

Ex-12 (B)

4. Expand

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

$$\Rightarrow (2a)^3 + (b)^3 + 3 \times 2a \times b (2a + b)$$

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

$$\Rightarrow 8a^3 + b^3 + 6ab(2a + b)$$

$$\Rightarrow 8a^3 + b^3 + 12a^2b + 6ab^2$$

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

$$\Rightarrow (a)^3 - (2b)^3 - 3 \times a \times 2b (a - 2b)$$

$$\Rightarrow [(a - b)^3 = a^3 - b^3 - 3ab(a - b)]$$

$$\Rightarrow a^3 - 8b^3 - 6ab(a - 2b)$$

$$\Rightarrow a^3 - 8b^3 - 6a^2b + 12ab^2$$

(iii) $(3x - 2y)^3 = (3x)^3 - (2y)^3 - 3 \times 3x \times 2y (3x - 2y)$

$$\Rightarrow 27x^3 - 8y^3 - 18xy(3x - 2y)$$

$$\Rightarrow 27x^3 - 8y^3 - 54x^2y + 36xy^2$$

(iv) $(x + 5y)^3$

$$\Rightarrow (x)^3 + (5y)^3 + 3 \times x \times 5y (x + 5y)$$

$$\Rightarrow x^3 + 125y^3 + 15xy(x + 5y)$$

$$\Rightarrow x^3 + 125y^3 + 15x^2y + 75xy^2$$

(v) $\left(a + \frac{1}{a}\right)^3$

$$\Rightarrow a^3 + \left(\frac{1}{a}\right)^3 + 3 \times a \times \frac{1}{a} \times \left(a + \frac{1}{a}\right)$$

$$\Rightarrow a^3 + \frac{1}{a^3} + 3 \times \left(a + \frac{1}{a}\right)$$

$$\Rightarrow a^3 + \frac{1}{a^3} + 3a + \frac{3}{a}$$

$$(vi) \left(2a - \frac{1}{2a}\right)^3$$

$$\Rightarrow (2a)^3 - \left(\frac{1}{2a}\right)^3 - 3 \times 2a \times \frac{1}{2a} \left(2a - \frac{1}{2a}\right)$$

$$\Rightarrow 8a^3 - \frac{1}{8a^3} - 3 \left(2a - \frac{1}{2a}\right)$$

$$\Rightarrow 8a^3 - \frac{1}{8a^3} - 6a + \frac{3}{2a}$$

5. Find the cube of:

$$(i) (a+2)^3$$

$$\Rightarrow (a)^3 + (2)^3 + 3 \times a \times 2 (a+2)$$

$$\Rightarrow a^3 + 8 + 6a(a+2)$$

$$\Rightarrow a^3 + 8 + 6a^2 + 12a$$

$$\Rightarrow a^3 + 6a^2 + 12a + 8$$

$$(ii) (2a-1)^3$$

$$\Rightarrow (2a)^3 - (1)^3 - 3 \times 2a \times 1 (2a-1)$$

$$\Rightarrow 8a^3 - 1 - 6a(2a-1)$$

$$\Rightarrow 8a^3 - 1 - 12a^2 + 6a$$

$$\Rightarrow 8a^3 - 12a^2 + 6a - 1$$

$$(iii) (2a+3b)^3$$

$$\Rightarrow (2a)^3 + (3b)^3 + 3 \times 2a \times 3b (2a+3b)$$

$$\Rightarrow 8a^3 + 27b^3 + 18ab(2a+3b)$$

$$\Rightarrow 8a^3 + 27b^3 + 36a^2b + 54ab^2$$

$$\Rightarrow 8a^3 + 36a^2b + 54ab^2 + 27b^3$$

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

$$\Rightarrow (3b)^3 - (2a)^3 - 3 \times 3b \times 2a (3b - 2a)$$

$$\Rightarrow 27b^3 - 8a^3 - 18ab(3b - 2a)$$

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

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

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

$$\Rightarrow (2x)^3 + \left(\frac{1}{x}\right)^3 + 3 \times 2x \times \frac{1}{x} \left(2x + \frac{1}{x}\right)$$

$$\Rightarrow 8x^3 + \frac{1}{x^3} + 6 \left(2x + \frac{1}{x}\right)$$

$$\Rightarrow 8x^3 + \frac{1}{x^3} + 12x + \frac{6}{x}$$

$$\Rightarrow 8x^3 + 12x + \frac{6}{x} + \frac{1}{x^3}$$

(vi) $\left(x - \frac{1}{2}\right)^3$

$$\Rightarrow (x)^3 - \left(\frac{1}{2}\right)^3 - 3 \times x \times \frac{1}{2} \left(x - \frac{1}{2}\right)$$

$$\Rightarrow x^3 - \frac{1}{8} - \frac{3x}{2} \left(x - \frac{1}{2}\right)$$

$$\Rightarrow x^3 - \frac{1}{8} - \frac{3x^2}{2} + \frac{3x}{4}$$

$$\Rightarrow x^3 - \frac{3x^2}{2} + \frac{3x}{4} - \frac{1}{8}$$