

6-5 Applying Systems of Linear Equations

Concept Summary - 5 methods of solving systems of linear equations

- Graphing - To estimate a solution
- Substitution - If one of the variables in either equation has a coefficient of **1 or -1**
- Elimination using Addition - Opposite coefficients
- Elimination using Subtraction - Same coefficient in both equations $(-)$
- Elimination using Multiplication - No 1 or -1, no opposite or same coefficients.

$$\begin{cases} 4x - 4y = 8 \\ -8x + y = 19 \end{cases}$$

Method 1:

$$\begin{array}{r} 2(4x - 4y) = (8) \cdot 2 \\ -8x + y = 19 \\ \hline 8x - 8y = 16 \\ -7y = 35 \end{array}$$

$$y = -5$$

$$\rightarrow 4x - 4(-5) = 8$$

$$4x + 20 = 8$$

$$4x = -12$$

$$x = -3$$

$(-3, -5)$

$$\begin{aligned} -8x + y &= 19 \\ y &= 8x + 19 \end{aligned}$$

Method 2:

$$4x - 4(8x + 19) = 8$$

$$4x - 32x - 76 = 8$$

$$-28x = 76 + 8$$

$$-28x = 84$$

$$x = -3$$

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

$$-12 - 4y = 8$$

$$-4y = 20$$

$$y = -5$$

1 A.)

$$\begin{array}{r} 5x + 7y = 2 \\ -1(-2x + 7y) = (9) - 1 \\ \hline \rightarrow 2x - 7y = -9 \\ \hline 7x = -7 \\ \hline x = -1 \end{array} \quad (-1, 1)$$

$$\begin{array}{r} 5(-1) + 7y = 2 \\ -5 + 7y = 2 \\ 7y = 7 \\ \hline y = 1 \end{array}$$

1B.)

$$\begin{array}{r} \times 2(3x - 4y) = (-10)^{\times 2} \\ 5x + 8y = -2 \\ \rightarrow + 6x - 8y = -20 \\ \hline 11x = -22 \\ \underline{x = -2} \end{array}$$

$(-2, -1)$

$$\begin{array}{r} 3(-2) - 4y = -10 \\ -6 - 4y = -10 \\ -4y = 4 \\ \underline{y = -1} \end{array}$$

1c)

$$\begin{array}{r} x - y = 9 \\ + \quad 7x + y = 7 \\ \hline 8x = 16 \end{array}$$

$$x = 2$$

$$(2, -7)$$

$$\begin{array}{r} 2 - y = 9 \\ -y = 7 \\ y = -7 \end{array}$$

1D.)

$$5x - y = 17 \quad \Rightarrow \quad \begin{aligned} -y &= -5x + 17 \quad (\cdot -1) \\ y &= 5x - 17 \end{aligned}$$

$$3x + 2y = 5$$

$$3x + 2(5x - 17) = 5$$

$$3x + 10x - 34 = 5$$

$$13x = 39$$

$$x = 3$$

$$(3, -2)$$

$$5(3) - y = 17$$

$$15 - y = 17$$

$$-y = 2$$

$$y = -2$$

2.

$$\begin{array}{l} y = 3x + 50 \\ y = 5x \end{array}$$
$$\begin{array}{r} y = y \\ 5x = 3x + 50 \\ -3x \quad -3x \\ \hline 2x = 50 \\ x = 25 \end{array}$$

Hrs. $\left\{ \begin{array}{l} \text{weeks} \end{array} \right.$

$$\begin{array}{l} y = 3(25) + 50 \\ 75 + 50 \\ y = 125 \end{array}$$

\checkmark 25 weeks

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total 10