

Linear Combination

* add the E.O.'s together
so that one var goes away

$$\begin{array}{r}
 2x - y = 4 \\
 + \quad 2x + 3y = -12 \\
 \hline
 4x + 2y = -8 \quad \leftarrow \text{still 2 variables}
 \end{array}$$

* we need one var to
have equal top coeff

$$\begin{array}{r}
 2x - y = 4 \\
 + \quad -2x + 3y = +12 \\
 \hline
 -4y = 16 \\
 \quad \quad \quad -4 \\
 \quad \quad \quad y = -4
 \end{array}$$

$$2x + 4 = 4$$

$$2x + 4 = 4$$

$$\begin{array}{r}
 -4 \\
 2x = 0 \\
 \hline
 2
 \end{array}$$

$$x = 0$$

$$(0, -4)$$

$$\begin{aligned}(2x + 3y = 16) & \cdot 3 \\ (3x - 7y = 1) & \cdot 2\end{aligned}$$

$$\begin{aligned}6x + 9y &= 48 \\ + -6x + 14y &= -2 \\ \hline 0 + 23y &= 46\end{aligned}$$

$$y = 2$$

$$\boxed{(5, 2)}$$

$$\begin{aligned}2x + 3(2) &= 16 \\ 2x + 6 &= 16 \\ -6 & \\ \hline 2x &= 10 \\ \frac{2x}{2} &= \frac{10}{2} \\ x &= 5\end{aligned}$$

$$\begin{aligned} (4x - y = 9) \times 3 \\ (3x - 5y = 11) \times (-4) \end{aligned}$$

$$\begin{aligned} 12x - 3y &= 27 \\ + -12x + 20y &= -44 \\ \hline \end{aligned}$$

$$\frac{17y = -17}{17}$$

$$y = -1$$

$$(2, -1)$$

$$3x - 5(-1) = 11$$

$$3x + 5 = 11$$

$$\frac{3x = 6}{3}$$

$$x = 2$$

your turn!

$$\begin{aligned} 1) \quad & 3x + 2y = 4 \\ & 2x - 5y = -29 \end{aligned}$$

$$\begin{aligned} 2) \quad & 2x + y = 7 \\ & 3x - y = 8 \end{aligned}$$