

# Mathematics

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

(Class – IX)

## Exercise 2.3

### Question 31:

Expand the following:

(i)  $(3a - 2b)^3$

(ii)  $\left(\frac{1}{x} + \frac{y}{3}\right)^3$

(iii)  $\left(4 - \frac{1}{3x}\right)^3$

### Answer 31:

(i). Given that:  $(3a - 2b)^3 = [3a + (-2b)]^3$

$$= (3a)^3 + (-2b)^3 + 3(3a)^2(-2b) + 3(3a)(-2b)^2$$

$$[\because (a + b)^3 = (a^3 + b^3 + 3a^2b + 3ab^2)]$$

$$= 27a^3 - 8b^3 - 54a^2b + 36ab^2$$

(ii). Given that:  $\left(\frac{1}{x} + \frac{y}{3}\right)^3$

$$= \left(\frac{1}{x}\right)^3 + \left(\frac{y}{3}\right)^3 + 3\left(\frac{1}{x}\right)^2\left(\frac{y}{3}\right) + 3\left(\frac{1}{x}\right)\left(\frac{y}{3}\right)^2$$

$$[\because (a + b)^3 = (a^3 + b^3 + 3a^2b + 3ab^2)]$$

$$= \frac{1}{x^3} + \frac{y^3}{27} + \frac{y}{x^2} + \frac{y^2}{3x}$$

(iii). Given that:  $\left(4 - \frac{1}{3x}\right)^3$

$$= (4)^3 + \left(-\frac{1}{3x}\right)^3 + 3(4)^2\left(-\frac{1}{3x}\right) + 3(4)\left(-\frac{1}{3x}\right)^2$$

$$[\because (a + b)^3 = (a^3 + b^3 + 3a^2b + 3ab^2)]$$

$$= 64 - \frac{1}{27x^3} - \frac{16}{x} + \frac{4}{3x^2}$$

