

1. (a) Solve the equations

$$3x - 2y = 4 \rightarrow \textcircled{1}$$

$$x - 2y = 2 \rightarrow \textcircled{2}$$

by eliminating one of the variables.

Step 1 Multiply $\textcircled{2}$ by -1

Step 2

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

$$\frac{2x}{2} = \frac{2}{2}$$

$$x = 1$$

Step 3 Substitute in $\textcircled{1}$

$$\begin{array}{r} 3(1) - 2y = 4 \\ 3 - 2y = 4 \\ -2y = 4 - 3 \\ -2y = 1 \end{array}$$

$$y = -\frac{1}{2}$$

(b) Solve the equations

$$-2 \quad 3x + 5y = 19 \rightarrow \textcircled{1}$$

$$5 \quad -5x + 2y = -11 \rightarrow \textcircled{2}$$

by eliminating one of the variables.

Step 1 Multiply $\textcircled{1}$ by -2
 and $\textcircled{2}$ by 5

Step 2

$$\begin{array}{r} -6x - 10y = -38 \\ -25x + 10y = -55 \\ \hline \end{array} \quad \text{Add}$$

$$\frac{-31x}{-31} = \frac{-93}{-31}$$

$$x = 3$$

Step 3 Substitute in $\textcircled{1}$

$$3(3) + 5y = 19$$

$$9 + 5y = 19$$

$$5y = 10$$

$$y = 2$$

Practice Problem

2. Attempt to solve the following systems of equations:

$$\begin{array}{ll} \text{(a)} & 3x - 6y = -2 \\ & -4x + 8y = -1 \end{array} \quad \begin{array}{ll} \text{(b)} & -5x + y = 4 \\ & 10x - 2y = -8 \end{array}$$



Comment on the nature of the solution in each case.

$$\text{a) } \begin{array}{l} 4 \\ 3 \end{array} \quad \begin{array}{l} 3x - 6y = -2 \\ -4x + 8y = -1 \end{array} \quad \begin{array}{l} \rightarrow \textcircled{1} \\ \rightarrow \textcircled{2} \end{array}$$

$$\begin{array}{l} 3 \\ 3 \end{array} \quad \begin{array}{l} -4x + 8y = -1 \\ -4x + 8y = -1 \end{array} \quad \begin{array}{l} \rightarrow \textcircled{2} \\ \rightarrow \textcircled{2} \end{array}$$

$$\cancel{12x} - \cancel{24y} = -8$$

$$\cancel{-12x} + \cancel{24y} = -3$$

$$0 = -11$$

(No solution)

$$\text{b) } \begin{array}{l} 2 \\ 1 \end{array} \quad \begin{array}{l} -5x + y = 4 \\ 10x - 2y = -8 \end{array} \quad \begin{array}{l} \rightarrow \textcircled{1} \\ \rightarrow \textcircled{2} \end{array}$$

$$\begin{array}{l} 1 \\ 1 \end{array} \quad \begin{array}{l} 10x - 2y = -8 \\ 10x - 2y = -8 \end{array} \quad \begin{array}{l} \rightarrow \textcircled{2} \\ \rightarrow \textcircled{2} \end{array}$$

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

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

$$0 = 0$$

(Infinitely many solutions)