Factorisation of Polynomials Ex 6.3 Q6

Answer :

Let us denote the given polynomials as

$f(x) = x^4 - 3x^2 + 4,$

$g(x) = x - 2$

We have to find the remainder when $f(x)$ is divided by $g(x)$.

By the remainder theorem, when $f(x)$ is divided by $g(x)$ the remainder is

$$\begin{aligned} f(2) &= (2)^4 - 3(2)^2 + 4 \\ &= 16 - 12 + 4 \\ &= \boxed{8} \end{aligned}$$

We will calculate remainder by actual division

$$\begin{array}{r|l} & x^3 + 2x^2 + x + 2 \\ \hline x-2 & x^4 - 3x^2 + 4 \\ & x^4 - 2x^3 \\ & - \quad + \\ \hline & 2x^3 - 3x^2 + 4 \\ & 2x^3 - 4x^2 \\ & - \quad + \\ \hline & x^2 + 4 \\ & x^2 - 2x \\ & - \quad + \\ \hline & 2x + 4 \\ & 2x - 4 \\ & - \quad + \\ \hline & 8 \end{array}$$

So the remainder is 8

Factorisation of Polynomials Ex 6.3 Q7

Answer :

Let us denote the given polynomials as

$f(x) = 9x^3 - 3x^2 + x - 5,$

$g(x) = x - \frac{2}{3}$

We have to find the remainder when $f(x)$ is divided by $g(x)$.

By the remainder theorem, when $f(x)$ is divided by $g(x)$ the remainder is

$$f\left(\frac{2}{3}\right) = 9\left(\frac{2}{3}\right)^3 - 3\left(\frac{2}{3}\right)^2 + \left(\frac{2}{3}\right) - 5$$

$$= 9 \times \frac{8}{27} - 3 \times \frac{4}{9} + \frac{2}{3} - 5$$

$$= \frac{8}{3} - \frac{4}{3} + \frac{2}{3} - 5$$

$$= \boxed{-3}$$

Remainder by actual division

$$\begin{array}{r|l} & 9x^2 + 3x + 3 \\ \hline x - \frac{2}{3} & 9x^3 - 3x^2 + x - 5 \\ & 9x^3 - 6x^2 \\ & - \quad + \\ \hline & \qquad 3x^2 + x - 5 \\ & \qquad 3x^2 - 2x \\ & \qquad - \quad + \\ \hline & \qquad\qquad 3x - 5 \\ & \qquad\qquad 3x - 2 \\ & \qquad\qquad - \quad + \\ \hline & \qquad\qquad\quad -3 \end{array}$$

Remainder is -3

*********** END **********