Factorisation – 1

- When we factorise a number(constant) we write it as a product of its prime factors.
- When we factorise an expression we write it as a product of its irreducible factor which may be constant, literal number or algebraic expression.
- An irreducible factor is a factor which cannot be expressed further as a product of factors.

Methods of Factorisation:

- **By finding common factors:**

Example1: Factorise the following

a. $12a^2b + 15ab^2$

$= (2 \times 2 \times 3)\, a.a.b + (3 \times 5)\, a.b.b$

$= (3ab)(4a) + (3ab)(5b)$

$= 3ab(4a + 5b)$

b. $10x^2 - 18x^3 + 14x^4$

$= (2x^2)(5) - (2x^2)(9x) + (2x^2)(7x^2)$

$= 2x^2(5 - 9x + 7x^2)$

- **By grouping terms:**

Example2: Factorise the following

a. $\mathbf{2xy + 3 + 3x + 2y}$

$= 2xy + 2y + 3x + 3$

$= [(2y)(x) + (2y))1)] + [(3)(x) + (3)(1)]$

$= 2y(x + 1) + 3(x + 1)$

$= (x + 1)(2y + 3)$

b. $\mathbf{6xy - 4y + 6 - 9x}$

$= [(2y)(3x) - (2y)(2)] + [(3)(2) - (3)(3x)]$

$= 2y(3x - 2) + 3(2 - 3x)$

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

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

Exercise:

1. Factorise the following expressions:

a. $6p - 12p^2$

b. $7a^2 + 14a$

c. $-16z + 20z^2$

d. $\mathbf{5x^3y - 15xy^2}$

e. $\mathbf{-4a^2+4ab+4ca}$

f. $\mathbf{ax^2y + bxy^2 + cxyz}$

g. $\mathbf{x^2yz + xy^2 + xyz^2}$

h. $\mathbf{x^2 + xy + 8x + 8y}$

i. $\mathbf{ax + bx - ay - by}$

j. $\mathbf{15xy - 6x + 5y - 2}$

k. $\mathbf{5pq + 15 + 9q + 25p}$

l. $\mathbf{z - 7 + 7xy - xyz}$