

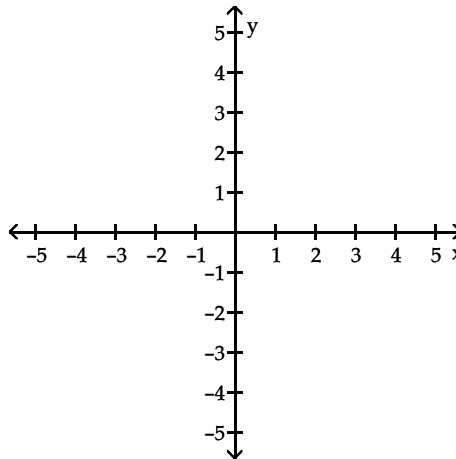
M118 SECTION 4.1 – SYSTEMS OF LINEAR EQUATIONS IN TWO VARIABLES

- 1) Given a linear system: $ax + by = h$ $a, b, c,$ and d are constants
 $cx + dy = k$

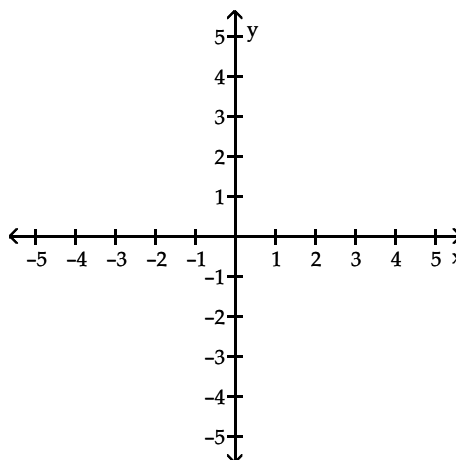
The solution of this system is $x = x_0$ and $y = y_0$ if each equation is satisfied by the ordered pair (x_0, y_0)

I. Solve a system of equation by **GRAPHING**: (Recall that the graph of a function is the set of all ordered pairs that satisfy all the equations)

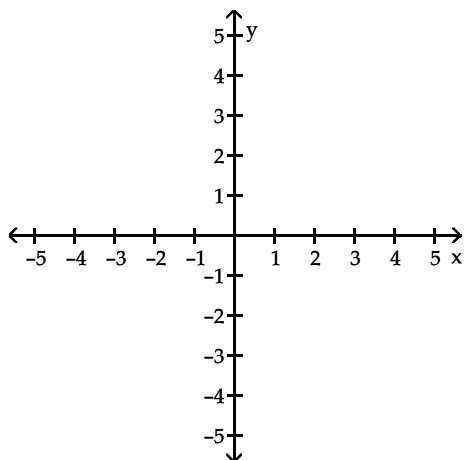
- a) Solve: $2x - y = -3$
 $x + 2y = -4$



- b) $6x - 3y = 9$
 $2x - y = 3$



c) $2x - y = 4$
 $6x - 3y = -18$



II. Solve by **SUBSTITUTION**:

1. Solve one of the equation for a specific variable.
2. Then using that, substitute the algebra expression of the specific variable into the second equation.
3. Solve for the specific variable.

a) $3x + 2y = -2$
 $2x - y = -6$

b) $3x - y = 7$
 $2x + 3y = 1$

III. Solve by **ELIMINATION**:

A system of equations is equivalent if

- 1) Two equations are interchanged
- 2) One equation is multiplied by a nonzero constant
- 3) A constant multiple of one is added to another.

a) $5x - 2y = 12$
 $2x + 3y = 1$

What happens if no solution?

$$\begin{aligned} 3x - 6y &= -9 \\ -2x + 4y &= 12 \end{aligned}$$

What happens if there are an infinite number of solutions?

$$\begin{aligned} 2x - 4y &= -10 \\ -x + 2y &= 5 \end{aligned}$$