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PAIR OF LINEAR EQUATIONS IN TWO VARIABLES

PPT4

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

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PREVIOUS KNOWLEDGE TEST

- If the two lines **intersect** each other at one particular point then that point will be the only solution of that pair of Linear Equations. It is said to be **a consistent** pair of equations.
- . If the two lines **coincide** with each other, then there will be infinite solutions as all the points on the line will be the solution for the pair of Linear Equations. It is said to be dependent or **consistent** pair of equations.
- If the two lines are **parallel** then there will be no solution as the lines are not intersecting at any point. It is said to be **an inconsistent** pair of equations.

• The general form of a pair of linear equations is: $a_1x + b_1y + c_1 = 0$; $a_2x + b_2y + c_2 = 0$
where a_1, a_2, b_1, b_2, c_1 and c_2 are real numbers, such that $a_1^2 + b_1^2 \neq 0$, $a_2^2 + b_2^2 \neq 0$.

•A pair of values of variables 'x' and 'y' which satisfy both the equations in the given system of equations is said to be a solution of the simultaneous pair of linear equations.

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Learning outcome

- Students will be able to find solution of a pair of linear equations algebraically by Substitution method.
- Students will be able to apply it to solve real life situations.

Substitution method

If we have a pair of Linear Equations with two variables x and y, then we have to follow these steps to solve them with the substitution method-

Step 1: We have to choose any one equation and find the value of one variable in terms of other variable i.e. y in terms of x.

Step 2: Then substitute the calculated value of y in terms of x in the other equation.

Step 3: Now solve this Linear Equation in terms of x as it is in one variable only i.e. x.

Step 4: Substitute the calculate value of x in the given equations and find the value of y.

Algebraic method of solving a pair of linear equations (Substitution method)
https://youtu.be/CnW5g-ARpgA

1.x + y = 14 ... (i)

x - y = 4 ... (ii)

From (i), we obtain:

x = 14 - y ... (iii)

Substituting this value in equation (ii), we obtain: $14 - y - y = 4$

$$14 - 2y = 4$$

$$-2y = -10$$

$$y = 5$$

Substituting the value of y in equation (iii), we obtain:

$$x = 9$$

$$y = 5$$

(*ii*)

$$s - t = 3 \quad \ldots (i)$$

$$\frac{s}{3} + \frac{t}{2} = 6 \quad \ldots (ii)$$

From equation (*i*), $s - t = 3 \Rightarrow s = 3 + t$

Putting the value of s in equation (*ii*), we get

$$\frac{3+t}{3} + \frac{t}{2} = 6 \Rightarrow \frac{2(3+t)+3t}{6} = 6$$

$$\Rightarrow \quad 6 + 2t + 3t = 36 \Rightarrow 5t = 36 - 6$$

$$5t = 30 \Rightarrow t = 6$$

Putting $t = 6$ in equation (*i*), we have

$$s = 3 + 6 = 9$$

So, $\boxed{s = 9, t = 6}$

(*iv*) $0.2x + 0.3y = 1.3$ ...(*i*)

$0.4x + 0.5y = 2.3$ ...(*ii*)

From equation (*i*),

$$0.2x + 0.3y = 1.3 \Rightarrow 0.2x = 1.3 - 0.3y$$

$$\Rightarrow \quad x = \frac{1.3 - 0.3y}{0.2}$$

Putting the value of x in equation (*ii*), we have

$$0.4\left(\frac{1.3 - 0.3y}{0.2}\right) + 0.5y = 2.3$$

$$\Rightarrow \quad 2(1.3 - 0.3y) + 0.5y = 2.3$$

$$\Rightarrow \quad 2.6 - 0.6y + 0.5y = 2.3$$

$$\Rightarrow \quad -0.1y = 2.3 - 2.6$$

$$\Rightarrow \quad -0.1y = -0.3 \Rightarrow y = 3$$

Putting $y = 3$ in equation (*i*), we get

$$0.2x + 0.3(3) = 1.3$$

$$\Rightarrow \quad 0.2x + 0.9 = 1.3$$

$$\Rightarrow \quad 0.2x = 1.3 - 0.9$$

$$\Rightarrow \quad 0.2x = 0.4 \Rightarrow x = 2$$

So, $\boxed{x = 2, y = 3}$

Home assignment

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- **Ex. 3.3 Q. 1 to 2 & AHA**

  Solve using Substitution Method

  1. $px + qy = p - q$

  $ax + by = c$

  2. $ax + by = c$

  $bx + ay = 1 + c$.

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