



Exercise 2J

Question 25:

We know that

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

$$\begin{aligned} & a^3 - \frac{1}{a^3} - 2a + \frac{2}{a} \\ &= a^3 - \frac{1}{a^3} - 2 \left(a - \frac{1}{a} \right) \\ &= \left(a - \frac{1}{a} \right) \left(a^2 + a \times \frac{1}{a} + \frac{1}{a^2} \right) - 2 \left(a - \frac{1}{a} \right) \\ &= \left(a - \frac{1}{a} \right) \left(a^2 + 1 + \frac{1}{a^2} - 2 \right) \\ &= \left(a - \frac{1}{a} \right) \left(a^2 + \frac{1}{a^2} - 1 \right). \end{aligned}$$

Question 26:

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

Question 27:

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

***** END *****