

ALGEBRAIC EXPRESSIONS

Objectives:

- ▣ To understand the formation of Algebraic Expressions
- ▣ To add & subtract Algebraic Expressions
- ▣ Simplify Algebraic Expressions
- ▣ To find value of Algebraic Expressions

- Algebraic expressions are formed from variables and constants. We use the operations of addition, subtraction, multiplication and division on the variables and constants to form expressions. For example, the expression $2xy + 5$ is formed from the variables x and y and constants 2 and 5. The constants 2 and 5 and the variables x and y are multiplied to give the product $2xy$ and the constant 5 is added to this product to give the expression.

- ▣ Expressions are made up of **terms**. Terms are **added** to make an expression. For example, the addition of the terms $4xy$ and 7 gives the expression $4xy + 7$.
- ▣ A term is a **product of factors**. The term $4xy$ in the expression $2xy + 5$ is a product of factors x , y and 2 . Factors containing variables are said to be **algebraic factors**.
- ▣ The **coefficient** is the numerical factor in the term. Sometimes any one factor in a term is called the coefficient of the remaining part of the term.

Types of expressions

MONOMIALS

THE EXPRESSION WHICH CONTAINS ONLY ONE TERM IS CALLED MONOMIAL.

EXAMPLE $6xy$;

BINOMIALS

THE EXPRESSIONS THAT CONTAINS TWO UNLIKE TERMS IS CALLED BINOMIAL.

EXAMPLE $4xy + 5xy$

TRINOMIALS

THE EXPRESSION CONTAINING THREE UNLIKE TERMS IS CALLED TRINOMIAL.

EXAMPLE $4xy + 9xy - 8xy$;

- ▣ Terms which have the same algebraic factors are like terms. Terms which have different algebraic factors are unlike terms. Thus, terms $4xy$ and $-3xy$ are like terms; but terms $4xy$ and $-3x$ are not like terms.

The terms which have same algebraic factors are called like terms. However, when terms have different algebraic factors, these are called unlike terms.

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|------------------------------|-------------------------------|
| (i) $1, 100$ Like | (ii) $-7x, \frac{5}{2}x$ Like |
| (iii) $-29x, -29y$ Unlike | (iv) $14xy, 42yx$ Like |
| (v) $4m^2p, 4mp^2$ Unlike | |
| (vi) $12xz, 12x^2z^2$ Unlike | |

- ▣ The sum (or difference) of two like terms is a like term with coefficient equal to the sum (or difference) of the coefficients of the two like terms. Thus, $8xy - 3xy = (8 - 3)xy$, i.e., $5xy$.
- ▣ When we add two algebraic expressions, the like terms are added as given above; the unlike terms are left as they are. Thus, the sum of $4x^2 + 5x$ and $2x + 3$ is $4x^2 + 7x + 3$; the like terms $5x$ and $2x$ add to $7x$; the unlike terms $4x^2$ and 3 are left as they are.

- ▣ In situations such as solving an equation and using a formula, we have to **find the value of an expression**. The value of the expression depends on the value of the variable from which the expression is formed. Thus, the value of $7x - 3$ for $x = 5$ is 32, since $7(5) - 3 = 35 - 3 = 32$.

Rules and formulas in mathematics are written in a concise and general form using algebraic expressions:

- ▣ Thus, the area of rectangle = lb , where l is the length and b is the breadth of the rectangle.
- ▣ The general (n th) term of a number pattern (or a sequence) is an expression in n .
- ▣ Thus, the n th term of the number pattern 11, 21, 31, 41, ... is $(10n + 1)$.

Thank You