



### Polynomials Ex 2.3 Q3

**Answer :**

We know that, if  $x = \alpha$  is a zero of a polynomial, and then  $x - \alpha$  is a factor of  $f(x)$ .

Since  $-2$  and  $-1$  are zeros of  $f(x)$ .

Therefore

$$\begin{aligned}(x+2)(x+1) &= x^2 + 2x + x + 2 \\ &= x^2 + 3x + 2\end{aligned}$$

$x^2 + 3x + 2$  is a factor of  $f(x)$ . Now, We divide  $2x^4 + x^3 - 14x^2 - 19x - 6$  by  $g(x) = x^2 + 3x + 2$  to find the other zeros of  $f(x)$ .

$$\begin{array}{r} 2x^2 + 5x - 3 \\ x^2 + 3x + 2 \overline{) 2x^4 + x^3 - 14x^2 - 19x - 6} \\ \underline{+ 2x^4 + 6x^3 + 4x^2} \phantom{- 19x - 6} \\ -5x^3 - 18x^2 - 19x \phantom{- 6} \\ \underline{- 5x^3 - 15x^2 - 10x} \phantom{- 6} \\ -3x^2 - 9x - 6 \\ \underline{- 3x^2 - 9x - 6} \\ 0 \end{array}$$

By using division algorithm we have,  $f(x) = g(x) \times q(x) - r(x)$

$$2x^4 + x^3 - 14x^2 - 19 - 6 = (x^2 + 3x + 2)(2x^2 - 5x - 3)$$

$$2x^4 + x^3 - 14x^2 - 19 - 6 = (x^2 + 2x + 1x + 2)(2x^2 - 6x + 1x - 3)$$

$$2x^4 + x^3 - 14x^2 - 19 - 6 = [x(x+2) + 1(x+2)][2x(x-3) + 1(x-3)]$$

$$2x^4 + x^3 - 14x^2 - 19 - 6 = [(x+1)(x+2)(2x+1)(x-3)]$$

Hence, the zeros of the given polynomials are  $\boxed{-1, -2, \frac{-1}{2} \text{ and } 3}$ .

### Polynomials Ex 2.3 Q4

**Answer :**

Since  $-2$  is one zero of  $f(x)$ .

Therefore, we know that, if  $x = \alpha$  is a zero of a polynomial, then  $(x - \alpha)$  is a factor of  $f(x) = x + 2$  is a factor of  $f(x)$ .

Now, we divide  $f(x) = x^3 + 13x^2 + 32x + 20$  by  $g(x) = (x + 2)$  to find the others zeros of  $f(x)$ .

$$\begin{array}{r} x^2 - 11x + 10 \\ x + 2 \overline{) x^3 + 13x^2 + 32x + 20} \\ \underline{+ x^3 + 2x^2} \phantom{+ 32x + 20} \\ + 11x^2 + 32x \phantom{+ 20} \\ \underline{+ 11x^2 + 22x} \phantom{+ 20} \\ + 10x + 20 \\ \underline{+ 10x + 20} \\ 0 \end{array}$$

By using that division algorithm we have,  $f(x) = g(x) \times q(x) + r(x)$

$$x^3 + 13x^2 + 32x + 20 = (x + 2)(x^2 + 11x + 10) + 0$$

$$x^3 + 13x^2 + 32x + 20 = (x + 2)(x^2 + 10x + 1x + 10)$$

$$x^3 + 13x^2 + 32x + 20 = (x + 2)[x(x + 10) + 1(x + 10)]$$

$$x^3 + 13x^2 + 32x + 20 = (x + 2)(x + 1)(x + 10)$$

Hence, the zeros of the given polynomials are  $-2, -1, \text{ and } -10$ .

\*\*\*\*\* END \*\*\*\*\*