

Mathematics

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(Chapter – 2) (Polynomials)(Exemplar Problems)

(Class – X)

Exercise 2.3

Find the zeroes of the following polynomials by factorization method and verify the relations between the zeroes and the coefficients of the polynomials.

Question 6:

$$4x^2 + 5\sqrt{2}x - 3.$$

Answer 6:

$$\begin{aligned} \text{Let } f(x) &= 4x^2 + 5\sqrt{2}x - 3 \\ &= 4x^2 + 6\sqrt{2}x - \sqrt{2}x - 3 \\ &= 2\sqrt{2}x(\sqrt{2}x + 3) - 1(\sqrt{2}x + 3) \\ &= (\sqrt{2}x + 3)(2\sqrt{2}x - 1) \end{aligned}$$

So, the value of $4x^2 + 5\sqrt{2}x - 3$ is zero when $\sqrt{2}x + 3 = 0$ or $2\sqrt{2}x - 1 = 0$,

$$\text{When } x = -\frac{3}{\sqrt{2}} \text{ or } x = \frac{1}{2\sqrt{2}}.$$

So, the zeroes of $4x^2 + 5\sqrt{2}x - 3$ are $-\frac{3}{\sqrt{2}}$ and $\frac{1}{2\sqrt{2}}$.

$$\begin{aligned} \therefore \text{Sum of zeroes} &= -\frac{3}{\sqrt{2}} + \frac{1}{2\sqrt{2}} = -\frac{5}{2\sqrt{2}} = -\frac{5\sqrt{2}}{4} \\ &= -\frac{(\text{coefficinet of } x)}{(\text{coefficinet of } x^2)} \end{aligned}$$

$$\begin{aligned} \text{and product of zeroes} &= -\frac{3}{\sqrt{2}} \cdot \frac{1}{2\sqrt{2}} = -\frac{3}{4} \\ &= \frac{\text{Constant term}}{\text{coefficinet of } x^2} \end{aligned}$$

Hence, the relations between the zeroes and the coefficients of the polynomial is verified.

