

Factorisation of Polynomials Ex 6.3 Q12 Answer:

Let us denote the given polynomials as

$$f(x) = x^3 + 3x^2 + 3x + 1,$$

$$g(x) = x+1$$

$$\Rightarrow g(x) = x - (-1),$$

$$h(x) = x - \frac{1}{2},$$

$$i(x) = x$$

$$\Rightarrow i(x) = x - 0,$$

$$j(x) = x + \pi$$

$$\Rightarrow$$
 $j(x) = x - (-\pi),$

$$k(x) = 5 + 2x$$

$$\Rightarrow k(x) = 2\left\{x - \left(-\frac{5}{2}\right)\right\}$$

(i) We will 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

$$= f(-1)$$

$$=(-1)^3+3(-1)^2+3(-1)+1$$

$$=-1+3-3+1$$

$$= 0$$

(ii) We will find the remainder when f(x) is divided by h(x).

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

$$= f\left(\frac{1}{2}\right)$$

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

$$= \frac{1}{8} + \frac{3}{4} + \frac{3}{2} + 1$$

$$= \frac{27}{8}$$

(iii) We will find the remainder when f(x) is divided by i(x).

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

$$= f(0)$$

$$=(0)^3+3(0)^2+3(0)+1$$

$$= 0 + 0 + 0 + 1$$

$$= 1$$

(iv) We will find the remainder when f(x) is divided by j(x).

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

$$=f(-\pi)$$

$$= (-\pi)^3 + 3(-\pi)^2 + 3(-\pi) + 1$$

$$=$$
 $-\pi^3 + 3\pi^2 - 3\pi + 1$

(v) We will find the remainder when f(x) is divided by k(x).

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

$$= f\left(-\frac{5}{2}\right)$$

$$= \left(-\frac{5}{2}\right)^3 + 3\left(-\frac{5}{2}\right)^2 + 3\left(-\frac{5}{2}\right) + 1$$

$$= -\frac{125}{8} + \frac{75}{4} - \frac{15}{2} + 1$$

$$= -\frac{27}{8}$$

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