

# Mathematics

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

(Class – IX)

## Exercise 2.3

### Question 37:

Without actually calculating the cubes, find the value of:

(i).  $\left(\frac{1}{2}\right)^3 + \left(\frac{1}{3}\right)^3 - \left(\frac{5}{6}\right)^3$

(ii).  $(0.2)^3 - (0.3)^3 + (0.1)^3$

### Answer 37:

(i). Given that:  $\left(\frac{1}{2}\right)^3 + \left(\frac{1}{3}\right)^3 - \left(\frac{5}{6}\right)^3$

Let  $a = \frac{1}{2}$ ,  $b = \frac{1}{3}$  and  $c = -\frac{5}{6}$

$$\therefore a + b + c = \frac{1}{2} + \frac{1}{3} - \frac{5}{6} = \frac{3 + 2 - 5}{6} = \frac{0}{6} = 0$$

$$\Rightarrow \left(\frac{1}{2}\right)^3 + \left(\frac{1}{3}\right)^3 + \left(-\frac{5}{6}\right)^3 = 3\left(\frac{1}{2}\right)\left(\frac{1}{3}\right)\left(-\frac{5}{6}\right) = -\frac{5}{12}$$

$$[\because a^3 + b^3 + c^3 - 3abc = (a + b + c)(a^2 + b^2 + c^2 - ab - bc - ca)]$$

$$[\text{if } a + b + c = 0, a^3 + b^3 + c^3 = 3abc]$$

(ii). Given that:  $(0.2)^3 - (0.3)^3 + (0.1)^3$

Let  $a = 0.2$ ,  $b = -0.3$  and  $c = 0.1$

$$\therefore a + b + c = 0.2 - 0.3 + 0.1 = 0.3 - 0.3 = 0$$

$$\Rightarrow (0.2)^3 + (-0.3)^3 + (0.1)^3 = 3(0.2)(-0.3)(0.1) = -0.018$$

$$[\because a^3 + b^3 + c^3 - 3abc = (a + b + c)(a^2 + b^2 + c^2 - ab - bc - ca)]$$

$$[\text{if } a + b + c = 0, a^3 + b^3 + c^3 = 3abc]$$

