Linear Equation In Two Variables

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This is Problem-1(i) from Exercise 3.3

x+y=14 , x-y=4

Solution:

Given Data: x+y=14 , x-y=4

This can also be written as:

$$\tag{1}$$

$$a1\begin{pmatrix}1\\1\end{pmatrix}\ a2\begin{pmatrix}1\\-1\end{pmatrix}\ b\begin{pmatrix}14\\4\end{pmatrix} \tag{2}$$

$$\tag{3}$$

$$x = \frac{\begin{vmatrix} b & a2 \end{vmatrix}}{\begin{vmatrix} a1 & a2 \end{vmatrix}} = \frac{\begin{vmatrix} 14 & 1 \\ 4 & -1 \end{vmatrix}}{\begin{vmatrix} 1 & 1 \\ 1 & -1 \end{vmatrix}} = \frac{\begin{vmatrix} -14 & -4 \end{vmatrix}}{\begin{vmatrix} -1 & -1 \end{vmatrix}} = \frac{-18}{-2} = 9 \tag{4}$$

$$\tag{5}$$

$$y = \frac{\begin{vmatrix} a1 & b \end{vmatrix}}{\begin{vmatrix} a1 & a2 \end{vmatrix}} = \frac{\begin{vmatrix} 1 & 14 \\ 1 & 4 \end{vmatrix}}{\begin{vmatrix} 1 & 1 \\ 1 & -1 \end{vmatrix}} = \frac{\begin{vmatrix} 4 & -14 \end{vmatrix}}{\begin{vmatrix} -1 & -1 \end{vmatrix}} = \frac{-10}{-2} = 5 \tag{6}$$

therefore x = 9 and y = 5