

Pair of linear equation in two variables

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August 7, 2023

10th Maths - Chapter 3

1. On comparing $\frac{a_1}{a_2}$, $\frac{b_1}{b_2}$, and $\frac{c_1}{c_2}$ Find out whether the following pair of linear equation are consistent or inconsistent

Solution:

Given Data:

$$\frac{3}{2}x + \frac{5}{3}y = 7,$$

$$\implies 6 \times \frac{3}{2}x + \frac{5}{3}y = 7, \quad 9x - 10y = 14$$

This can also be written as:

$$\begin{pmatrix} 9 & 10 & 14 \\ 9 & -10 & 14 \end{pmatrix} \quad (1)$$

$$R_2 \rightarrow R_1 + R_2$$

we get,

$$\begin{pmatrix} 9 & 10 & 14 \\ 0 & 20 & 28 \end{pmatrix} \quad (2)$$

(3)

$$R_2 \rightarrow \frac{R_2}{4}$$

$$\begin{pmatrix} 9 & 10 & 14 \\ 0 & 5 & 7 \end{pmatrix} \quad (4)$$

(5)

$$R_1 \rightarrow R_1 + 2R_2$$

$$\begin{pmatrix} 9 & 0 & 28 \\ 0 & 5 & 7 \end{pmatrix} \tag{6}$$

$$\tag{7}$$

$$R_2 \rightarrow R_2/5; R_1 \rightarrow \frac{R_1}{9}$$

$$\begin{pmatrix} 1 & 0 & \frac{28}{9} \\ 0 & 1 & \frac{7}{5} \end{pmatrix} \tag{8}$$

Since, The values of $\frac{a_1}{a_2} \neq \frac{b_1}{b_2}$
It is a consistent equation