

Solving a System of Linear Equations Graphically

The solution of a linear system can be graphed on the same grid.
If the two lines intersect, the coordinates of the intersection are the _____
of the linear system.

For example, the following are graphed.

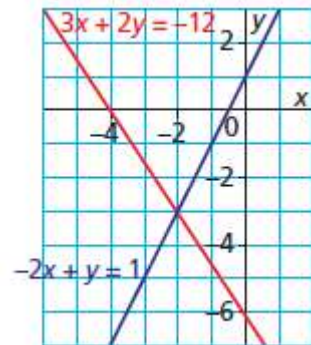
$$3x + 2y = -12 \quad (1)$$

$$-2x + y = 1 \quad (2)$$

The set of points that satisfy equation (1) lie on its graph.

The set of points that satisfy equation (2) lie on its graph.

The set of points that satisfy both equations lie

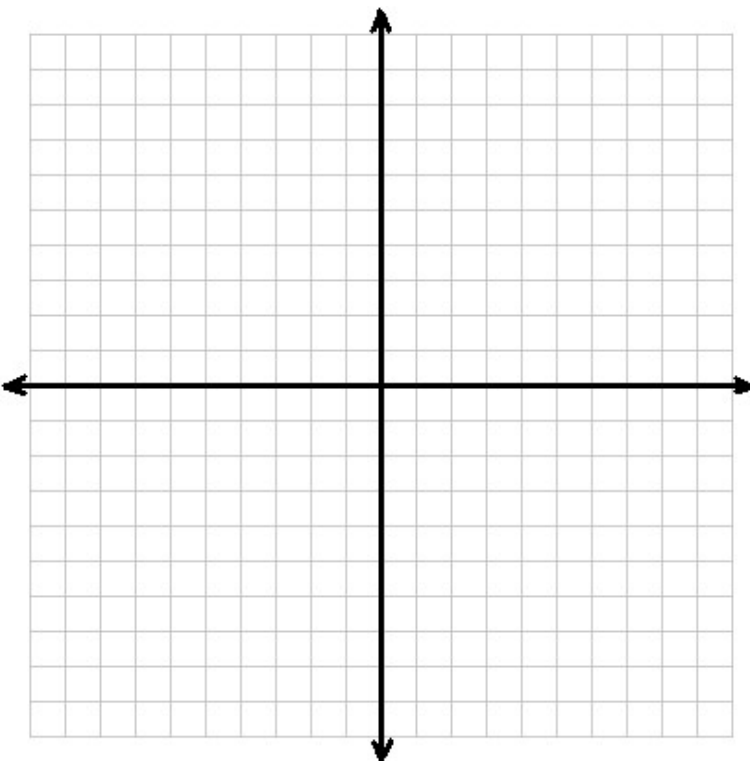


The point of intersection of the graphs appears to be the point _____.

Ex. #1: Solve this linear system by graphing.

$$x + y = 8$$

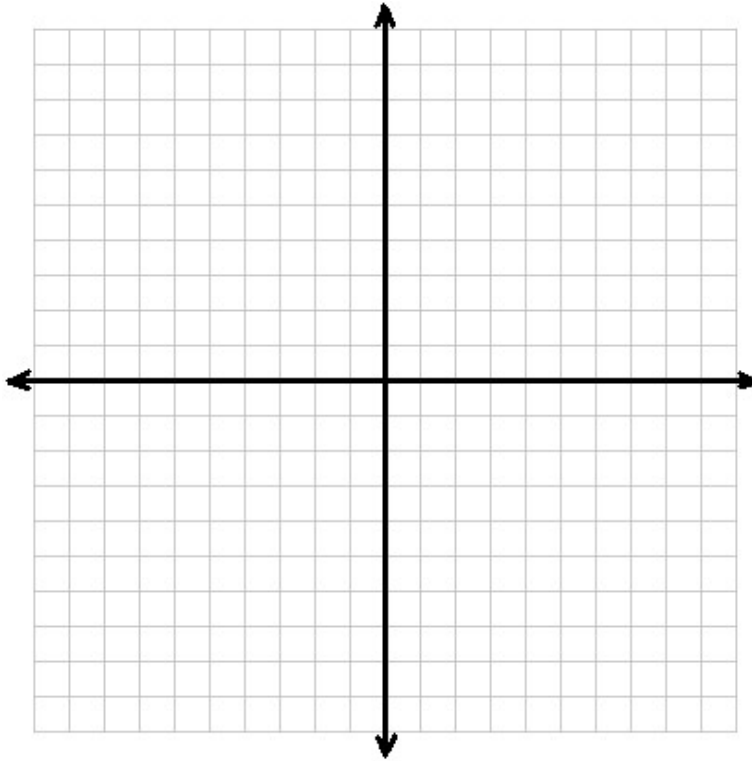
$$3x - 2y = 14$$



Ex. #2: Solve this linear system by graphing.

$$x - y = 4$$

$$2x + y = -4$$



Practice:

Solve the linear systems by graphing

1. $3x + 2y = 12$
 $x - y = -1$

2. $x + 2y = -1$
 $2x + y = -5$

Solve a System of Linear Equations by Substitution

Solving by substitution is an alternative method to solving by graphing.

Ex. #1: Solve this linear system (by substitution)

$$2x - 4y = 7$$

$$4x + y = 5$$

Ex. #2: Solve the linear system

$$\begin{aligned}x + 7y &= 4 \\2x - 9y &= -15\end{aligned}$$

Practice:

Solve the system of equations by substitution.

3. $\begin{aligned}4x + y &= -5 \\2x + 3y &= 5\end{aligned}$

4. $\begin{aligned}x + 2y &= 13 \\2x - 3y &= -9\end{aligned}$

Solving a System of Equations by Elimination

Adding or subtracting two equations in a linear system produces equivalent linear systems. We use this property to solve a linear system by first eliminating one variable

Ex. #1: Solve this linear system by elimination.

$$2x + 4y = -4$$

$$-4x - 5y = 5$$

Ex. #2: Solve this linear system by elimination.

$$3x - 4y = 7$$

$$5x - 6y = 8$$

Practice:

Solve the system of equations by elimination

5. $2x + 7y = 24$

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

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

$$\frac{1}{8}x + \frac{1}{4}y = 2$$