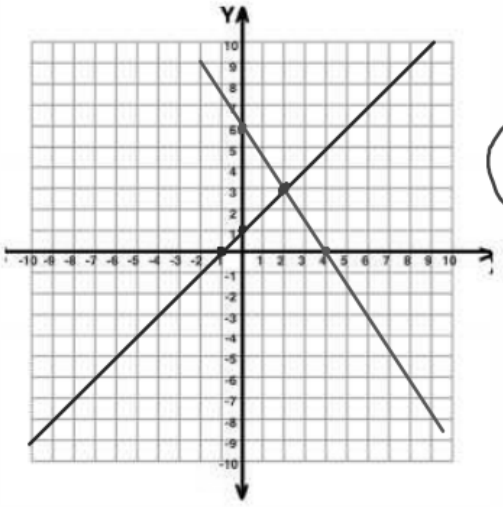
$x\text{-intercept} = \frac{C}{A}$

$y\text{-intercept} = \frac{C}{B}$

Solve the system by graphing: $\begin{cases} -x + y = 1 \\ 3x + 2y = 12 \end{cases}$

$x = -1 \quad y = 1$

$x = 4 \quad y = 6$

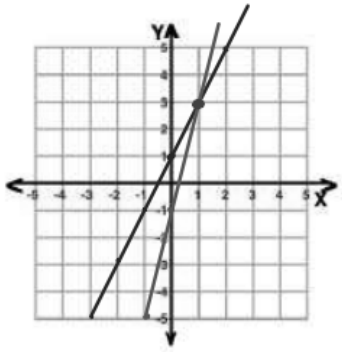


(2,3)

Solve the system by graphing: $\begin{cases} y = 2x + 1 \\ y = 4x - 1 \end{cases}$

$b = 1 \quad m = 2$

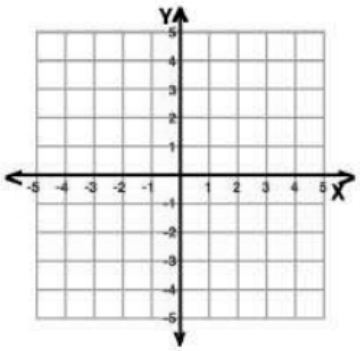
$b = -1 \quad m = 4$



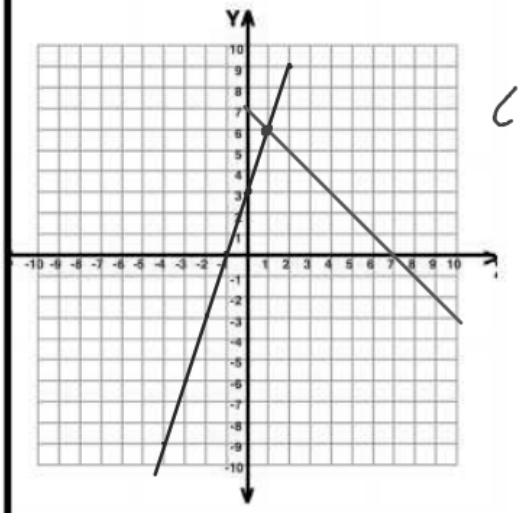
(1,3)

Solve the system by graphing:

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



Solve the system by graphing: $\begin{cases} y = 3x + 3 \\ y = -x + 7 \end{cases}$



(1, 6)

