

Factorisation of Polynomials Ex 6.4 Q16

Answer:

Let $f(x) = x^4 + px^3 + 2x^2 - 3x + q$ and $g(x) = x^2 - 1$ be the given polynomials. We have,

$$g(x) = x^2 - 1$$

= $(x-1)(x+1)$

Here, (x-1), (x+1) are the factor of g(x).

If f(x) is divisible by (x-1) and (x+1), then (x-1) and (x+1) are factor of f(x).

Therefore, f(1) and f(-1) both must be equal to zero.

Therefore.

$$f(1) = (1)^4 + p(1)^3 + 2(1)^2 - 3(1) + q$$

$$\Rightarrow 1 + p + 2 - 3 + q = 0$$

$$p + q = 0 \qquad ...(i)$$

and

$$f(-1) = (-1)^4 + p(-1)^3 + 2(-1)^2 - 3(-1) + q = 0$$

$$1 - p + 2 + 3 + q = 0$$

$$- p + q = -6 \qquad ...(ii)$$

Adding both the equations, we get,

$$(p+q) + (-p+q) = -6$$
$$2q = -6$$
$$q = -3$$

Putting this value in (i)

$$p + (-3) = 0$$
$$p = 3$$

Hence, the value of p and q are 3, -3 respectively.

Factorisation of Polynomials Ex 6.4 Q17 Answer:

Let $f(x) = x^4 + ax^3 - 3x^2 + 2x + b$ be the given polynomial.

By factor theorem, (x+1) and (x-1) are the factors of f(x) if f(-1) and f(1) both are equal to zero. Therefore,

$$f(-1) = (-1)^4 + a(-1)^3 - 3(-1)^2 + 2(-1) + b = 0$$

$$1 - a - 3 - 2 + b = 0$$

$$-a + b = 4 \qquad \dots(i)$$

and

$$f(1) = (1)^4 + a(1)^3 - 3(1)^2 + 2(1) + b = 0$$
$$1 + a - 3 + 2 + b = 0$$
$$a + b = 0 \qquad ...(ii)$$

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

2b = 4

b = 2

Putting this value in equation (i), we get,

-a + 2 = 4

a = -2

Hence, the value of a and b are -2 and 2 respectively.

Factorisation of Polynomials Ex 6.4 Q18

Answer:

Let $f(x) = x^3 + ax^2 - bx + 10$ and $g(x) = x^2 - 3x + 2$ be the given polynomials. We have,

$$g(x) = x^{2} - 3x + 2$$

$$= x^{2} - 2x - x + 2$$

$$= (x - 2)(x - 1)$$

Here, (x-2) and (x-1) are the factors of g(x),

Now,

By factor theorem,

$$f(2) = (2)^{3} + a(2)^{2} - b(2) + 10 = 0$$

$$8 + 4a - 2b + 10 = 0$$

$$4a - 2b + 18 = 0$$

$$2a - b = -9$$
 ...(i)

and

$$f(1) = (1)^3 + a(1)^2 - b(1) + 10 = 0$$
$$1 + a - b + 10 = 0$$
$$a - b = -11 \qquad ...(ii)$$

Subtracting (ii) by (i), we get,

$$(2a-b)-(a-b)=-9-(-11)$$

$$a = 2$$

Putting this value in equation (ii), we get,

$$2-b = -11$$

$$b = 13$$

Hence, the value of a and b are 2 and 13 respectively.

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