Exercise 2J

Question 25:

We know that

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

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

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

$$= \left(a - \frac{1}{a}\right)\left(a^2 + a \times \frac{1}{a} + \frac{1}{a^2}\right) - 2\left(a - \frac{1}{a}\right)$$

$$= \left(a - \frac{1}{a}\right)\left(a^2 + 1 + \frac{1}{a^2} - 2\right)$$

$$= \left(a - \frac{1}{a}\right)\left(a^2 + \frac{1}{a^2} - 1\right).$$

Question 26:

$8a^3 - b^3 - 4ax + 2bx$

$= 8a^3 - b^3 - 2x(2a - b)$

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

$= (2a - b)[(2a)^2 + 2a(b) + (b)^2] - 2x(2a - b)$

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

$= (2a - b)(4a^2 + 2ab + b^2) - 2x(2a - b)$

$= (2a - b)(4a^2 + 2ab + b^2 - 2x).$

Question 27:

$8a^3 - b^3 - 4ax + 2bx$

$= 8a^3 - b^3 - 2x(2a - b)$

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

$= (2a - b)[(2a)^2 + 2a(b) + (b)^2] - 2x(2a - b)$

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 **********