

Mathematics

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(Chapter – 2) (Polynomials)(Exemplar Problems)

(Class – IX)

Exercise 2.3

Question 29:

Factorise the following:

(i) $9x^2 + 4y^2 + 16z^2 + 12xy - 16yz - 24zx$

(ii) $25x^2 + 16y^2 + 4z^2 - 40xy + 16yz - 20zx$

(iii) $16x^2 + 4y^2 + 9z^2 - 16xy - 12yz + 24zx$

Answer 29:

(i). Given that: $9x^2 + 4y^2 + 16z^2 + 12xy - 16yz - 24zx$

$$= (3x)^2 + (2y)^2 + (-4z)^2 + 2(3x)(2y) + 2(2y)(-4z) + 2(-4z)(3x)$$

$$= (3x + 2y - 4z)^2$$

$$[\because a^2 + b^2 + c^2 + 2ab + 2bc + 2ca = (a + b + c)^2]$$

$$= (3x + 2y - 4z)(3x + 2y - 4z)$$

(ii). Given that: $25x^2 + 16y^2 + 4z^2 - 40xy + 16yz - 20zx$

$$= (-5x)^2 + (4y)^2 + (2z)^2 + 2(-5x)(4y) + 2(4y)(2z) + 2(2z)(-5x)$$

$$= (-5x + 4y + 2z)^2$$

$$[\because a^2 + b^2 + c^2 + 2ab + 2bc + 2ca = (a + b + c)^2]$$

$$= (-5x + 4y + 2z)(-5x + 4y + 2z)$$

(iii). Given that: $16x^2 + 4y^2 + 9z^2 - 16xy - 12yz + 24zx$

$$= (4x)^2 + (-2y)^2 + (3z)^2 + 2(4x)(-2y) + 2(-2y)(3z) + 2(3z)(4x)$$

$$= (4x - 2y + 3z)^2$$

$$[\because a^2 + b^2 + c^2 + 2ab + 2bc + 2ca = (a + b + c)^2]$$

$$= (4x - 2y + 3z)(4x - 2y + 3z)$$

