FACTORIZATION

The process of writing a given algebraic expression as a product of two or more expressions is called factorization.

Each of a numbers (constant or variable), which form the product is called a factor of the product.

Different Methods of factorization:

- **Factorization taking common factors.**
$$9x^2 + 12xy = (3x)(3x) + (3x)(4y) = 3x(3x + 4y)$$
- **Factorization by grouping**
$$ab + bc + cx = (ab + bc) + (ax + cx) = b(a + c) + x(a + c) = (a + c)(b + x)$$
- **Factorization of difference of two squares using identities**
$$(a + b)(a - b) = (a)^2 - (b)^2$$
- **Factorization of trinomials using identities**
$$x^2 - 9x + 20 = x^2 - 5x - 4x + 20 = x(x - 5) - 4(x - 5) = (x - 4)(x - 5)$$
- **Factorization of perfect square trinomial**
Square of a binomial is a perfect square trinomial
$$a^2 + 2ab + b^2 = (a + b)^2 \ and \ a^2 - 2ab + b^2 = (a - b)^2$$

CONDITIONAL IDENTITY? **An identity which is valid only for those values of the variables which satisfy the given condition.**

IDENTITY? A relation which is true for all values of the variables in it.

Given a Quadratic Equation $ax^2 + bx + c = 0, a \neq 0$.**It can be factored if we find two numbers p and q such that pq=ac and (p+q)=b**

"IDENTITIES"

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