CLASS-7

LESSON-10 ALGEBRAIC EXPRESSIONS

(This PDF Based on NCERT Book)

TERMS OF AN EXPRESSIONS(बीजीय व्यंजकों के पद)-In an algebraic expression, a **term** is a single number, a variable, or a combination of numbers and variables joined by multiplication or division. Terms are separated from one another by addition (+) or subtraction (-) signs.

Identifying Terms

To find the terms in an algebraic expression, you simply look for the plus and minus signs that separate the different parts.

For example, in the expression $5x^2-7xy+4$:

- The first term is $5x^2$.
- The second term is $-7xy$.
- The third term is 4.

Notice that the minus sign in front of the 7xy belongs to the term itself.

COMPONENTS OF A TERM(एक शब्द के घटक)

Each term can have its own components:

- **Coefficient:** The numerical part of the term. In the term $5x^2$, the coefficient is **5**. When a variable has no number in front of it, the coefficient is **1**. For example, in the term y, the coefficient is **1**.
- **Variable:** The letter or symbol that represents an unknown value. In the term $-7xy$, the variables are **x** and **y**.
- **Constant:** A term that is a number on its own and does not contain any variables. In the expression $5x^2-7xy+4$, the constant term is **4**

TYPES OF TERMS(पदों के प्रकार)-

- **Like Terms:** Terms that have the exact same variables raised to the same powers. For example, $3x^2$ and $-2x^2$ are like terms because they both have the variable x raised to the power of 2. You can add or subtract like terms to simplify an expression.
- **Unlike Terms:** Terms that have different variables or the same variables but with different exponents. For example, 5x and $5x^2$ are unlike terms because the variable x has a different exponent in each term. You cannot add or subtract unlike terms.

MONOMIALS, BINOMIALS, TRINOMIALS AND POLYNOMIALS(एकपद, द्विपद, त्रिपद और बहुपद)-

These terms are used to classify algebraic expressions based on the number of terms they contain. A **term** is a single number, a variable, or a combination of numbers and variables multiplied together. Terms are separated by addition or subtraction signs.

Polynomials(बहुपद)

A **polynomial** is a mathematical expression consisting of variables and coefficients, involving only the operations of addition, subtraction, multiplication, and non-negative integer exponents. The word "poly" means "many," so a polynomial is an expression with one or more terms. Monomials, binomials, and trinomials are all types of polynomials.

- **Examples:** $2x^2-3x+5$, $7y^3+y$, -9

Monomials(एकपद)

A **monomial** is a polynomial with exactly one term. The prefix "mono" means "one." A monomial can be a number, a variable, or a product of numbers and variables.

- **Examples:** $5x$, $-7y^2$, 12, a^2b
- **Non-examples:** $x+2$ (has two terms), $y3$ (has a variable in the denominator)

Binomials(द्विपद)

A **binomial** is a polynomial with exactly two terms. The prefix "bi" means "two." The two terms are joined by a plus or minus sign.

- **Examples:** $x+5$, $4a-9b$, y^2+3y
- **Non-examples:** $2x$ (is a monomial), $a+b+c$ (is a trinomial)

Trinomials(त्रिपद)

A **trinomial** is a polynomial with exactly three terms. The prefix "tri" means "three." The terms are separated by addition or subtraction signs.

- **Examples:** $2x^2+3x-1$, a^3+2b-c, $-4xy+8$
- **Non-examples:** $x2+5$ (is a binomial), $x^2+2x-5x$ (simplifies to x^2-3x, a binomial)

FINDING THE VALUE OF AN EXPRESSION(किसी व्यंजक का मान ज्ञात करना)-

Steps to Follow

1. **Substitute the values:** Replace each variable in the expression with its given numerical value. It's often helpful to use parentheses around the substituted numbers, especially if they are negative, to avoid errors with signs and order of operations.
2. **Simplify using the order of operations:** After substituting, the expression becomes a numerical problem. Use the order of operations (**PEMDAS/BODMAS**) to simplify it:
    - **P**arentheses (or **B**rackets)
    - **E**xponents (or **O**rders)
    - **M**ultiplication and **D**ivision (from left to right)

- **A**ddition and **S**ubtraction (from left to right)

Examples

Example 1: One Variable

Find the value of the expression $4x+7$ when $x=3$.

1. **Substitute:** Replace x with 3.

   $4(3)+7$

2. **Simplify:** Follow the order of operations.
   - Multiply first: $4\times3=12$
   - Then add: $12+7=19$

The value of the expression is 19.

Example 2: Multiple Variables

Find the value of the expression $2a^2-b$ when $a=4$ and $b=5$.

1. **Substitute:** Replace a with 4 and b with 5.

   $2(4)^2-5$

2. **Simplify:**
   - Evaluate the exponent first: $(4)^2=16$
   - Now the expression is: $2(16)-5$
   - Multiply next: $2\times16=32$
   - Finally, subtract: $32-5=27$

The value of the expression is 27.