ALGEBRA

Algebra
It is branch of mathematics that substitutes letters for numbers. Algebra gives different methods of solve equations.

Variables
A variable is represented by either a sign or a letter. Its value may not be the same in every equation.
Example: $2x - 10 = 0$; here, will get $x = 5$
$3x - 3 = 0$; here, he will get $x = 10$.
Here, x can have different values in different equations.
Therefore, x is variable

Constants
A constant always has fixed values. Every real number is a constant.
Example: 2, 5, 7 etc.

Expressions
An expression is a combination of constant and/or variables connected to each other by mathematical operators (addition, subtraction, multiplication and division).
Example: $3x + 5$, $2y^2 - 4x \ 5$, etc.

Terms
The parts of an expression are separated from one another by plus or minus sign and are called terms of that expression.
Example: in $3x + 5$, $3x$ and 5 are both expressions, as they are separated by a plus sign.
In $2y^2 - 4x + 5$, $2y^2$, $4x$ and 5 are separated by plus and minus signs, Therefore, they all are terms.

Like Terms
Two or more terms are said to be alike if their algebraic factors are the same.
Example: $3x^2y$, $7x^2y$ and $10x^2y$ are like terms.
In the expression $2xy + 3x - 4y - 7xy$, $2xy$ and $7xy$ are like terms.

Unlike Terms
Two or more terms are said to be unalike if their algebraic factors are different
Example: $3x^2y$, $7xy$ and $10xy^2$ are unlike terms.

Factors

When numbers and variables multiply to form a product, each quantity is called a factor of the product.

Example: Factors of 3xy are 3, x and y.

Coefficients

The numerical part of term is called its coefficient.

Example: In $6x^3$, 6 is the coefficient of x^3.

Polynomials

The algebraic expression having one or more terms, each of which consists of a constant multiplied by one or more variables raised to a negative integral power, is called a polynomial.

A polynomial can have any finite number of terms.

Monomials, binomials and trinomials are the types of polynomials.

Monomials

The algebraic expression having a single term is called a monomial.

Example: 4x is a monomial expression.

Binomials

The algebraic expression having two terms is called a binomial.

Example: $4x^3 + 7x$ is binomial expression

Trinomials

The algebraic expression having three terms is called a trinomial.

Example: $4x^3 + 2y^2 - x$ is a trinomial expression.

Addition and subtraction of Algebraic Expressions

The addition or subtraction of algebraic expressions can be simplified by combining the like terms. In this method, coefficient or combined according to their signs, keeping the same algebraic factors.

Example:

1. Find $(2x^2y + 3xy^2) + (7x^2y - 2xy^2)$.

we have

$(2x^2y + 3xy^2) + (7x^2y - 2xy^2)$

$= 2x^2y + 3xy^2 + 7x^2y - 2xy^2$

$= 2x^2y + 7x^2y + 3xy - 2xy^2$

$= (2 + 7)y + (3 - 2)xy^2$

$= 9x^2y + xy^2$

Multiplication of Algebraic Expressions

By the distributive law, the product of algebraic expressions is calculated.

Example:

1. Fin $2x^2y \times (7x^2y - 2xy^2)$.

We have

$2x^2y \times (7x^2y - 2xy^2)$

$= 2x^2y \times 7x^2y - 2x^2y \times 2xy^2$

$= 14x^4y^2 - 4x^3y^3$