

CHAPTER 03

Pair of Linear Equations in Two Variables

Cross-Multiplication method of solution of a pair of linear equations:

Step - I:

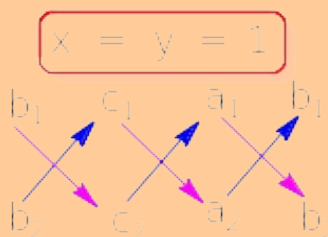
Consider a pair of linear equations in two variables in standard form as,

$$a_1x + b_1y + c_1 = 0 \text{ ----- (1)}$$

$$a_2x + b_2y + c_2 = 0 \text{ ----- (2)}$$

Step - II:

Use the given diagram to find the solution of the pair of linear equations.



We can write the solution in the following form:

$$\frac{x}{b_1c_2 - b_2c_1} = \frac{y}{c_1a_2 - c_2a_1} = \frac{1}{a_1b_2 - a_2b_1}$$

Hence, we get $x = \frac{b_1c_2 - b_2c_1}{a_1b_2 - a_2b_1}$ and $y = \frac{c_1a_2 - c_2a_1}{a_1b_2 - a_2b_1}$

Where, $a_1b_2 - a_2b_1 \neq 0$

Note:

1. If $a_1b_2 - a_2b_1 \neq 0$, we get $\frac{a_1}{a_2} \neq \frac{b_1}{b_2}$, then the pair of linear equation has a unique solution.

2. If $a_1b_2 - a_2b_1 = 0$, we get $\frac{a_1}{a_2} = \frac{b_1}{b_2}$, then two cases arise.

Case-I:

When, $\frac{a_1}{a_2} = \frac{b_1}{b_2} = \frac{c_1}{c_2}$, there are infinitely many solutions.

Case-II:

When, $\frac{a_1}{a_2} = \frac{b_1}{b_2} \neq \frac{c_1}{c_2}$, there is no solution.

Example:

Suhrita went to a bank to withdraw 2000Rs. She asked the cashier to give the cash in 50Rs and 100Rs notes only. She got 15 notes in all. Can you tell how many notes each of 50Rs and 100Rs she received?