Linear Equations in Two Variables

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10^{th} Maths - Chapter 3

This is Problem-(1)i from Exercise 3.3

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:
   x+y=14
   x-y=4

Solution:

Matrix form of the equations: $\begin{pmatrix} 1 & 1 & 14 \\ 1 & -1 & 4 \end{pmatrix}$

$R_1 = \begin{pmatrix} 1 & 1 & 14 \end{pmatrix}, R_2 = \begin{pmatrix} 1 & -1 & 4 \end{pmatrix}$

$R_1 \to R_1 + R_2$,we get:

$$\begin{pmatrix} 2 & 0 & 18 \\ 1 & -1 & 4 \end{pmatrix} \tag{1}$$

$R_2 \to 2R_2 - R_1$,we get:

$$\begin{pmatrix} 2 & 0 & 18 \\ 0 & -2 & -10 \end{pmatrix} \tag{2}$$

$R_1 \to \frac{R_1}{2}$

$R_2 \to \frac{R_2}{-2}$

$$\begin{pmatrix} 1 & 0 & 9 \\ 0 & 1 & 5 \end{pmatrix} \tag{3}$$

Therefore,x = 9 , y = 5