

## 7.5 Using an Elimination Strategy to Solve a System of Linear Equations

### **Lesson Focus**

Use the substitution of one variable to solve for a linear system

# Elimination

Solve the following system

$$x + 2y = 10$$

$$-1(x + y = 7)$$

$$-x - y = -7$$

$$x + 2y = 10$$

$$y = 3$$

$$(4, 3)$$

\* We must line up similar terms.

Find  $x$

$$x + y = 7$$

$$x + 3 = 7$$

$$x = 4$$

# $(-5, -1\frac{1}{2})$ Elimination

Solve the following system

$$\begin{cases} 3x - 4y = 7 \\ 5x - 6y = 8 \end{cases}$$

$$\begin{array}{r} 15x - 20y = 35 \\ -15x + 18y = -24 \\ \hline \end{array}$$

$$\begin{array}{r} -2y = 11 \\ y = -1\frac{1}{2} \end{array}$$

Find x

$$\begin{array}{r} 3x - 4y = 7 \\ 3x - 4(-\frac{1}{2}) = 7 \\ 3x + 2 = 7 \end{array}$$

$$\begin{array}{r} 3x = 5 \\ x = \frac{5}{3} \end{array}$$

$$\left(\frac{4}{5}, \frac{16}{5}\right)$$

Example

Solve the following system

$$(2x + 7y = 24) \cdot 2$$

$$(3x - 2y = -4) \cdot 7$$

$$4x + 14y = 48$$

$$21x - 14y = -28$$

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$$25x = 20$$

$$x = \frac{20}{25} = \frac{4}{5}$$

Find y

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

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

$$5\left(\frac{12}{5} - 2y = -4\right)$$

$$12 - 10y = -20$$

$$-10y = -32$$

$$y = \frac{32}{10} = \frac{16}{5}$$

$$3x - 4y = 8$$

$$(2x + y = 7) \cdot 4$$

# Example

Solve the following system

$$\left( \frac{2}{3}x - \frac{1}{2}y = 4 \right) \cdot 6$$

$$\left( \frac{1}{2}x + \frac{1}{4}y = \frac{5}{2} \right) \cdot 4$$

$$4x - 3y = 24$$

$$\left( 2x + y = 10 \right) \cdot 3$$

$$6x + 3y = 30$$

$$\underline{4x - 3y = 24}$$

$$10x = 54$$

$$x = \frac{54}{10}$$

$$x = \frac{27}{5}$$

$$\left(\frac{27}{5}, -\frac{4}{5}\right)$$

Find y

$$6x + 3y = 30$$

$$6\left(\frac{27}{5}\right) + 3y = 30$$

$$5\left(\frac{162}{5} + 3y = 30\right)$$

$$162 + 15y = 150$$

$$\frac{15y}{15} = \frac{-12}{15}$$

$$y = \frac{-12}{15} = \left(-\frac{4}{5}\right)$$

# Homework

**P. 437-439**

**#'s 3, 5, 6, 7**