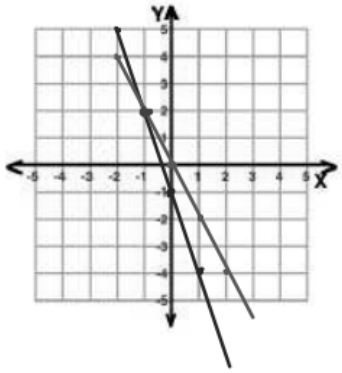
$X = -\frac{1}{3}$ $y = -1$

$m = \frac{-3}{1}$

$X = 0$ $Y = 0$

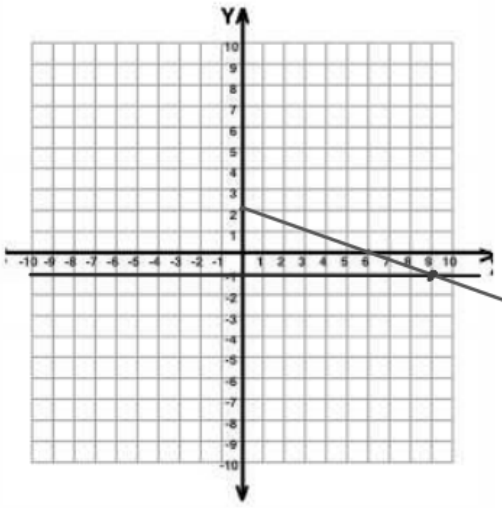
$m = \frac{-A}{B} = \frac{-2}{1}$

Solve the system by graphing: $\begin{cases} 3x + y = -1 \\ 2x + y = 0 \end{cases}$



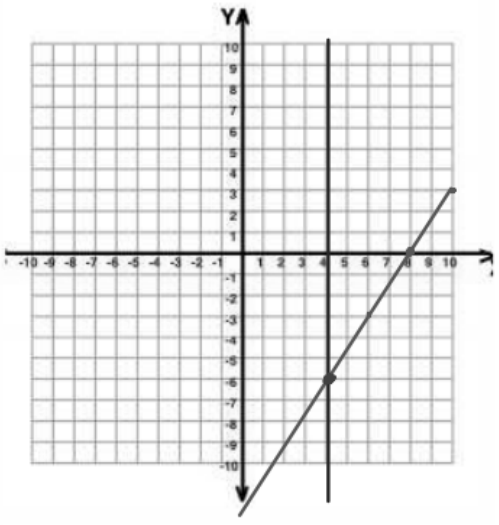
(-1, 2)

Solve the system by graphing: $\begin{cases} y = -1 \\ x + 3y = 6 \end{cases}$



(9, -1)

Solve the system by graphing: $\begin{cases} x = 4 \\ 3x - 2y = 24 \end{cases}$

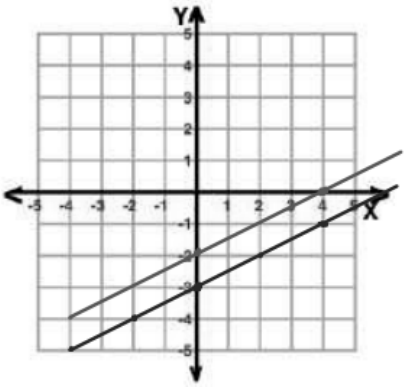


(4, -6)

Solve the system by graphing: $\begin{cases} y = \frac{1}{2}x - 3 \\ x - 2y = 4 \end{cases}$

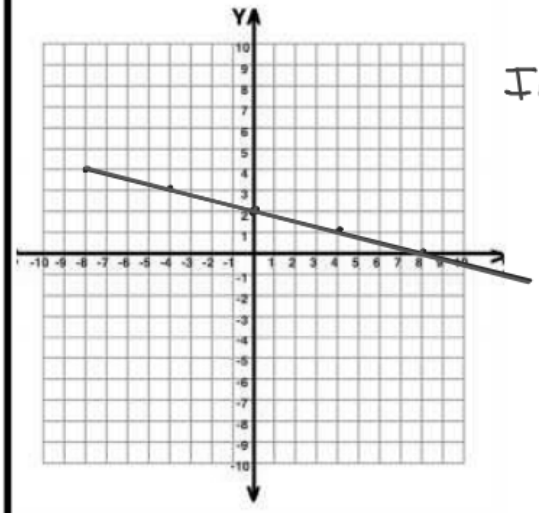
↳ $x = 4$

$y = -2$



No Solution

Solve the system by graphing: $\begin{cases} y = -\frac{1}{4}x + 2 \\ x + 4y = 8 \end{cases}$



Infinitely many Solutions