

Solving Systems of Linear Equations by Elimination Practice

Use the elimination method to solve the following systems of linear equations.

1) $3x + 4y = -18$

$$\begin{array}{r} 3x + 4y = -18 \\ -(3x + 3y = 9) \\ \hline y = -27 \end{array}$$

$$3x + 3(-27) = 9$$

$$\begin{array}{r} 3x - 81 = 9 \\ +81 \quad +81 \\ \hline \end{array}$$

$$\begin{array}{r} 3x = 90 \\ \frac{3x}{3} = \frac{90}{3} \\ x = 30 \end{array}$$

$$\boxed{(30, -27)}$$

3) $7x + y = -2$

$$\begin{array}{r} -7x + y = -2 \\ -7x - 3y = -8 \\ \hline -2y = -10 \\ \frac{-2y}{-2} = \frac{-10}{-2} \\ y = 5 \end{array}$$

$$\begin{array}{r} 7x + 5 = -2 \\ -5 \quad -5 \\ \hline 7x = -7 \\ \frac{7x}{7} = \frac{-7}{7} \\ x = -1 \end{array}$$

$$\boxed{(-1, 5)}$$

5) $\begin{cases} 2x - y = -25 \\ x + 3y = 5 \end{cases} \Rightarrow$

$$\begin{array}{r} 6x - 3y = -75 \\ x + 3y = 5 \\ \hline 7x = -70 \\ \frac{7x}{7} = \frac{-70}{7} \\ x = -10 \end{array}$$

$$\begin{array}{r} -10 + 3y = 5 \\ +10 \quad +10 \\ \hline 3y = 15 \\ \frac{3y}{3} = \frac{15}{3} \\ y = 5 \end{array}$$

$$\boxed{(-10, 5)}$$

2) $12x - 10y = -8$

$$\begin{array}{r} 12x - 10y = -8 \\ -(2x - 10y = 32) \\ \hline 10x = -40 \\ \frac{10x}{10} = \frac{-40}{10} \\ x = -4 \end{array}$$

$$\begin{array}{r} 2(-4) - 10y = 32 \\ -8 - 10y = 32 \\ +8 \quad +8 \\ \hline -10y = 40 \\ \frac{-10y}{-10} = \frac{40}{-10} \\ y = -4 \end{array}$$

$$\boxed{(-4, -4)}$$

4) $7x + 2y = 18$

$$\begin{array}{r} 7x + 2y = 18 \\ -(3x + 2y = 2) \\ \hline 4x = 16 \\ \frac{4x}{4} = \frac{16}{4} \\ x = 4 \end{array}$$

$$\begin{array}{r} 3(4) + 2y = 2 \\ 12 + 2y = 2 \\ -12 \quad -12 \\ \hline 2y = -10 \\ \frac{2y}{2} = \frac{-10}{2} \\ y = -5 \end{array}$$

$$\boxed{(4, -5)}$$

6) $-4x + y = -3$

$4(x + 4y = 22) \Rightarrow$

$$\begin{array}{r} -4x + y = -3 \\ 4x + 16y = 88 \\ \hline 17y = 85 \\ \frac{17y}{17} = \frac{85}{17} \\ y = 5 \end{array}$$

$$\begin{array}{r} x + 4(5) = 22 \\ x + 20 = 22 \\ -20 \quad -20 \\ \hline x = 2 \end{array}$$

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

$$\begin{array}{l} -5 \\ 7) \end{array} \begin{array}{l} 2x - y = 0 \\ 6x - 5y = -20 \end{array}$$

$$\begin{array}{r} -10x + 5y = 0 \\ 6x - 5y = -20 \\ \hline \end{array}$$

$$\begin{array}{r} -4x = -20 \\ \hline -4 \quad -4 \end{array}$$

$$x = 5$$

$$2(5) - y = 0$$

$$\begin{array}{r} 10 - y = 0 \\ +y \quad +y \end{array}$$

$$10 = y$$

$$\boxed{(5, 10)}$$

$$\begin{array}{l} 9) \\ -3 \end{array} \begin{array}{l} -2x - 6y = -12 \\ -7x - 10y = -2 \end{array}$$

$$-10x - 30y = -60$$

$$21x + 30y = 6$$

$$\begin{array}{r} -10x - 30y = -60 \\ 21x + 30y = 6 \\ \hline \end{array}$$

$$11x = -54$$

$$x = -\frac{54}{11}$$

$$-\frac{2}{1} \left(-\frac{54}{11} \right) - 6y = -12$$

$$\frac{108}{11} - 6y = -12$$

$$-6y = -\frac{12}{1} - \frac{108}{11}$$

$$-6y = -\frac{132}{11} - \frac{108}{11}$$

$$-6y = -\frac{240}{11}$$

$$y = 40/11$$

$$\boxed{\left(-\frac{54}{11}, \frac{40}{11} \right)}$$

$$\begin{array}{l} 7 \\ 8) \\ 4) \end{array} \begin{array}{l} -4x - 7y = 7 \\ 7x - 2y = 2 \end{array}$$

$$-28x - 49y = 49$$

$$28x - 8y = 8$$

$$\begin{array}{r} -28x - 49y = 49 \\ 28x - 8y = 8 \\ \hline \end{array}$$

$$-57y = 57$$

$$\begin{array}{r} -57 \quad -57 \end{array}$$

$$y = -1$$

$$-4x - 7(-1) = 7$$

$$\begin{array}{r} -4x + 7 = 7 \\ -7 \quad -7 \end{array}$$

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

$$x = 0$$

$$\boxed{(0, -1)}$$

$$\begin{array}{l} 5 \\ 10) \\ 2) \end{array} \begin{array}{l} 7x + 2y = -5 \\ -4x - 5y = -1 \end{array}$$

$$35x + 10y = -25$$

$$-8x - 10y = -2$$

$$\begin{array}{r} 35x + 10y = -25 \\ -8x - 10y = -2 \\ \hline \end{array}$$

$$27x = -27$$

$$\begin{array}{r} 27 \quad 27 \end{array}$$

$$x = -1$$

$$7(-1) + 2y = -5$$

$$\begin{array}{r} -7 + 2y = -5 \\ +7 \quad +7 \end{array}$$

$$\begin{array}{r} 2y = 2 \\ \hline 2 \quad 2 \end{array}$$

$$y = 1$$

$$\boxed{(-1, 1)}$$