

# Warmup

Solve by substitution

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

$$\begin{array}{r} \rightarrow x + y = 12 \\ \quad -x \quad -y \\ \hline x = -y + 12 \end{array}$$
$$\begin{array}{r} -y + 12 - y = 4 \\ -12 \quad -12 \\ \hline -2y = -8 \\ \quad -2 \quad -2 \\ \hline y = 4 \end{array}$$

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

$(8, 4)$

$$\begin{aligned} 2) \quad 3x + 9y &= 75 \\ 8x + 5y &= 67 \end{aligned}$$

$$\begin{array}{r} 3x + 9y = 75 \\ \quad -9y \quad -9y \\ \hline 3x = 75 - 9y \end{array}$$

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

$$x = 25 - 3y$$

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

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

$$\begin{array}{r} 200 - 19y = 67 \\ -200 \quad -200 \\ \hline -19y = -133 \end{array}$$

$$\begin{array}{r} -19y = -133 \\ \quad -19 \quad -19 \\ \hline y = 7 \end{array}$$

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

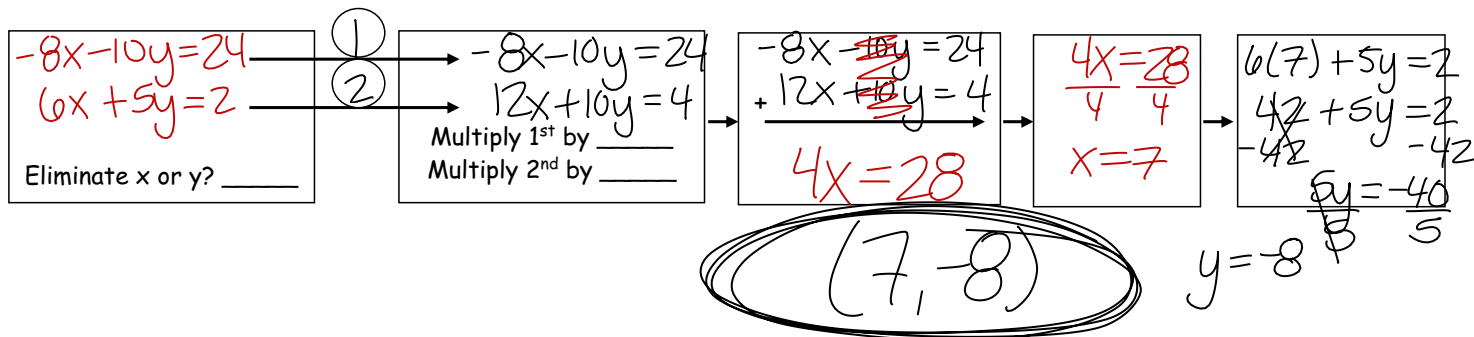
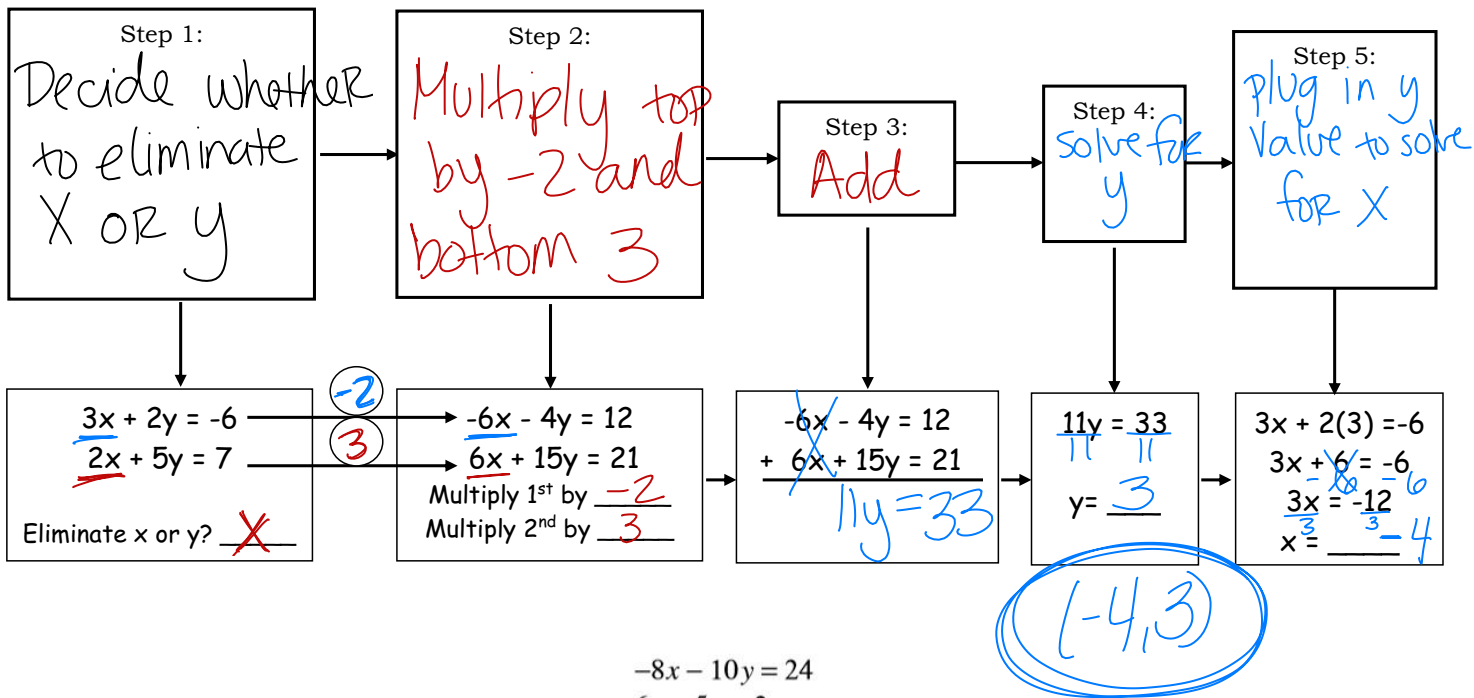
$$\begin{array}{r} 8x + 35 = 67 \\ \quad -35 \quad -35 \\ \hline 8x = 32 \end{array}$$

