Variables and Expressions

Variable is a quantity that can take any value, its value is **not fixed**. It is a symbol for a number whose value is unknown yet.

Expressions are formed by performing operations like **addition, subtraction, multiplication** and **division** on the variables.

Example: 6x – 3 is an expression in variable x.

Algebraic Equation:

An **equation** is a **condition on a variable** such that two expressions in the variable should have **equal value**.

Example: 8x−8=16 is an equation.

The **value** of the **variable** in an equation for which the **equation is satisfied** is called the **solution of the equation**.

Example: The solution for the equation 2x−3=5 is x=4.

Mathematical Operations on Expressions

- Addition of variables: (3x+4z)+(5y+6)
- Subtraction of variables: (4x−7y)−(6y+5)
- Multiplication of variables: (5xy+6)×7x
- Division of variables: (8xz+5z)/(5x-6y)

Solving an Equation

Solving an equation involves performing the **same operations** on the expressions on **either side** of the "=" sign so that the value of the variable is found **without disturbing the balance**.
Example : Solve 2x+4=10
Consider 2x+4=10
⇒2x+4−4=10−4 [Subtracting 4 from both LHS and RHS] ⇒2x=6
⇒2x/2=6/2 [Dividing both LHS and RHS by 2] ⇒x=3

Methods of Solving an Equation

Method 1: performing the **same operations** on the expressions on **either side** of the "=" sign so that the value of the variable is found **without disturbing the balance**.

Operations involve **Adding, subtracting, multiplying or dividing** on **both** sides.

Example: x+2=6

Subtract 2 from LHS and RHS

⇒ LHS: x+2−2=x

⇒ RHS: 6−2=4

But LHS = RHS

⇒ x = 4

Method 2: Transposing

It involves moving the terms to one side of the equation to find out the value of the variable.

When terms move from one side to another they change their sign.

Example: x+2=6

Transpose (+2) from LHS to RHS

⇒x=6−2

⇒x=4