Quadratic Equations Ex 14.1 Q9

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

We will apply discriminant rule,

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

where $D = b^2 - 4ac$

$$= (-6)^2 - 4.5.2$$

$$= 36 - 40$$

$$= -4$$

from (A)

$$x = \frac{-(-6) \pm \sqrt{-4}}{2.5}$$

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

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

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

Quadratic Equations Ex 14.1 Q10

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

Comparing the given equation with the general form

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

Substituting a and b in,

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

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

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

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

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,

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

where $D = b^2 - 4ac$

$$= (-1)^2 - 4.1.1$$
$$= 1 - 4$$
$$= -3$$

from (A)

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

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

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

Quadratic Equations Ex 14.1 Q12

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

We will apply discriminant rule,

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

where $D = b^2 - 4ac$

$= 1^2 - 4.1.1$

$= 1 - 4$

$= -3$

from (A)

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

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

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

********** END **********