Linear Equations in Two Varible

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Class 10^{th} Maths - Chapter 3

This is Problem-1 from Exercise 3.2

1. Form the pair of linear equatins in the following problems, and their solutions
   2.5 pencils and 7 pens together cost 50 rupees,whereas 7 pencils and 5 pens together cost 46 rupees .Find the cost of one pencil and that of one pen.

   Solution:
   Equations can also be written as:

$$\begin{pmatrix} 5 & 7 \\ 7 & 5 \end{pmatrix} \begin{pmatrix} x \\ y \end{pmatrix} = \begin{pmatrix} 50 \\ 46 \end{pmatrix} \tag{1}$$

$$x = \frac{\begin{vmatrix} \mathbf{b} & \mathbf{a_2} \end{vmatrix}}{\begin{vmatrix} \mathbf{a_1} & \mathbf{a_2} \end{vmatrix}} = \frac{\begin{vmatrix} 50 & 7 \\ 46 & 5 \end{vmatrix}}{\begin{vmatrix} 5 & 7 \\ 7 & 5 \end{vmatrix}} = \frac{(50)(5)-(46)(7)}{(7)(7)-(5)(5)} = \frac{250-320}{25-49} = 3 \tag{2}$$

$$y = \frac{\begin{vmatrix} \mathbf{a_1} & \mathbf{b} \end{vmatrix}}{\begin{vmatrix} \mathbf{a_1} & \mathbf{a_2} \end{vmatrix}} = \frac{\begin{vmatrix} 5 & 50 \\ 7 & 46 \end{vmatrix}}{\begin{vmatrix} 5 & 7 \\ 7 & 5 \end{vmatrix}} = \frac{(5)(46)-(7)(750)}{(7)(7)-(5)(5)} = \frac{230-350}{25-49} = 5 \tag{3}$$

(4)