

Class 9-Mathematics

Instructions for students: The notes provided must be copied to the Maths copy and then do the homework in the same copy.

Chapter 4

FACTORISATION

Factorisation: The process of changing an algebraic expression into irreducible factors is called Factorisation.

For example, $4x^2 - 9 = (2x+3)(2x-3)$

$$4x^3 - 6x^2 = 2x^2(x - 3)$$

Factorisation is the reverse process of multiplication.

FACTORISATION METHODS

1) Factorisation by taking out common factors

The following steps are involved in this method.

- Find the H.C.F (Highest Common Factor) of all the terms of the given polynomial.
- Divide each term of the given polynomial by H.C.F.
- Enclose the quotient within the brackets and keep the common factor outside the bracket.

Exercise 4.1

1) ii) $15ax^3 - 9ax^2 = 3ax^2(5x - 1)$ Ans.

5) ii) $14mn - 22m - 62p = 2(7mn - 11m - 31p)$ Ans.

9) ii) $x(x^2 + y^2 - z^2) + y(-x^2 - y^2 + z^2) - z(x^2 + y^2 - z^2)$

$$= x(x^2 + y^2 - z^2) - y(x^2 + y^2 - z^2) - z(x^2 + y^2 - z^2) \text{ [Note that -1 is taken as}$$
$$= (x^2 + y^2 - z^2)(x - y - z) \text{ Ans.} \quad \text{common in the middle term]}$$

2) Factorisation by Grouping

This method involves the following steps:

- Arrange the terms of the given polynomial in groups in such a way that each group has a common factor.
- Factorise each group.
- Take out the factor which is common to each group.

Exercise 4.2

1. i. $\underline{x^2 + xy} - \underline{x - y} = x(x+y) - 1(x+y)$
 $= (x+y)(x - 1)$ Ans.

3. ii. $\underline{a^2b - ab^2} + \underline{3a - 3b} = ab(a - b) + 3(a - b)$
 $= (a - b)(ab + 3)$ Ans.

$$\begin{aligned}
 5. \text{ ii. } a(a - 2b - c) + 2bc &= \underline{a^2 - 2ab - ac} + 2bc \\
 &= a(a - 2b) - c(a - 2b) \\
 &= (a - 2b)(a - c) \text{ Ans.}
 \end{aligned}$$

$$\begin{aligned}
 8. \text{ i. } 5ph - 10qk + 2rph - 4qrk &= \underline{5ph + 2rph} - \underline{10qk - 4qrk} \\
 &= ph(5 + 2r) - 2qk(5 + 2r) \\
 &= (5 + 2r)(ph - 2qk) \text{ Ans.}
 \end{aligned}$$

$$\begin{aligned}
 11. \underline{a^2b + ab^2} - \underline{abc - b^2c} + \underline{axy + bxy} &= ab(a + b) - bc(a + b) + xy(a + b) \\
 &= (a + b)(ab - bc + xy) \text{ Ans.}
 \end{aligned}$$

$$\begin{aligned}
 13. \underline{x - 1} - \underline{(x - 1)^2} + \underline{ax - a} &= 1(x - 1) - (x - 1)(x - 1) + a(x - 1) \text{ [x - 1 is common]} \\
 &= (x - 1)[1 - (x - 1) + a] \\
 &= (x - 1)[1 - x + 1 + a] \\
 &= (x - 1)(2 - x + a) \text{ Ans.}
 \end{aligned}$$

Refer the video for more solved sums.

Home work: Complete exercise 4.1 (Page 89)
and 4.2 (Page 92) in the Maths copy (Solve all the sums).