

# Warmup

## Solve by Substitution

$$\begin{aligned} 1) \quad & xy = 12 \\ & x - y = 4 \end{aligned}$$

$$\begin{array}{rcl} \downarrow & & \\ x + y & = & 12 \\ -x & & -y \\ \hline x & = & -y + 12 \end{array}$$

$$\begin{array}{rcl} x + y & = & 12 \\ x + 4 & = & 12 \\ -4 & & -4 \\ \hline x & = & 8 \end{array}$$

$$\begin{array}{rcl} -y + 12 - x & = & 4 \\ -12 & & -12 \\ \hline -2y & = & -8 \\ -2 & & -2 \\ \hline y & = & 4 \end{array}$$

$$(8, 4)$$

$$2) \quad 3x + 9y = 75$$

$$8x + 5y = 67$$

$$3x + 9y = 75$$

$$\begin{array}{rcl} -9y & & -9y \end{array}$$

$$\frac{3x}{3} = \frac{75 - 9y}{3}$$

$$x = 25 - 3y$$

$$8(25 - 3y) + 5y = 67$$

$$200 - 24y + 5y = 67$$

$$\cancel{200} - 19y = 67$$

$$\begin{array}{rcl} -200 & & -200 \\ \hline -19y & = & -133 \\ -19 & & -19 \end{array}$$

$$8x + 5(7) = 67$$

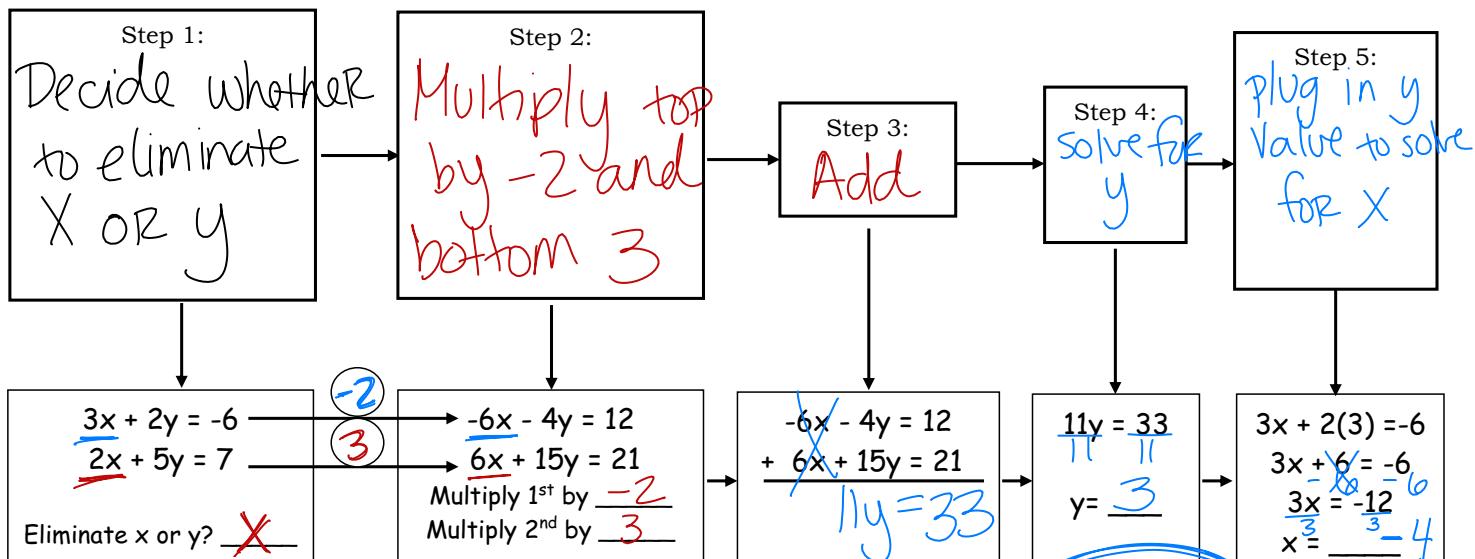
$$\begin{array}{rcl} 8x + 35 & = & 67 \\ -35 & & -35 \\ \hline 8x & = & 32 \end{array}$$

