

## Solve Linear Systems by Graphing and Substitution

A **System of Linear Equations**, or simply a linear system, consists of two or more linear equations with the same variables.

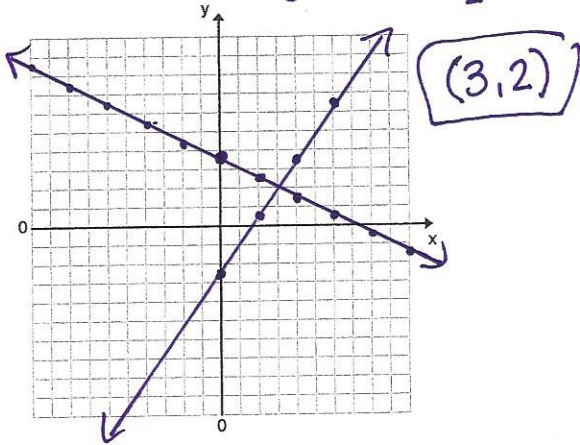
Ex:  $x + 2y = 7$

$3x - 2y = 5$

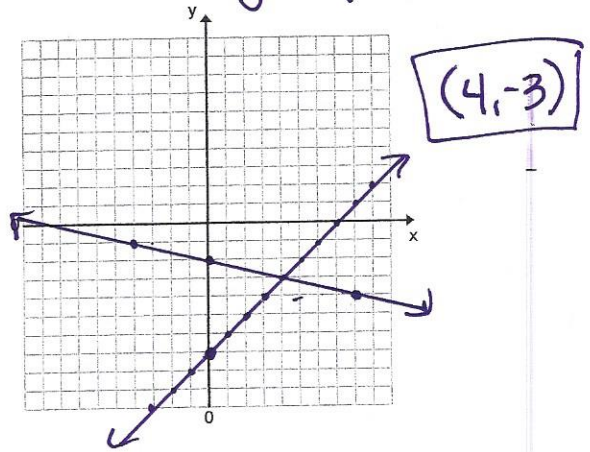
A **Solution of a System of Linear Equations** is an ordered pair  $(x, y)$  that satisfies each equation in the problem.

Use the graph to solve the system. Then, check your solution.

Ex. 1)  $x + 2y = 7 \quad y = -\frac{1}{2}x + \frac{7}{2}$   
 $3x - 2y = 5 \quad y = \frac{3}{2}x - \frac{5}{2}$



Ex. 2)  $-x + y = -7 \quad y = x - 7$   
 $x + 4y = -8 \quad y = -\frac{1}{4}x - 2$



Ex. 2) Solve the system using substitution.

$$\begin{aligned}
 y &= 3x + 2 & x + 2y &= 11 \\
 x + 2(3x + 2) &= 11 & y &= 3(1) + 2 \\
 x + 6x + 4 &= 11 & &= 3 + 2 \\
 7x + 4 &= 11 & y &= 5 \\
 \underline{-4 \quad -4} & & & \\
 7x &= 7 & & \\
 \underline{\quad \quad \quad} & & & \\
 x &= 1 & & \boxed{(1, 5)}
 \end{aligned}$$

$$\begin{aligned}
 x - 2y &= -6 & 4x + 6y &= 4 \\
 x &= 2y - 6 & & \\
 4(2y - 6) + 6y &= 4 & & \\
 8y - 24 + 6y &= 4 & & \\
 14y - 24 &= 4 & & \\
 \underline{\quad \quad \quad} & & & \\
 14y &= 28 & & \\
 \underline{\quad \quad \quad} & & & \\
 y &= 2 & & \boxed{(-2, 2)}
 \end{aligned}$$