5.9.3

EE25BTECH11049 - Sai Krishna Bakki

Question:

Two schools **P** and **Q** decided to award prizes to their students for two games of Hockey ₹ x per students and cricket ₹ y per student. School **P** decided to award a total of ₹ 9,500 for the two games to 5 and 4 students respectively; while school **Q** decided to award ₹ 7,370 for the two games to 4 and 3 students respectively. Based on the given information, answer the following questions :

1) Represent the following information algebraically (in terms of x and y).
2) a) What is the prize amount for hockey ?
   b) Prize amount on which game is more and by how much ?
3) What will be the total prize amount if there are 2 students each from two games ?

Solution:

Given

For Schools **P** and **Q**:

$$5x + 4y = 9500 \tag{3.1}$$

$$4x + 3y = 7370 \tag{3.2}$$

$$\implies \begin{pmatrix} 5 & 4 \\ 4 & 3 \end{pmatrix} \begin{pmatrix} x \\ y \end{pmatrix} = \begin{pmatrix} 9500 \\ 7370 \end{pmatrix} \tag{3.3}$$

$$\left(\begin{array}{cc|c} 5 & 4 & 9500 \\ 4 & 3 & 7370 \end{array}\right) \xleftrightarrow{R_1 \to R_1 - R_2} \left(\begin{array}{cc|c} 1 & 1 & 2130 \\ 4 & 3 & 7370 \end{array}\right) \tag{3.4}$$

$$\left(\begin{array}{cc|c} 1 & 1 & 2130 \\ 4 & 3 & 7370 \end{array}\right) \xleftrightarrow{R_2 \to R_2 - 4R_2} \left(\begin{array}{cc|c} 1 & 1 & 2130 \\ 0 & -1 & -1150 \end{array}\right) \tag{3.5}$$

$$\left(\begin{array}{cc|c} 1 & 1 & 2130 \\ 0 & -1 & -1150 \end{array}\right) \xleftrightarrow{R_1 \to R_1 + R_2} \left(\begin{array}{cc|c} 1 & 0 & 980 \\ 0 & -1 & -1150 \end{array}\right) \tag{3.6}$$

$$\left(\begin{array}{cc|c} 1 & 0 & 980 \\ 0 & -1 & -1150 \end{array}\right) \xleftrightarrow{R_2 \to -R_2} \left(\begin{array}{cc|c} 1 & 0 & 980 \\ 0 & 1 & 1150 \end{array}\right) \tag{3.7}$$

$$\begin{pmatrix} x \\ y \end{pmatrix} = \begin{pmatrix} 980 \\ 1150 \end{pmatrix} \tag{3.8}$$

$\therefore$ The prize amount for Hockey(x) and Cricket(y) respectively are ₹ 980 and ₹ 1150. The Prize amount of Cricket is more than Hockey by a difference of ₹ 170.

$$\text{Total amount} = \begin{pmatrix} 2 & 2 \end{pmatrix} \begin{pmatrix} x \\ y \end{pmatrix} \tag{3.9}$$

$$\text{Total amount} = \begin{pmatrix} 2 & 2 \end{pmatrix} \begin{pmatrix} 980 \\ 1150 \end{pmatrix} \tag{3.10}$$

$$\begin{aligned} \text{Total amount} &= 1960 + 2300 \\ &= 4260 \end{aligned} \tag{3.11}$$

$\therefore$ The total prize amount if there are 2 students each from two games is ₹ 4260.

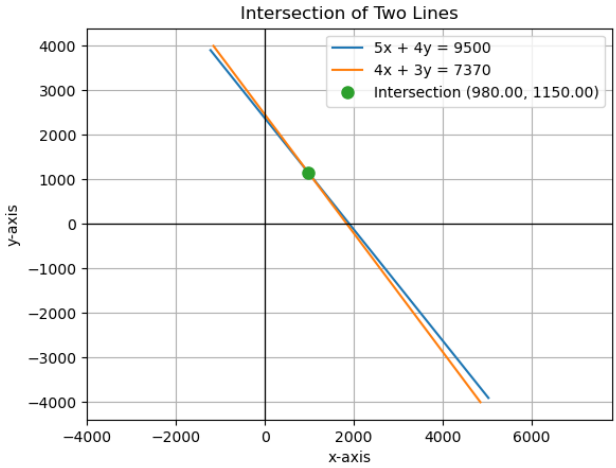

Fig. 3.1: 1