Class-X^{th}

Key Notes

Chapter-03

Pair of Linear Equation in Two Variables

- Algebraic Expression: A combination of constants and variables, connected by four fundamental arithmetical operations of +,-, × and ÷ is called an algebraic expression. For example, $3x^2 + 4xy - 5y^2$ *is an algebraic expression.*
- Equation: An algebraic expression with equal to sign (=) is called the equation. Without an Equal to sign, it is an expression only. For example, 3x+9=0 is an equation, but 3x+9 is an expression.
- Linear Equation: If the greatest exponent of the variable(s) in a equation is one, then equation is said to be a linear equation.
- The most general form of a pair of linear equation is:

$$a_1x + b_1y + c_1 = 0,$$

$a_2x + b_2y + c_2 = 0$ *where* $a_1, a_2, b_1, b_2, c_1, c_2$ *are real numbers and*

$$a_1^2 + b_1^2 \neq 0, a_2^2 + b_2^2 \neq 0.$$

- The graph of a pair of linear equations in two variables is represented by two lines;
  - (i) If the lines intersect at a point, the pair of equations is consistent. The point of Intersection gives the unique solution of the equation.
  - (ii) If the lines coincide, then there are infinitely many solutions. The pair of equations is consistent. Each point on the line will be a solution.
  - (iii) If the lines are parallel, the pair of the linear equations has no solution. The pair of linear equations is inconsistent.

→ If a pair of linear equations is given by $a_1x + b_1y + c_1 = 0$ *and* $a_2x + b_2y + c_2 = 0$

(i)$\left(\frac{a_1}{a_2}\right) \neq \left(\frac{b_1}{b_2}\right) \Rightarrow$ *the pair of linear equations is consisten.* $(Unique\ solution)$.

(ii)$\frac{a_1}{a_2} = \frac{b_1}{b_2} \neq \frac{c_1}{c_2} \Rightarrow$ *the pair of linear equation is inconsistent* $(No\ solution)$.

(iii)$\frac{a_1}{a_2} = \frac{b_1}{b_2} = \frac{c_1}{c_2} \Rightarrow$
the pair of linear equations is dependent and consisten $(infinitely\ many\ solutions)$.

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