Unit No. 4

Factorization and Algebraic Manipulation

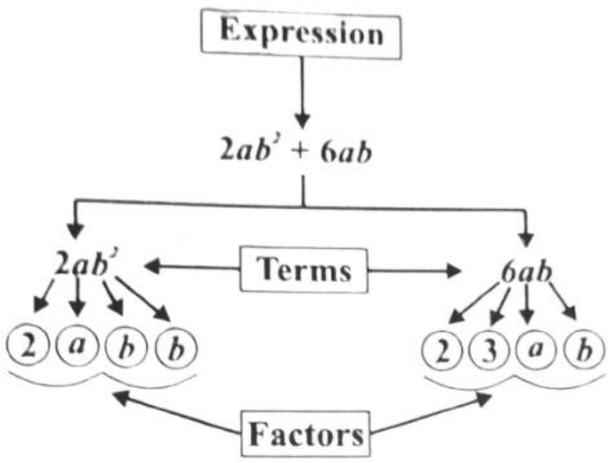
Basic Concepts

Common Factors:

In algebra, a common factor is an expression that divides two or more expressions exactly. For example,

$2x - 6 = 2(x - 3)$

Here 2 is the common factor which exactly divides both terms 2x and 6.



Trinomial Factoring:

Trinomial factoring is converting a trinomial expression as a product of two binomial expressions. A trinomial is an expression with three terms and a binomial is an expression with two terms.

For example, x2+4x+4 and 3x2−x−2 are trinomials whereas x+2 and 3x−1 are binomials.

Remember!

An expression having degree 2 is called a quadratic expression.

Remember!

$a^2 - b^2 = (a-b)(a+b)$

$(a + b)^2 = a^2 + 2ab + b^2$

$(a - b)^2 = a^2 - 2ab + b^2$

Remember!

$(a + b)^3 = a3 + 3a2b + 3ab^2 + b^3$

$(a - b)3 = a^3 - 3a^2b + 3ab^2 - b^3$

Do you know?

$(a + b)^2 \neq a^2 + b^2$

$(a - b)^2 \neq a^2 - b^2$

$(a + b)^3 \neq a^3 + b^3$

$(a - b)^3 \neq a^3 - b^3$

Highest Common Factor (HCF):

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

Methods for Finding HCF:

(a) By factorization

(b) By division

Least Common Multiple (LCM):

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

Formula for Finding LCM:

LCM = C.F × Non-C.F

Relationship Between LCM and HCF:

LCM × HCF = p(x)×q(x)

Where, p(x) = 1st polynomial

q(x) = 2nd polynomial

Square Root of an Algebraic Expression:

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

For example, the square root of $4a^2$ is $\pm 2a$ because $2a \times 2a = 4a^2$ and

$(-2a) \times (-2a) = 4a^2$.

Methods for Finding Square Root:

(a) By factorization method

(b) By division method