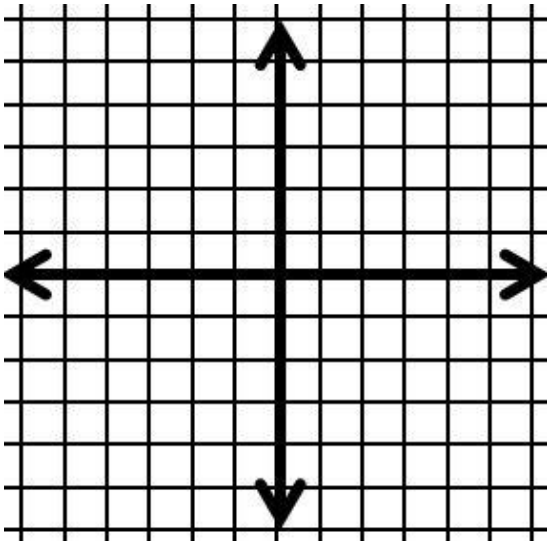# Solving Systems of Equations

Example 1:

Solve the linear system by graphing. $\begin{cases} -x + 2y = 3 \\ 2x + y = 4 \end{cases}$

Example 7:

Solve the linear system using the elimination method.

$$\begin{cases} 4x + 3y = 8 \\ x - 2y = 13 \end{cases}$$

Elimination

Example 5:

Solve the linear system using the elimination method.

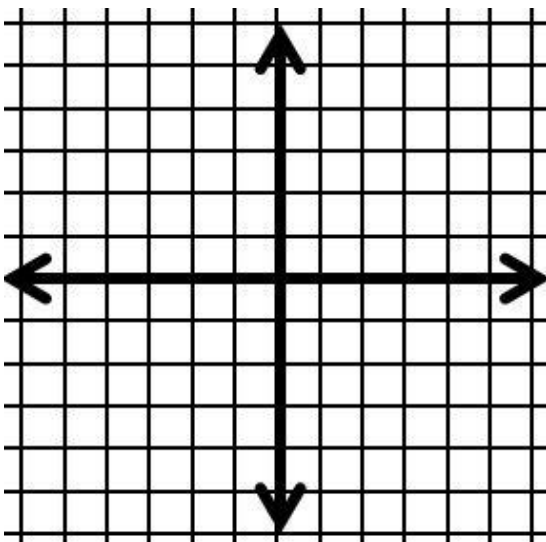$$\begin{cases} 4x - 3y = 5 \\ -2x + 3y = -7 \end{cases}$$

Example 6:

Solve the linear system using the elimination method.

$$\begin{cases} 7x - 2y = 5 \\ 7x - 3y = 4 \end{cases}$$

Example 2:

Solve the linear system by graphing.

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

Graphing

Example 3:

Solve the linear system using the substitution method.

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

Example 4:

Solve the linear system using the substitution method.

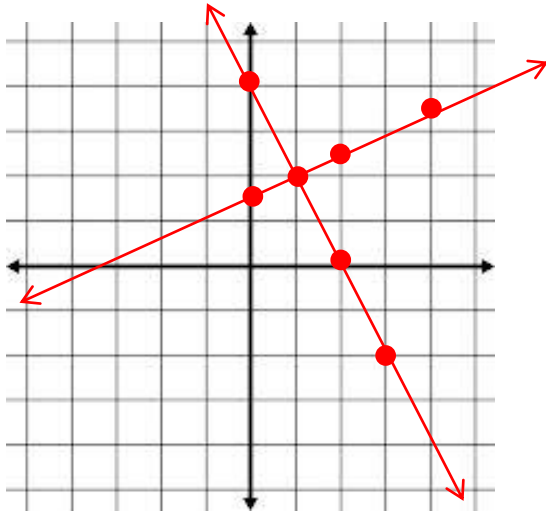$$\begin{cases} x - y = 3 \\ x + 2y = -6 \end{cases}$$

Substitution

Answer Key!

Solving Systems
of Equations

Example 1:

Solve the linear system by graphing. $\begin{cases} -x + 2y = 3 \\ 2x + y = 4 \end{cases}$

$-x + 2y = 3$
$\underline{+x \qquad\quad +x}$

$\dfrac{2y}{2} = \dfrac{x}{2} + \dfrac{3}{2}$

$y = \dfrac{1}{2}x + \dfrac{3}{2}$

$2x + y = 4$
$\underline{-2x \qquad\quad -2x}$

$y = -2x + 4$

SOLUTION:
(1,2)

Example 7:

Solve the linear system using the elimination method.

