# Algebraic Expressions

In an algebraic expression constant and variables are linked with arithmetic operations.
The value of unknown variable is obtained by simplification of the given expression.

## Terms of an algebraic Expression

### Variables

Alphabetical symbols used in algebraic expressions are called variables a, b, c, d, m, n, x, y, z .....etc. are some common letters which are used for variables.

### Constant Terms

The symbol which itself indicate a permanent value is called constant. All numbers are constant.

$6, 10, \frac{10}{11}, 15, -6, \sqrt{3}$.... etc. are constants because, their values are fixed.

### Variable Terms

A term which contains various numerical values is called variable term. For example. Product of $X=4\times X=4X$

Product of $2, X, Y^2$ and $Z=2\times X\times Y^2\times Z=2XY^2Z$

Thus, $4X$ and $2XY^2Z$ are variable terms

## Types of Terms

There are two types of terms, like and unlike. Terms are classified by similarity of their variables.

### Like and unlike Terms

The terms having same variables are called like terms and the terms having different variables are called unlike terms.

For example, $6x, x, -2x, \frac{4}{9}x$, are like terms and $6x, 2y^2, -9x^2yz, 4xy$, are unlike terms.

### Coefficient

A number or a symbol multiplied with a variable in an algebraic expression is called its coefficient. In $-6m^2np$, coefficient of $nm^2p$ is $-6$ because $m^2np$ is multiplied with $-6$ to from $-6m^2np$.

The variable part of the term is called its variable or literal coefficient. In $-\frac{5}{4}abc$, variable coefficients are a, b and c.

The constant part of the term is called constant coefficient.

In term $-\frac{5}{4}abc$, constant coefficient is $-\frac{5}{4}$.

**Example:** Sign of resulting addition of two like terms depends on which one of the following?
(a) Sign of biggest term
(b) Sign of smallest term
(c) Sign of positive term
(d) Sign of negative term
(e) None of these
Answer (a)

## Operations on Algebraic Expressions

When constant and variables are linked with any of the following fundamental arithmetic operations i.e. addition, subtraction, multiplication and division, then the solution of the expression is obtained by simplification of the expression.

**Addition and Subtraction of Terms**

The addition of two unlike terms is not possible and their addition is obtained in the same form. Addition of $2x+3x$ is $5x$ but the addition of $2x+3y$ is $2x+3y$.

Subtraction of two like terms is same as the subtraction of whole numbers. For example, $4x-2x=2x$

**Example:** Simplify: $(2x^2+x^2)-(5x^2+11x^2)$

(a) $15x^3$ (b) $15x^2$

(c) $-3x^2$ (d) $13x^2$

(e) None of these

Answer (c)

**Explanation:** $(2x^2+x^2)-(5x^2+11x^2) = 3x^2-16x^2=-13x^2$

**Example:** Evaluate:

$[\{(x^2+3x^2)-(x^2+x^2)5\}\div x]$

(a) $-10x$ (b) $-15x$

(c) $-6x$ (d) $10x$

(e) None of these

**Answer** (c)

**Explanation:** $(4x^2-5\times 2x^2)\div x=\dfrac{4x^2-10x^2}{x} = \dfrac{-6x^2}{x}=-6x$

**Equation**

An equation is a condition on a variable. For example, the expression $10x+3=13$ is an equation which describe that the variable is equal to a fixed number.

This value itself is called the solution of the equation.

Thus, $10x+3=13\Rightarrow 10x=13-3=10\Rightarrow x=1$

Here the definite value of the variable x in the equation $10x+3=13$

**Note:**

(i) An equation has two sides, LHS and RHS, between them is the equal (=) sign. So only for a definite value of the variable used in the equation, we get LHS = RHS.

(ii) We can also find the solution of an equation by using trial and error method. In this method we can put different values to the variable until we get the right value, which satisfies the equation.