linear equation in two variables

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Class 10th Maths - Chapter 3

This is Problem-2 from Exercise 3.1

1. The coach of a cricket team buys 3bats and 6balls for 3900 rupees.Later she buys another bat and 3 more balls of the same kind for 1300 rupees.Represent the situation algebrically and geometrically.

   Solution:
   Equations can also be written as:

$$\begin{pmatrix} 3 & 6 \\ 1 & 3 \end{pmatrix} \begin{pmatrix} x \\ y \end{pmatrix} = \begin{pmatrix} 3900 \\ 1300 \end{pmatrix} \tag{1}$$

$$x = \frac{\begin{vmatrix} \mathbf{b} & \mathbf{a_2} \end{vmatrix}}{\begin{vmatrix} \mathbf{a_1} & \mathbf{a_2} \end{vmatrix}} = \frac{\begin{vmatrix} 3900 & 6 \\ 1300 & 3 \end{vmatrix}}{\begin{vmatrix} 3 & 6 \\ 1 & 3 \end{vmatrix}} = \frac{(3900)(3) - (1300)(6)}{(3)(3) - (1)(6)} = \frac{11700 - 7800}{9 - 6} = 1300 \tag{2}$$

$$y = \frac{\begin{vmatrix} \mathbf{a_1} & \mathbf{b} \end{vmatrix}}{\begin{vmatrix} \mathbf{a_1} & \mathbf{a_2} \end{vmatrix}} = \frac{\begin{vmatrix} 3 & 3900 \\ 1 & 1300 \end{vmatrix}}{\begin{vmatrix} 3 & 6 \\ 1 & 3 \end{vmatrix}} = \frac{(1300)(3) - (1)(3900)}{(3)(3) - (1)(6)} = \frac{3900 - 3900}{3} = 0 \tag{3}$$

(4)