$$\begin{array}{rcl} 8x & = & 32 \\ 8 & & 8 \\ \hline x & = & 4 \end{array}$$

$$y = 7$$

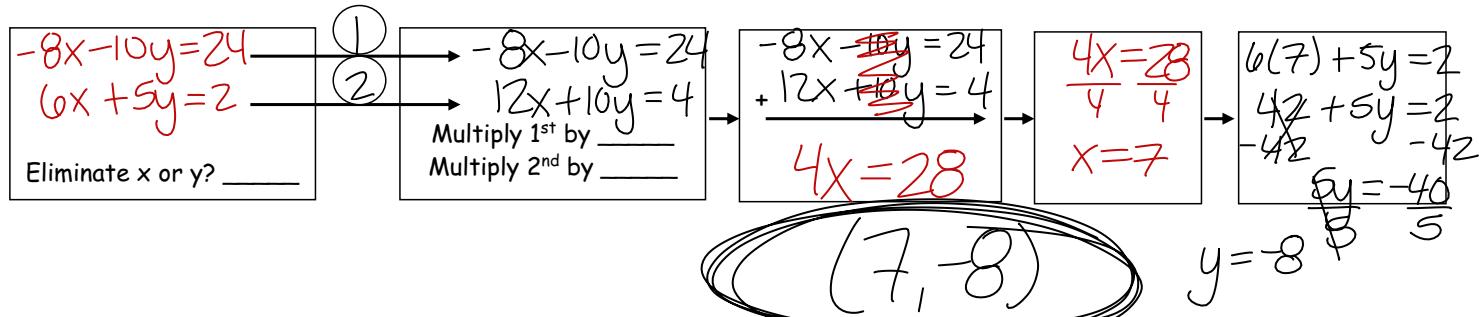
$$(4, 7)$$

## How Do You Solve a System of Equations by Elimination?



$$\begin{array}{l} -8x - 10y = 24 \\ 6x + 5y = 2 \end{array}$$

(-4, 3)



Solve the systems using elimination.

$$\begin{array}{l} \text{1. } \begin{array}{r} x - y = 11 \\ 2x + y = 19 \end{array} \\ \hline \begin{array}{r} 3x = 30 \\ 3 \\ \hline x = 10 \end{array} \quad \begin{array}{r} 10 - y = 11 \\ -10 \\ \hline -y = 1 \\ \hline y = -1 \end{array} \\ \text{ } \quad \text{ } \quad \boxed{(10, -1)} \end{array}$$

$$\begin{array}{l} \text{4. } \begin{array}{r} -3x + 7y = -16 \\ -9x + 5y = 16 \end{array} \\ \hline \begin{array}{r} -9x + 5y = 16 \\ -9x + 7(-4) = -16 \\ -9x + 28 = 16 \\ -9x = -12 \\ \hline x = 4 \end{array} \quad \begin{array}{r} 7y = 48 \\ -3x - 28 = -16 \\ 7y = 32 \\ y = 4 \end{array} \\ \text{ } \quad \text{ } \quad \boxed{(-4, 4)} \end{array}$$

$$\begin{array}{l} \text{7. } \begin{array}{r} 8x + y = -16 \\ -3x + y = -5 \end{array} \\ \hline \begin{array}{r} 8x = -16 \\ -3x = -5 \\ \hline x = -2 \\ y = -8 \end{array} \quad \begin{array}{r} -8x - 16 = 16 \\ -3x + 15 = -5 \\ \hline -11x = -22 \\ x = -2 \end{array} \\ \text{ } \quad \text{ } \quad \boxed{(-2, -8)} \end{array}$$

$$\begin{array}{l} \text{2. } \begin{array}{r} 5x + y = 9 \\ 10x - 7y = -18 \end{array} \\ \hline \begin{array}{r} -7y = 27 \\ y = -3 \end{array} \end{array}$$

$$\begin{array}{l} \text{3. } \begin{array}{r} -4x + 9y = 9 \\ x - 3y = -6 \end{array} \\ \hline \begin{array}{r} -3x = 15 \\ x = -5 \end{array} \end{array}$$

$$\begin{array}{l} \text{5. } \begin{array}{r} 6x - 12y = 24 \\ -x - 6y = 4 \end{array} \\ \hline \begin{array}{r} -x - 6y = 4 \\ x + 6y = -24 \\ \hline 0 = -20 \end{array} \end{array}$$

$$\begin{array}{l} \text{6. } \begin{array}{r} -7x + y = -19 \\ -2x + 3y = -19 \end{array} \\ \hline \begin{array}{r} 3y = -19 \\ y = -\frac{19}{3} \end{array} \end{array}$$

$$\begin{array}{l} \text{8. } \begin{array}{r} -3x + 3y = 4 \\ -x + y = 3 \end{array} \\ \hline \begin{array}{r} -3x + 3y = 4 \\ 3x - 3y = -9 \\ \hline 0 = -5 \end{array} \end{array}$$

No Solution

$$\begin{array}{l} \text{9. } \begin{array}{r} 2x + 8y = 6 \\ -4x - 16y = -12 \end{array} \\ \hline \begin{array}{r} -4x - 16y = -12 \\ 4x + 16y = 12 \\ \hline 0 = 0 \end{array} \end{array}$$

Infinite Solutions