

Substitution Method

1) Solve: $3x + 4y = -6$

$y = -2x + 1$

Notice that the equations are written in two different forms. Here it's easiest to substitute the 2nd equation into the 1st and then solve for x and y.

$$\begin{aligned} \textcircled{1} &\leftarrow 3x + 4y = -6 \\ \textcircled{2} &\leftarrow y = -2x + 1 \end{aligned} \left. \vphantom{\begin{aligned} \textcircled{1} \\ \textcircled{2} \end{aligned}} \right\} \text{System}$$

$$3x + 4(-2x + 1) = -6 \quad \text{Sub } \textcircled{2} \text{ into } \textcircled{1}$$

$$3x - 8x + 4 = -6$$

$$-5x = -10$$

$$\frac{-5x}{-5} = \frac{-10}{-5}$$

$$x = 2$$

now find y using $x = 2$

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

$$y = -3$$

Sol: $(2, -3)$

2) $4x + y = -1$

$8x + 3y = 0$

You must re-arrange one of the equations first to solve using substitution.

$$4x + y = -1 \quad \leftarrow \text{Re-arrange the 1st rule 2 solve.}$$

$$y = -4x - 1$$

$$8x + 3(-4x - 1) = 0$$

$$8x - 12x - 3 = 0$$

$$-4x = 3$$

$$x = -\frac{3}{4}$$

now find y:

$$y = -4\left(-\frac{3}{4}\right) - 1 \quad \therefore \left(-\frac{3}{4}, 2\right)$$

$$y = 3 - 1$$

$$y = 2$$

3) The length of a rectangular plot of land measures 10m more than twice its width. The plot has a perimeter of 110m. How much does this plot of land cost if it is sold for \$50 per square metre?

x: width of yard

y: length of yard

$$\begin{aligned} y &= 2x + 10 \\ 2x + 2y &= 110 \end{aligned} \left. \vphantom{\begin{aligned} y \\ 2x + 2y \end{aligned}} \right\} \text{System.}$$

Solve:

$$2x + 2(2x + 10) = 110$$

$$2x + 4x + 20 = 110$$

$$\frac{6x}{6} = \frac{90}{6}$$

$$x = 15$$

$$y = 2(15) + 10$$

$$y = 40$$

Sol: $(15, 40)$

Answer the Question:

$$A = 15 \times 40$$

$$= 600 \text{ m}^2$$

$$\text{Cost} = 600 \times 50$$

$$= 30000 \$$$