Factorisation of Polynomials Ex 6.4 Q7

Answer :

It is given that $f(x) = x^3 - 6x^2 + 11x - 6$ and $g(x) = x^2 - 3x + 2$

We have

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

$\quad\quad = x^2 - 2x - x + 2$

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

$\Rightarrow$ x-2 and $(x-1)$ are factor of $g(x)$ by the factor theorem.

To prove that $(x-2)$ and $(x-1)$ are the factor of $f(x)$.

It is sufficient to show that $f(2)$ and $f(1)$ both are equal to zero.

$f(2) = (2)^3 - 6(2)^2 + 11(2) - 6$

$\quad\quad = 8 - 24 + 22 - 6$

$\quad\quad = 30 - 30$

$\boxed{f(2) = 0}$

And

$f(1) = (1)^3 - 6(1)^2 + 11(1) - 6$

$\quad\quad = 1 - 6 + 11 - 6$

$\quad\quad = 12 - 12$

$\boxed{f(1) = 0}$

Hence, $g(x)$ is the factor of the polynomial $f(x)$.

Factorisation of Polynomials Ex 6.4 Q8

Answer :

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

By factor theorem,

$(x-2), (x+3)$ and $(x-4)$ are the factor of $f(x)$.

If $f(2), f(-3)$ and $f(4)$ are all equal to zero.

Now,

$$f(2) = (2)^3 - 3(2)^2 - 10(2) + 24$$
$$= 8 - 12 - 20 + 24$$
$$= 32 - 32$$
$$= 0$$

also

$$f(-3) = (-3)^3 - 3(-3)^2 - 10(-3) + 24$$
$$= -27 - 27 + 30 + 24$$
$$= -54 + 54$$
$$= 0$$

And

$$f(4) = (4)^3 - 3(4)^2 - 10(4) + 24$$
$$= 64 - 48 - 40 + 24$$
$$= 88 - 88$$
$$= 0$$

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

Factorisation of Polynomials Ex 6.4 Q9

Answer :

Let $f(x) = x^3 - 6x^2 - 19x + 84$ be the given polynomial.

By the factor theorem,

$(x+4), (x-3)$ and $(x-7)$ are the factor of $f(x)$.

If $f(-4), f(3)$ and $f(7)$ are all equal to zero.

Therefore,

$$f(-4) = (-4)^3 - 6(-4)^2 - 9(-4) + 84$$
$$= -64 - 96 + 76 + 84$$
$$= -160 + 160$$
$$= 0$$

Also

$$f(3) = (3)^3 - 6(3)^2 - 19(3) + 84$$
$$= 27 - 54 - 57 + 84$$
$$= 111 - 111$$
$$= 0$$

And

$$f(7) = (7)^3 - 6(7)^2 - 19(7) + 84$$
$$= 243 - 294 - 133 + 84$$
$$= 427 - 427$$
$$= 0$$

Hence, $(x+4), (x-3)$ and $(x-7)$ are the factor of the polynomial $f(x)$.