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PAIR OF LINEAR EQUATIONS IN TWO VARIABLES

PPT8

SUBJECT : MATHEMATICS
CHAPTER NUMBER: 03
CHAPTER NAME : PAIR OF LINEAR EQUATIONS IN TWO VARIABLES

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PREVIOUS KNOWLEDGE TEST

- **Solution Using Elimination with Two Variables**

•Arrange both equations in standard form, placing like variables and constants one above the other.

•Choose a variable to eliminate, and with a proper choice of multiplication, arrange so that the coefficients of that variable are opposites of one another.

•Add the equations, leaving one equation with one variable

•Solve for the remaining variable.

•Substitute the value found in Step 4 into any equation involving both variables and solve for the other variable.

•Check the solution in both original equations

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Learning outcome

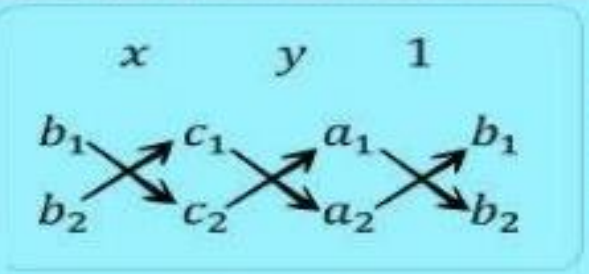
- Students will be able to find solution of a pair of linear equations algebraically by cross multiplication method.

- Students will be able to apply it to solve real life situations.

CROSS- MULTIPLICATION METHOD

$$a_1x + b_1y + c_1 = 0 \qquad a_2x + b_2y + c_2 = 0$$

To solve this pair of equations for x and y using cross-multiplication, we'll arrange the variables and their coefficients a_1 ,a_2 and b_1 ,b_2 and the constants c_1 and c_2



$$\Rightarrow x = \frac{b_1c_2 - b_2c_1}{a_1b_2 - a_2b_1}$$

$$\Rightarrow y = \frac{c_1a_2 - c_2a_1}{a_1b_2 - a_2b_1}$$

Discussion on solving a pair of linear equations using Cross-multiplication method.
https://youtu.be/oyDdsh121AA(5.2)

$3x + 2y + 25 = 0$

$2x + y + 10 = 0$

Here,

$a_1 = 3, b_1 = 2, c_1 = 25$

$a_2 = 2, b_2 = 1 \ and \ c_2 = 10$

By cross-multiplication, we have

$$\Rightarrow \frac{x}{2\times10-25\times1} = \frac{-y}{3\times10-25\times2} = \frac{1}{3\times1-2\times2}$$

$$\Rightarrow \frac{x}{20-25} = \frac{-y}{30-50} = \frac{1}{3-4}$$

$$\Rightarrow \frac{x}{-5} = \frac{-y}{-20} = \frac{1}{-1}$$

Now, $\frac{x}{-5} = \frac{1}{-1}$

$$\Rightarrow x = \frac{-5}{-1} = 5$$

And,

$$\frac{-y}{-20} = \frac{1}{-1}$$

$$\Rightarrow \quad \frac{y}{20} = 1$$

$$\Rightarrow \quad y = -20$$

Solve the following pair of linear equations by cross-multiplication method : [NCERT]

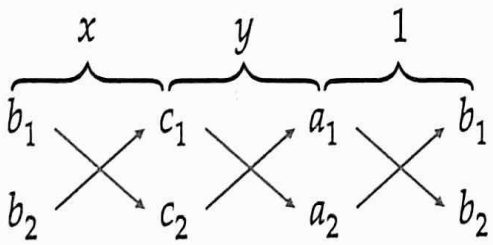
$8x+5y=9\,;\qquad 3x+2y=4$

. The given equations can be written as

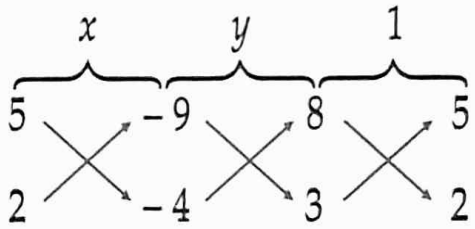
$$8x+5y-9=0$$

$$3x+2y-4=0$$

cross-multiplication, we have



or



$$\Rightarrow \quad \frac{x}{5(-4)-2(-9)}=\frac{y}{-9\times 3-(-4)8}=\frac{1}{8\times 2-3\times 5} \quad \Rightarrow \quad \frac{x}{-20+18}=\frac{y}{-27+32}=\frac{1}{16-15}$$

$$\Rightarrow \quad \frac{x}{-2}=\frac{y}{5}=\frac{1}{1}=1 \quad \Rightarrow \quad x=1(-2)=-2 \text{ and } y=1\times 5=5$$

Hence, $x=-2$ and $y=5$ is the required solution.

For which values of a and b does the following pair of linear equations have an infinite number of solutions?

$2x + 3y = 7$

$(a - b)x + (a + b)y = 3a + b - 2$

https://youtu.be/NxExdapLZ5o (8.05)

For which values of a and b does the following pair of linear equations have an infinite number of solutions?

$2x + 3y = 7$

$(a - b)x + (a + b)y = 3a + b - 2$

For infinitely many solutions,

$$\frac{a_1}{a_2} = \frac{b_1}{b_2} = \frac{c_1}{c_2} \quad \Rightarrow \quad \frac{2}{a-b} = \frac{3}{a+b} = \frac{7}{3a+b-2}$$

$$\frac{2}{a-b} = \frac{3}{a+b} \quad \text{and} \quad \frac{3}{a+b} = \frac{7}{3a+b-2}$$

$$\Rightarrow \quad 3a - 3b = 2a + 2b \quad \text{and} \quad 9a + 3b - 6 = 7a + 7b$$

$$\Rightarrow \quad a = 5b \quad \text{and} \quad 2a - 4b = 6$$

$$\Rightarrow \quad 2(5b) - 4b = 6$$

$$\Rightarrow \quad 6b = 6$$

$$\Rightarrow \quad b = 1$$

Hence, $a = 5 \times 1 = 5$ and $b = 1$

Home assignment

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- **Ex. 3.34Q. 1 to 3 & AHA**

Solve for x and y

$(a - b)x + (a + b)\, y = a^2 - 2ab - b^2$

$a + b)(x + y) = a^2 + b^2$..

THANKING YOU

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