



Factorisation of Polynomials Ex 6.5 Q6

**Answer :**

Let  $f(x) = x^4 + 10x^3 + 35x^2 + 50x + 24$  be the given polynomial.

Now, putting  $x = -1$ , we get

$$\begin{aligned} f(-1) &= (-1)^4 + 10(-1)^3 + 35(-1)^2 + 50(-1) + 24 \\ &= 1 - 10 + 35 - 50 + 24 = 60 - 60 \\ &= 0 \end{aligned}$$

Therefore,  $(x + 1)$  is a factor of polynomial  $f(x)$ .

Now,

$$\begin{aligned} f(x) &= x^3(x+1) + 9x^2(x+1) + 26x(x+1) + 24(x+1) \\ &= (x+1)\{x^3 + 9x^2 + 26x + 24\} \\ &= (x+1)g(x) \quad \dots(i) \end{aligned}$$

Where  $g(x) = x^3 + 9x^2 + 26x + 24$

Putting  $x = -2$ , we get

$$\begin{aligned} g(-2) &= (-2)^3 + 9(-2)^2 + 26(-2) + 24 \\ &= -8 + 36 - 52 + 24 = 60 - 60 \\ &= 0 \end{aligned}$$

Therefore,  $(x + 2)$  is the factor of  $g(x)$ .

Now,

$$\begin{aligned} g(x) &= x^2(x+2) + 7x(x+2) + 12(x+2) \\ &= (x+2)\{x^2 + 7x + 12\} \\ &= (x+2)\{x^2 + 4x + 3x + 12\} \\ &= (x+2)(x+3)(x+4) \quad \dots(ii) \end{aligned}$$

From equation (i) and (ii), we get

$$f(x) = (x+1)(x+2)(x+3)(x+4)$$

Hence  $(x + 1)$ ,  $(x + 2)$ ,  $(x + 3)$  and  $(x + 4)$  are the factors of polynomial  $f(x)$ .

Factorisation of Polynomials Ex 6.5 Q7

**Answer :**

Let  $f(x) = 2x^4 - 7x^3 - 13x^2 + 63x - 45$  be the given polynomial.

Now, putting  $x = 1$ , we get

$$\begin{aligned}f(1) &= 2(1)^4 - 7(1)^3 - 13(1)^2 + 63(1) - 45 \\&= 2 - 7 - 13 + 63 - 45 \\&= 65 - 65 = 0\end{aligned}$$

Therefore,  $(x - 1)$  is a factor of polynomial  $f(x)$ .

Now,

$$\begin{aligned}f(x) &= 2x^3(x - 1) - 5x^2(x - 1) - 18x(x - 1) + 45(x - 1) \\&= (x - 1)\{2x^3 - 5x^2 - 18x + 45\} \\&= (x - 1)g(x) \quad \dots(i)\end{aligned}$$

Where  $g(x) = 2x^3 - 5x^2 - 18x + 45$

Putting  $x = 3$ , we get

$$\begin{aligned}g(3) &= 2(3)^3 - 5(3)^2 - 18(3) + 45 \\&= 54 - 45 - 54 + 45 \\&= 0\end{aligned}$$

Therefore,  $(x - 3)$  is a factor of  $g(x)$ .

Now,

$$\begin{aligned}g(x) &= 2x^2(x - 3) + x(x - 3) - 15(x - 3) \\&= (x - 3)\{2x^2 + x - 15\} \\&= (x - 3)\{2x^2 + 6x - 5x - 15\} \\&= (x - 3)\{(2x - 5)(x + 3)\} \\&= (x - 3)(x + 3)(2x - 5) \quad \dots(ii)\end{aligned}$$

From equation (i) and (ii), we get

$$f(x) = (x - 1)(x - 3)(x + 3)(2x - 5)$$

Hence  $(x - 1)$ ,  $(x - 3)$ ,  $(x + 3)$  and  $(2x - 5)$  are the factors of polynomial  $f(x)$ .

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