



Exercise 2J

Question 17:

We know that

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

Let us rewrite

$$\begin{aligned} 8x^3 - \frac{1}{27y^3} &= (2x)^3 - \left(\frac{1}{3y}\right)^3 \\ &= \left(2x - \frac{1}{3y}\right) \left[(2x)^2 + 2x \times \frac{1}{3y} + \left(\frac{1}{3y}\right)^2 \right] \\ &= \left(2x - \frac{1}{3y}\right) \left[4x^2 + \frac{2x}{3y} + \frac{1}{9y^2} \right]. \end{aligned}$$

Question 18:

$$\begin{aligned} a^3 - 0.064 &= (a)^3 - (0.4)^3 \\ &= (a - 0.4) [(a)^2 + a(0.4) + (0.4)^2] \\ \text{Since } a^3 - b^3 &= (a - b)(a^2 + ab + b^2) \\ &= (a - 0.4)(a^2 + 0.4a + 0.16). \end{aligned}$$

Question 19:

$$\begin{aligned} (a + b)^3 - 8 &= (a + b)^3 - (2)^3 \\ &= (a + b - 2) [(a + b)^2 + (a + b)2 + (2)^2] \\ \text{Since } a^3 - b^3 &= (a - b)(a^2 + ab + b^2) \\ &= (a + b - 2) [a^2 + b^2 + 2ab + 2(a + b) + 4]. \end{aligned}$$

Question 20:

$$\begin{aligned} x^6 - 729 &= (x^2)^3 - (9)^3 \\ &= (x^2 - 9) [(x^2)^2 + x^2 \cdot 9 + (9)^2] \\ \text{Since } a^3 - b^3 &= (a - b)(a^2 + ab + b^2) \\ &= (x^2 - 9)(x^4 + 9x^2 + 81) \\ &= (x + 3)(x - 3) [(x^2 + 9)^2 - (3x)^2] \\ &= (x + 3)(x - 3)(x^2 + 3x + 9)(x^2 - 3x + 9). \end{aligned}$$

***** END *****