DAY 5

4. **Obtain all other zeroes of $3x^4 + 6x^3 - 2x^2 - 10x - 5$ if two of its zeroes are $\pm\sqrt{\frac{5}{3}}$**

Sol. Since two of zeroes of given polynomial are $\sqrt{\frac{5}{3}}$ and $-\sqrt{\frac{5}{3}}$

$\left(x - \sqrt{\frac{5}{3}}\right)\left(x + \sqrt{\frac{5}{3}}\right)$ is a factor of given polynomial.

$x^2 - \frac{5}{3}$ $i.e.\, 3x^2 - 5$ is a factor of given polynomial.

By Division

$$\begin{array}{r|l} & x^2 + 2x + 1 \\ \hline 3x^2 - 5 & 3x^4 + 6x^3 - 2x^2 - 10x - 5 \\ & \pm 3x^4 \quad \mp 5x^2 \\ \hline & 6x^3 + 3x^2 - 10x - 5 \\ & \mp\ 6x^3 \quad \mp 10x \\ \hline & 3x^2 \quad -5 \\ & \pm\ 3x^2 \quad \mp 5 \\ \hline & 0 \quad \grave{} \end{array}$$

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So $3x^4 + 6x^3 - 2x^2 - 10x - 5 = (3x^2 - 5)(x^2 + 2x + 1)$

Thus other zeroes will be obtained by factorising $x^2 + 2x + 1$

$x^2 + 2x + 1 = (x + 1)^2 = (x + 1)(x + 1)$

Zeroes are $-1, -1$

EXERCISE

1. If $\sqrt{2}$ and $-\sqrt{2}$ are the zeroes of polynomial $2x^4 - 3x^3 - 3x^2 + 6x - 2$, find other zeroes.
2. On dividing $p(x) = x^3 - 27x^2 + 8x + 18$ by a polynomial $g(x)$. The quotient & the remainder were $x^2 - 26x - 18$ and 0 respectively. Find g(x)
3. Find the value of a and b so that $x^4 + x^3 + 8x^2 + ax + b$ is divisible be $x^2 + 1$
4. If the polynomial $x^4 - 6x^3 + 16x^2 - 25x + 10$ is divided by $x^2 - 2x + k$, the remainder comes out to be $x + a$, find k and a.
5. On dividing $x^3 - 3x^2 + x + 2$ by a polynomial$g(x)$, the quotient and remainder were $x - 2$ and $-2x + 4$ respectively. Find $g(x)$.