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Subject: - Mathematics

Solution of a Pair of Linear Equations in Two Variables

Word Problems (Use Elimination Method)

Solve for x and y.

(1) $\frac{x}{a} + \frac{y}{b} = 2$ _____ (i)

$ax - by = a^2 - b^2$ _____ (ii) × a

Taking eqn. (i)

$\Rightarrow \frac{x}{a} + \frac{y}{b} = 2$

$\Rightarrow \frac{bx+ay}{ab} = 2$

$\Rightarrow bx + ay = 2ab$ _____ (iii) × b

Eqn. (ii) × a & (iii) × b also (ii) + (iii)

$a^2x - aby = a^3 - ab^2$

$b^2x + aby = 2ab^2$

$x(a^2 + b^2) = a^3 - ab^2 + 2ab^2$

$\Rightarrow x(a^2 + b^2) = a^3 + ab^2$

$\Rightarrow x(a^2 + b^2) = a(a^2 + b^2)$

$\therefore x = a$

Putting the value of x in eqn. (iii)

$\Rightarrow bx + ay = 2ab$

$\Rightarrow b \times a + ay = 2ab$

$\Rightarrow ab + ay = 2ab$

$\Rightarrow ay = 2ab - ab$

$\Rightarrow ay = ab$

$\therefore y = b$

Hence $x = a$ and $y = b$ *Answer*

(i) $x + y = a + b$

$ax - by = a^2 - b^2$

(ii) $6(ax + by) = 3a + 2b$

$6(bx - ay) = 3b - 2a$

(iii) $ax + by = c$

$bx + ay = 1 + c$