

THEORY OF EQUATIONS

Solve the eq.

$$6x^4 - 13x^3 - 35x^2 - x + 3 = 0$$

Which has a root $2 - \sqrt{3}$.

Sol.

Given eq. is

$$6x^4 - 13x^3 - 35x^2 - x + 3 = 0 \quad \text{--- (1)}$$

Now Given Root is $2 - \sqrt{3}$.

Which is a irrational root

In an. eq. with rational Coeff
irrational roots occur in
Conjugate pairs.

$\Rightarrow 2 + \sqrt{3}$ is also root of ①

$\Rightarrow (x - (2 - \sqrt{3})), (x - (2 + \sqrt{3}))$ are factors
of ①

Now $(x - (2 - \sqrt{3}))(x - (2 + \sqrt{3}))$ is

$$[(x-2) + \sqrt{3}][(x-2) - \sqrt{3}]$$

$$= (x-2)^2 - (\sqrt{3})^2$$

$$= x^2 + 4 - 4x - 3$$

$$= x^2 - 4x + 1$$

$\therefore x^2 - 4x + 1$ divides ①

$$x^2 - 4x + 1 \overline{) 6x^4 - 13x^3 - 35x^2 - x + 3}$$

$$\underline{6x^4 - 24x^3 + 6x^2} $$

$$11x^3 - 41x^2 - x + 3$$

$$\underline{11x^3 - 44x^2 + 11x}$$

$$3x^2 - 12x + 8$$

$$\underline{3x^2 - 12x + 3}$$

$$\underline{ 5}$$

$$6x^2 + 11x + 3$$



OMG! MATHS!
The poetry of logical ideas.

\therefore The other roots of eq (1) is

given by

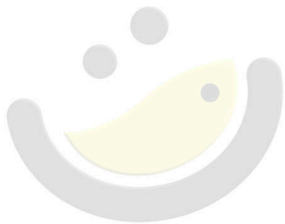
$$6x^2 + 11x + 3 = 0$$

$$6x^2 + 9x + 2x + 3 = 0$$

$$3x(2x + 3) + 1(2x + 3) = 0$$

$$(3x + 1)(2x + 3) = 0$$

$$x = -1/3, -3/2$$



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