



Quadratic Equations Ex 14.1 Q9

$$5x^2 - 6x + 2 = 0$$

We will apply discriminant rule,

$$x = \frac{-b \pm \sqrt{D}}{2a} \dots\dots\dots (A)$$

$$\text{where } D = b^2 - 4ac$$

$$= (-6)^2 - 4 \cdot 5 \cdot 2$$

$$= 36 - 40$$

$$= -4$$

from (A)

$$x = \frac{-(-6) \pm \sqrt{-4}}{2 \cdot 5}$$

$$= \frac{6 \pm 2i}{10}$$

$$= \frac{3 \pm i}{5}$$

$$\therefore x = \frac{3}{5} + \frac{i}{5}, \quad \frac{3}{5} - \frac{i}{5}$$

Quadratic Equations Ex 14.1 Q10

$$21x^2 + 9x + 1 = 0$$

Comparing the given equation with the general form

$$ax^2 + bx + c = 0, \text{ we get } a = 21, b = 9, c = 1$$

Substituting a and b in,

$$\alpha = \frac{-b + \sqrt{b^2 - 4ac}}{2a} \quad \text{and} \quad \beta = \frac{-b - \sqrt{b^2 - 4ac}}{2a}$$

$$\alpha = \frac{-9 + \sqrt{81 - 84}}{42} \quad \text{and} \quad \beta = \frac{-9 - \sqrt{81 - 84}}{42}$$

$$\Rightarrow \alpha = \frac{-9 + \sqrt{-3}}{42} \quad \text{and} \quad \beta = \frac{-9 - \sqrt{-3}}{42}$$

$$\Rightarrow \alpha = \frac{-9 + i\sqrt{3}}{42} \quad \text{and} \quad \beta = \frac{-9 - i\sqrt{3}}{42}$$

$$\text{The roots are } x = \frac{-9}{42} \pm \frac{i\sqrt{3}}{42}$$

Quadratic Equations Ex 14.1 Q11

$$x^2 - x + 1 = 0$$

We will apply discriminant rule,

$$x = \frac{-b \pm \sqrt{D}}{2a} \dots\dots\dots (A)$$

$$\text{where } D = b^2 - 4ac$$

$$= (-1)^2 - 4.1.1$$

$$= 1 - 4$$

$$= -3$$

from (A)

$$\therefore x = \frac{-(-1) \pm \sqrt{-3}}{2}$$

$$= \frac{1 \pm \sqrt{3}i}{2}$$

$$\therefore x = \frac{1}{2} + \frac{\sqrt{3}}{2}i, \quad \frac{1}{2} - \frac{\sqrt{3}}{2}i$$

Quadratic Equations Ex 14.1 Q12

$$x^2 + x + 1 = 0$$

We will apply discriminant rule,

$$x = \frac{-b \pm \sqrt{D}}{2a} \dots\dots\dots (A)$$

$$\begin{aligned} \text{where } D &= b^2 - 4ac \\ &= 1^2 - 4.1.1 \\ &= 1 - 4 \\ &= -3 \end{aligned}$$

from (A)

$$\begin{aligned} x &= \frac{-1 \pm \sqrt{-3}}{2} \\ &= \frac{-1 \pm \sqrt{3}i}{2} \end{aligned}$$

$$\therefore x = \frac{-1}{2} + \frac{\sqrt{3}}{2}i, \quad \frac{-1}{2} - \frac{\sqrt{3}}{2}i$$

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