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. $2xy + 3 + 3x + 2y$
  $= 2xy + 2y + 3x + 3$
  $= [(2y)(x) + (2y))1)] + [(3)(x) + (3)(1)]$
  $= 2y(x + 1) + 3(x + 1)$
  $= (x + 1)(2y + 3)$
  b. $6xy - 4y + 6 - 9x$
  $= [(2y)(3x) - (2y)(2)] + [(3)(2) - (3)(3x)]$

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

Exercise:
1. Factorise the following expressions:
   a. $6p - 12p^2$

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   b. $7a^2 + 14a$

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

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   d. $5x^3y - 15xy^2$

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   e. $-4a^2 + 4ab + 4ca$

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   f. $ax^2y + bxy^2 + cxyz$

l. $z - 7 + 7xy - xyz$

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g. $x^2yz + xy^2 + xyz^2$

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h. $x^2 + xy + 8x + 8y$

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i. $ax + bx - ay - by$

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j. $15xy - 6x + 5y - 2$

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k. $5pq + 15 + 9q + 25p$

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