



Exercise 2K

Question 11:

Putting $(a - b) = x$, $(b - c) = y$ and $(c - a) = z$, we get,

$$(a - b)^3 + (b - c)^3 + (c - a)^3$$

$$= x^3 + y^3 + z^3, \text{ where } (x + y + z) = (a - b) + (b - c) + (c - a) = 0$$

$$= 3xyz \text{ [Since } (x + y + z) = 0 \Rightarrow (x^3 + y^3 + z^3) = 3xyz]$$

$$= 3(a - b)(b - c)(c - a).$$

Question 12:

We have:

$$(3a - 2b) + (2b - 5c) + (5c - 3a) = 0$$

$$\text{So, } (3a - 2b)^3 + (2b - 5c)^3 + (5c - 3a)^3$$

$$= 3(3a - 2b)(2b - 5c)(5c - 3a).$$

Question 13:

$$a^3(b - c)^3 + b^3(c - a)^3 + c^3(a - b)^3$$

$$= [a(b - c)]^3 + [b(c - a)]^3 + [c(a - b)]^3$$

$$\text{Now, since, } a(b - c) + b(c - a) + c(a - b)$$

$$= ab - ac + bc - ba + ca - bc = 0$$

$$\text{So, } a^3(b - c)^3 + b^3(c - a)^3 + c^3(a - b)^3$$

$$= 3a(b - c)b(c - a)c(a - b)$$

$$= 3abc(a - b)(b - c)(c - a).$$

Question 14:

$$(5a - 7b)^3 + (9c - 5a)^3 + (7b - 9c)^3$$

$$\text{Since, } (5a - 7b) + (9c - 5a) + (7b - 9c)$$

$$= 5a - 7b + 9c - 5a + 7b - 9c = 0$$

$$\text{So, } (5a - 7b)^3 + (9c - 5a)^3 + (7b - 9c)^3$$

$$= 3(5a - 7b)(9c - 5a)(7b - 9c).$$

***** END *****