Pair of Linear Equations in Two Variables

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Class 10th Maths - Chapter 3

This is Problem-1.1 from Exercise 3.2

1. 10 students of Class X took part in a mathematics quiz.If the number of girls is 4 more than the number of boys,find the number of boys and girls who took part in the quiz.

   Solution:
   Let number of boys be x and number of girls be y.
   x+y=10
   x+4=y

   The 1st equation is y-x=4
   The 2nd equation is y+x=10

$$\begin{pmatrix} 1 & -1 \\ 1 & 1 \end{pmatrix} \begin{pmatrix} x \\ y \end{pmatrix} = \begin{pmatrix} 4 \\ 10 \end{pmatrix} \tag{1}$$

$$x = \begin{vmatrix} a1 & b \\ a1 & a2 \end{vmatrix} = \frac{\begin{vmatrix} 1 & 4 \\ 1 & 10 \end{vmatrix}}{\begin{vmatrix} 1 & -1 \\ 1 & 1 \end{vmatrix}} = \frac{10-4}{1-(-1)} = \frac{6}{2} = 3 \tag{2}$$

$$\tag{3}$$

$$y = \begin{vmatrix} b & a2 \\ a1 & a2 \end{vmatrix} = \frac{\begin{vmatrix} 4 & -1 \\ 10 & 1 \end{vmatrix}}{\begin{vmatrix} 1 & -1 \\ 1 & 1 \end{vmatrix}} = \frac{4-(-10)}{1-(-1)} = \frac{14}{2} = 7 \tag{4}$$

$$\tag{5}$$

$$\tag{6}$$

   Therefore X=3 and Y=7