$\begin{cases} 4x + 3y = 8 \\ x - 2y = 13 \end{cases}$

$4x + 3y = 8 \qquad\rightarrow\qquad 4x + 3y = 8$

$(x - 2y = 13) \; x\,\text{-}4 \;\rightarrow\; \underline{-4x + 8y = -52}$

$\dfrac{11y}{11} = \dfrac{-44}{11}$

$y = -4$

$4x + 3y = 8$
$4x + 3(-4) = 8$
$4x - 12 = 8$
$\underline{\qquad +12 \;\; +12 \qquad}$

$\dfrac{4x}{4} = \dfrac{20}{4}$

$x = 5$

SOLUTION
(5, -4)

Elimination

Example 5:

Solve the linear system using the elimination method.

$$\begin{cases} 4x - 3y = 5 \\ -2x + 3y = -7 \end{cases}$$

$$\begin{array}{l} 4x - 3y = 5 \\ (+) \ -2x + 3y = -7 \\ \hline \dfrac{2x}{2} = \dfrac{-2}{2} \\ \hline x = -1 \end{array}$$

$$4x - 3y = 5$$
$$4(-1) - 3y = 5$$
$$-4 - 3y = 5$$
$$\underline{+4 \qquad +4}$$
$$\dfrac{-3y}{-3} = \dfrac{9}{-3}$$

$$y = -3$$

SOLUTION (-1,-3)

Example 6:

Solve the linear system using the elimination method.

$$\begin{cases} 7x - 2y = 5 \\ 7x - 3y = 4 \end{cases}$$

$$\begin{array}{l} 7x - 2y = 5 \\ (-) \ 7x - 3y = 4 \\ \hline \\ y = 1 \end{array}$$

$$7x - 2y = 5$$
$$7x - 2(1) = 5$$
$$7x - 2 = 5$$
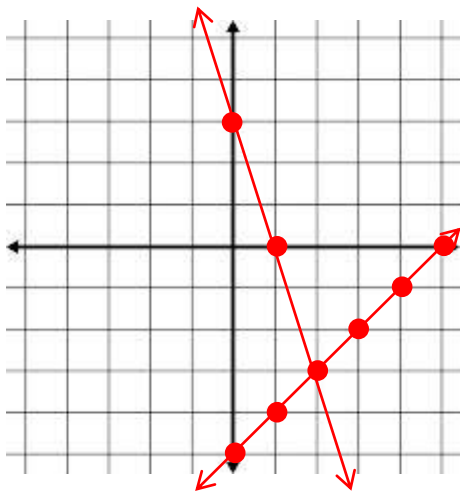$$\underline{+2 \quad +2}$$
$$\dfrac{7x}{7} = \dfrac{7}{7}$$

$$x = 1$$

SOLUTION (1,1)

Example 2:

Solve the linear system by graphing.

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

$$x - y = 5$$
$$\underline{-x \qquad -x}$$
$$-y = -x + 5$$

$$y = x - 5$$

$$3x + y = 3$$
$$\underline{-3x \qquad -3x}$$
$$y = -3x + 3$$

SOLUTION (2, -3)

Graphing

Example 3:

Solve the linear system using the substitution method.

$$y = 2x + 5$$
$$3x + y = 10$$

$y = \boxed{2x + 5}$

$3x + y = 10$	$y = 2x + 5$
$3x + (2x + 5) = 10$	$y = 2(1) + 5$
$5x + 5 = 10$	$y = 2 + 5$
$\quad\quad -5 \quad -5$	$y = 7$
$\overline{\quad\quad\quad\quad}$	
$5x = 5$	**SOLUTION (1,7)**
$x = 1$	

Example 4:

Solve the linear system using the substitution method.

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

$x - y = 3$
$\quad +y \quad +y$
$\overline{\quad\quad\quad}$
$x = \boxed{y + 3}$

$x + 2y = -6$
$(y + 3) + 2y = -6$
$3y + 3 = -6$
$\quad\quad -3 \quad -3$
$\dfrac{3y}{3} = \dfrac{-9}{3}$
$y = -3$

$x - (-3) = 3$
$x + 3 = 3$
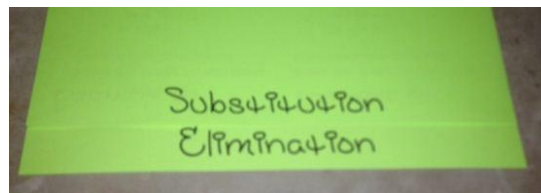$\quad -3 \quad -3$
$\overline{\quad x = 0}$

SOLUTION (0, -3)

Substitution

Directions:

Step 1: Print the pages front to back (pages 1 &2, and pages 3 &4) so that the writing faces in opposite directions,

Step 2: Line up the pages as follows:

Step 3: Fold over the top portion so that "graphing" is just above "substitution".

The final product should look like this: