

Linear Equations in Two Variables

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10th Maths - Chapter 3

This is Problem-4.1 from Exercise 3.2

1. On comparing the ratios $\frac{a_1}{a_2}$, $\frac{b_1}{b_2}$, $\frac{c_1}{c_2}$, find out whether the lines representing the following pairs of linear equations intersect at a point, are parallel or coincident: $5x - 4y + 8 = 0$
 $7x + 6y - 9 = 0$

Solution:

This can also be written as:

$$\begin{pmatrix} 5 & -4 & -8 \\ 7 & 6 & 9 \end{pmatrix} \quad (1)$$

now, Making $R_2 \rightarrow 5R_2 - 7R_1$
we get

$$\begin{pmatrix} 5 & -4 & -8 \\ 0 & 58 & 101 \end{pmatrix} \quad (2)$$

now, making $R_1 \rightarrow 2R_2 + 29R_1$
we get

$$\begin{pmatrix} 145 & 0 & -30 \\ 0 & 58 & 101 \end{pmatrix} \quad (3)$$

now, making $R_1 \rightarrow R_1/(145)$
 $R_2 \rightarrow R_2/(58)$
we get

$$\begin{pmatrix} 1 & 0 & -30/145 \\ 0 & 1 & 101/58 \end{pmatrix} \quad (4)$$

so, $x = -30/145$, $y = 101/58$
It is a independent equation.