

Jan. 22, 2007

7.3 Solving Linear Systems by Linear Combinations

$$\begin{array}{r} 35 \\ +14 \\ \hline 49 \end{array}$$

The Concept

Multiply \rightarrow Add
(to get a opposite) (for 1 Variable)

ex 1) Add the Equations.

$$\begin{array}{r} 4x + 3y = 16 \\ + 2x - 3y = 8 \\ \hline \end{array}$$

$$6x + 0 = 24$$

$$\underline{6x = 24}$$

$$\begin{array}{r} 6 \\ 6 \end{array}$$

$$\boxed{x = 4}$$

$$2(4) - 3y = 8$$

$$8 - 3y = 8$$

$$\underline{-8 \quad -8}$$

$$-3y = 0$$

$$\underline{-3 \quad -3}$$

$$\boxed{y = 0}$$

So... the solution is: (4, 0)

Which Equation do I want to Multiply by what number to get an opposite?

ex 2)

$$\begin{array}{l} 2(-x + y = 1) \rightarrow -2x + 2y = 2 \\ 2x + y = -2 \rightarrow +2x + y = -2 \\ \hline 3y = 0 \\ \frac{3y}{3} = \frac{0}{3} \\ y = 0 \end{array}$$
$$\begin{array}{l} 2x + (0) = -2 \\ 2x = -2 \\ \frac{2x}{2} = \frac{-2}{2} \\ x = -1 \end{array}$$

So... The Solution is: $\underline{(-1, 0)}$

Which Equation do I want to Multiply by what number to get an opposite?

ex 3)

$$\begin{array}{l} 4(3x + 5y = 6) \rightarrow 12x + 20y = 24 \\ 3(-4x + 2y = 5) \rightarrow +12x + 6y = 15 \\ \hline + 14y = 9 \end{array}$$

$-4x + 2\left(\frac{3}{2}\right) = 5$
 $-4x + 3 = 5$
 $ -3 $

 $-4x = 2$
 $ -4 $

 $x = -\frac{1}{2}$

$\frac{26y}{26} = \frac{39}{26}$
 $y = \frac{39}{26}$
 $y = \frac{3}{2}$

so... The Solution is: $\left(-\frac{1}{2}, \frac{3}{2}\right)$

Check

$$\begin{array}{l} 3x + 5y = 6 \\ 3\left(-\frac{1}{2}\right) + 5\left(\frac{3}{2}\right) = 6 \\ \frac{-3}{2} + \frac{15}{2} = 6 \\ \frac{-3+15}{2} = 6 \\ \frac{12}{2} = 6 \\ 6 = 6 \checkmark \end{array}$$
$$\begin{array}{l} -4x + 2y = 5 \\ -4\left(-\frac{1}{2}\right) + 2\left(\frac{3}{2}\right) = 5 \\ 2 + 3 = 5 \\ 5 = 5 \checkmark \end{array}$$

Which Equation do I want to Multiply by what number to get an opposite?

ex 1)

$$\begin{array}{r} -1(3x + 2y = 8) \rightarrow -3x - 2y = -8 \\ 2y = 12 - 5x \rightarrow +5x + 2y = 12 \\ \hline +5x \qquad +5x \qquad \qquad \qquad \frac{2x}{2} = \frac{4}{2} \\ 5x + 2y = 12 \end{array}$$

$x = 2$

$$\begin{array}{r} 5(2) + 2y = 12 \\ 10 + 2y = 12 \\ -10 \qquad -10 \\ \hline 2y = 2 \\ \frac{2y}{2} = \frac{2}{2} \\ y = 1 \end{array}$$

So... the solution is: (2, 1)

~~Check~~

O.T.L.

① Pg 405: 7-13(o);
14-22(e);
23-29(o)

Show All Work