

Unit 4

Factorization and Algebraic Manipulation

1. Define factorization.

The process of expressing an algebraic expression in term of its factor is called factorization. For example,
 $5a + 5b = 5(a + b)$

2. How do we classify expressions based on the number of terms?

We use different terms to express the number of terms in an expression:

Monomial: An expression with only *one term*, such as $2x$ or $3y$.

Binomial: An expression with *two terms*, such as $2x + 3y$ or $x^2 - 4$.

Trinomial: An expression with *three terms*, such as $x^2 + 4x - 3$ or $2x^2 - 5x + 1$.

Polynomial: A broad category that includes all types of expressions with one or more terms.

3. Define HCF (Highest Common Factor) and how is it found?

The HCF of two or more algebraic expressions refers to the greatest algebraic expression which divides them without leaving a remainder.

We can find the HCF of given expressions by the following two methods:

- (i) By factorization
- (ii) By division

4. Define LCM (Least Common Multiple) and how is it found?

The LCM of two or more algebraic expressions is the smallest expression that is divisible by each of the given expressions.

To find the LCM by factorization, we use the formula:

$$LCM = \text{Common factors} \times \text{Non common factors}$$

5. Explain the relationship between LCM and HCF.

The relationship between LCM and HCF can be expressed as follows:

$$LCM \times HCF = p(x) \times q(x)$$

Where,

$$\begin{aligned} p(x) &= 1^{st} \text{ polynomial} \\ q(x) &= 2^{nd} \text{ polynomial} \end{aligned}$$

6. Define square root.

The square root of an algebraic expression refers to a value that, when multiplied by itself, gives the original expression.

For example square root of $4a^2$ is $\pm 2a$, because

$$\begin{aligned} 2a \times 2a &= 4a^2 \\ \text{and } (-2a) \times (-2a) &= 4a^2 \end{aligned}$$

There are following two methods for finding the square root of an algebraic expression:

- (i) By factorization method
- (ii) By division method