



Quadratic Equations Ex 14.1 Q5

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

Now, completing the squares, we get

$$\begin{aligned} & \left(x + \frac{1}{2}\right)^2 + \frac{3}{4} = 0 \\ \Rightarrow & \left(x + \frac{1}{2}\right)^2 - \left(\frac{\sqrt{3}}{2}i\right)^2 = 0 \\ \Rightarrow & \left(x + \frac{1}{2} + \frac{\sqrt{3}}{2}i\right)\left(x + \frac{1}{2} - \frac{\sqrt{3}}{2}i\right) = 0 \\ \Rightarrow & \left(x + \frac{1}{2} + \frac{\sqrt{3}}{2}i\right) = 0 \quad \text{or} \quad \left(x + \frac{1}{2} - \frac{\sqrt{3}}{2}i\right) = 0 \\ \therefore x = & \frac{-1}{2} + \frac{\sqrt{3}}{2}i, \quad \frac{-1}{2} - \frac{\sqrt{3}}{2}i \end{aligned}$$

Quadratic Equations Ex 14.1 Q6

$$4x^2 + 1 = 0$$

$$\begin{aligned} \Rightarrow & (2x)^2 - i^2 = 0 \quad [\because i^2 = -1] \\ \Rightarrow & (2x + i)(2x - i) = 0 \\ \Rightarrow & \text{either } 2x + i = 0 \quad \text{or} \quad 2x - i = 0 \\ \Rightarrow & x = \frac{-i}{2} \quad \text{or} \quad x = \frac{i}{2} \end{aligned}$$

$$\therefore x = \frac{-i}{2}, \frac{i}{2}$$

Quadratic Equations Ex 14.1 Q7

$$x^2 - 4x + 7 = 0$$

We will apply discriminant rule,

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

$$\text{where } D = b^2 - 4ac = (-4)^2 - 4.1.7 = -12$$

from (A)

$$x = - \frac{(-4) \pm \sqrt{-12}}{2}$$

$$= \frac{4 \pm 2\sqrt{3}i}{2}$$

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

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

Quadratic Equations Ex 14.1 Q8

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

We will apply discriminant rule,

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

$$\begin{aligned} \text{where } D &= b^2 - 4ac \\ &= 2^2 - 4.1.2 \\ &= 4 - 8 \\ &= -4 \end{aligned}$$

from (A)

$$x = \frac{-2 \pm \sqrt{-4}}{2}$$

$$= \frac{-2 \pm 2i}{2}$$

$$= -1 \pm i$$

$$\therefore x = -1 + i, -1 - i$$

*****END*****