$$\frac{8x}{8} = \frac{32}{8}$$

$$\begin{array}{r} y = 7 \\ x = 4 \end{array}$$

$(4, 7)$

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



Solve the systems using elimination.

<p>1. <math>x - y = 11</math> <math>2x + y = 19</math></p> $\begin{array}{r} x - y = 11 \\ 2x + y = 19 \\ \hline 3x = 30 \\ \hline x = 10 \end{array}$ <p><del><math>x - y = 11</math></del> <del><math>-y = -10</math></del> <del><math>-y = 1</math></del> <del><math>-y = -1</math></del> <del><math>y = -1</math></del> <del><math>(10, -1)</math></del></p>	<p>2. <math>5x + y = 9</math> <math>10x - 7y = -18</math></p>	<p>3. <math>-4x + 9y = 9</math> <math>x - 3y = -6</math></p>
<p>4. <math>-3x + 7y = -16</math> <math>-9x + 5y = 16</math></p> $\begin{array}{r} -3x + 7y = -16 \\ -9x + 5y = 16 \\ \hline 9x - 21y = 48 \\ -9x + 5y = 16 \\ \hline -16y = 64 \\ y = -4 \end{array}$ <p><del><math>-3x + 7y = -16</math></del> <del><math>-9x + 5y = 16</math></del> <del><math>-3x - 28 = -16</math></del> <del><math>-3x = -4</math></del> <del><math>-3x = -4</math></del> <del><math>y = -4</math></del> <del><math>(-4, -4)</math></del> <del><math>3x + 7(-4) = -16</math></del> <del><math>3x - 28 = -16</math></del> <del><math>3x = -4</math></del></p>	<p>5. <math>6x - 12y = 24</math> <math>-x - 6y = 4</math></p>	<p>6. <math>-7x + y = -19</math> <math>-2x + 3y = -19</math></p>
<p>7. <math>8x + y = -16</math> <math>-3x + y = -5</math></p> $\begin{array}{r} 8x + y = -16 \\ -3x + y = -5 \\ \hline 11x = -11 \\ x = -1 \end{array}$ <p><del><math>8x + y = -16</math></del> <del><math>-3x + y = -5</math></del> <del><math>-8x + y = 16</math></del> <del><math>-3x + y = -5</math></del> <del><math>-11x = 11</math></del> <del><math>-11x = -11</math></del> <del><math>x = -1</math></del> <del><math>8(-1) + y = -16</math></del> <del><math>-8 + y = -16</math></del> <del><math>y = -8</math></del> <del><math>(-1, -8)</math></del></p>	<p>8. <math>-3x + 3y = 4</math> <math>-3(-x + y = 3)</math></p> $\begin{array}{r} -3x + 3y = 4 \\ 3x - 3y = -9 \\ \hline 0 = -5 \end{array}$ <p>No Solution</p>	<p>9. <math>2x + 8y = 6</math> <math>-4x - 16y = -12</math></p> $\begin{array}{r} 2x + 8y = 6 \\ -4x - 16y = -12 \\ \hline 0 = 0 \end{array}$ <p>Infinite Solutions</p>

$(-1, -8)$