

Solutions to WS 33.1 - Solving Systems of Equations by Elimination, #2-16 even

$$\textcircled{2} \begin{cases} x - 3y = -13 \\ -x + 4y = 15 \end{cases}$$

$$\underline{y = 2} \rightarrow \begin{aligned} x - 3(2) &= -13 \\ x - 6 &= -13 \\ x &= -7 \end{aligned}$$

$\therefore (-7, 2)$

$$\textcircled{4} \begin{cases} 5x - 2y = 3 \xrightarrow{\text{mult. by } (-1)} -5x + 2y = -3 \\ 5x + y = -9 \end{cases} \Rightarrow \begin{aligned} -5x + 2y &= -3 \\ 5x + y &= -9 \\ \hline 3y &= -12 \\ y &= -4 \end{aligned}$$

$$\begin{aligned} 5x + y &= -9 \\ 5x + (-4) &= -9 \\ 5x &= -5 \\ x &= -1 \end{aligned}$$

$\therefore (-1, -4)$

$$\textcircled{6} \begin{cases} x + 2y = -1 \xrightarrow{\text{mult. by } (-4)} -4x - 8y = 4 \\ 4x + 3y = -9 \end{cases} \Rightarrow \begin{aligned} -4x - 8y &= 4 \\ 4x + 3y &= -9 \\ \hline -5y &= -5 \\ y &= 1 \end{aligned}$$

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

$\therefore (-3, 1)$

$$\textcircled{8} \begin{cases} 2x + y = -1 \xrightarrow{\text{mult. by } 5} 10x + 5y = -5 \\ 7x - 5y = 5 \end{cases} \Rightarrow \begin{aligned} 10x + 5y &= -5 \\ 7x - 5y &= 5 \\ \hline 17x &= 0 \\ x &= 0 \end{aligned}$$

$$\begin{aligned} 2x + y &= -1 \\ 2(0) + y &= -1 \\ y &= -1 \end{aligned}$$

$\therefore (0, -1)$

$$\textcircled{10} \begin{cases} 4x + 3y = 27 \xrightarrow{\times (-5)} -12x - 9y = -81 \\ 3x + 4y = 29 \xrightarrow{\times 4} 12x + 16y = 116 \end{cases}$$

$$\begin{aligned} -12x - 9y &= -81 \\ 12x + 16y &= 116 \\ \hline 7y &= 35 \\ y &= 5 \end{aligned}$$

$$\begin{aligned} 4x + 3y &= 27 \\ 4x + 3(5) &= 27 \\ 4x + 15 &= 27 \\ 4x &= 12 \\ x &= 3 \end{aligned}$$

$\therefore (3, 5)$

$$\textcircled{12} \begin{cases} x + 5y = -13 \\ 2x - 5y = -19 \end{cases}$$

$$\begin{aligned} x + 5y &= -13 \\ 2x - 5y &= -19 \\ \hline 3x &= -32 \\ x &= \frac{-32}{3} \end{aligned}$$

$$\begin{aligned} x + 5y &= -13 \\ \frac{-32}{3} + 5y &= -13 \\ -32 + 15y &= -39 \\ 15y &= -7 \\ y &= \frac{-7}{15} \end{aligned}$$

$\therefore \left(\frac{-32}{3}, \frac{-7}{15}\right)$

$$\textcircled{14} \begin{cases} 2x + 2y = -8 \xrightarrow{\times 3} 6x + 6y = -24 \\ 3x - 3y = 18 \xrightarrow{\times 2} 6x - 6y = 36 \end{cases}$$

$$\begin{aligned} 6x + 6y &= -24 \\ 6x - 6y &= 36 \\ \hline 12x &= 12 \\ x &= 1 \end{aligned}$$

$$\begin{aligned} 2x + 2y &= -8 \\ 2(1) + 2y &= -8 \\ 2 + 2y &= -8 \\ 2y &= -10 \\ y &= -5 \end{aligned}$$

$\therefore (1, -5)$

$$\textcircled{16} \begin{cases} 2x - y = -6 \xrightarrow{\times 3} 6x - 3y = -18 \\ 2x + 3y = 14 \end{cases} \Rightarrow \begin{aligned} 6x - 3y &= -18 \\ 2x + 3y &= 14 \\ \hline 8x &= -4 \\ x &= \frac{-4}{8} \\ x &= -\frac{1}{2} \end{aligned}$$

$$\begin{aligned} 2x - y &= -6 \\ 2\left(-\frac{1}{2}\right) - y &= -6 \\ -1 - y &= -6 \\ -y &= -5 \\ y &= 5 \end{aligned}$$

$\therefore \left(-\frac{1}{2}, 5\right)$