



Exercise 4.3

Q2. Find the roots of the following Quadratic Equations by applying quadratic formula.

(i) $2x^2 - 7x + 3 = 0$

(ii) $2x^2 + x - 4 = 0$

(iii) $4x^2 + 4\sqrt{3}x + 3 = 0$

(iv) $2x^2 + x + 4 = 0$

Ans. (i) $2x^2 - 7x + 3 = 0$

Comparing quadratic equation $2x^2 - 7x + 3 = 0$ with general form $ax^2 + bx + c = 0$, we get $a = 2$, $b = -7$ and $c = 3$

Putting these values in quadratic formula

$$x = \frac{-b \pm \sqrt{b^2 - 4ac}}{2a}$$

$$x = \frac{7 \pm \sqrt{(-7)^2 - 4(2)(3)}}{2 \times 2}$$

$$\Rightarrow x = \frac{7 \pm \sqrt{49 - 24}}{4}$$

$$\Rightarrow x = \frac{7 \pm 5}{4}$$

$$\Rightarrow x = \frac{7+5}{4}, \frac{7-5}{4}$$

$$\Rightarrow x = 3, \frac{1}{2}$$

$$\text{(ii) } 2x^2 + x - 4 = 0$$

Comparing quadratic equation $2x^2 + x - 4 = 0$ with the general form $ax^2 + bx + c = 0$, we get $a = 2$, $b = 1$ and $c = -4$

Putting these values in quadratic formula

$$x = \frac{-b \pm \sqrt{b^2 - 4ac}}{2a}$$

$$x = \frac{-1 \pm \sqrt{(1)^2 - 4(2)(-4)}}{2 \times 2}$$

$$\Rightarrow x = \frac{-1 \pm \sqrt{33}}{4}$$

$$\Rightarrow x = \frac{-1 + \sqrt{33}}{4}, \frac{-1 - \sqrt{33}}{4}$$

$$(iii) 4x^2 + 4\sqrt{3}x + 3 = 0$$

Comparing quadratic equation $4x^2 + 4\sqrt{3}x + 3 = 0$ with the general form $ax^2 + bx + c = 0$, we get $a = 4$, $b = 4\sqrt{3}$ and $c = 3$

Putting these values in quadratic formula

$$x = \frac{-b \pm \sqrt{b^2 - 4ac}}{2a}$$

$$x = \frac{-4\sqrt{3} \pm \sqrt{(4\sqrt{3})^2 - 4(4)(3)}}{2 \times 4}$$

$$\Rightarrow x = \frac{-4\sqrt{3} \pm \sqrt{0}}{8}$$

$$\Rightarrow x = \frac{-\sqrt{3}}{2}$$

A quadratic equation has two roots. Here, both the roots are equal.

$$\text{Therefore, } x = \frac{-\sqrt{3}}{2}, \frac{-\sqrt{3}}{2}$$

$$(iv) 2x^2 + x + 4 = 0$$

Comparing quadratic equation $2x^2 + x + 4 = 0$ with the general form $ax^2 + bx + c = 0$, we get $a = 2$, $b = 1$ and $c = 4$

Putting these values in quadratic formula

$$x = \frac{-b \pm \sqrt{b^2 - 4ac}}{2a}$$

$$x = \frac{-1 \pm \sqrt{(1)^2 - 4(2)(4)}}{2 \times 2}$$

$$\Rightarrow x = \frac{-1 \pm \sqrt{-31}}{4}$$

But, square root of negative number is not defined.

Therefore, Quadratic Equation $2x^2 + x + 4 = 0$ has no solution.

Q3. Find the roots of the following equations:

(i) $\frac{x-1}{x} = 3, x \neq 0$

(ii) $\frac{1}{x+4} - \frac{1}{x-7} = \frac{11}{30}, x \neq -4, 7$

Ans. (i) $x - \frac{1}{x} = 3$ where $x \neq 0$

$$\Rightarrow \frac{x^2 - 1}{x} = 3$$

$$\Rightarrow x^2 - 1 = 3x$$

$$\Rightarrow x^2 - 3x - 1 = 0$$

Comparing equation $x^2 - 3x - 1 = 0$ with general form $ax^2 + bx + c = 0$,

We get $a = 1$, $b = -3$ and $c = -1$

Using quadratic formula $x = \frac{-b \pm \sqrt{b^2 - 4ac}}{2a}$ to solve equation,

$$x = \frac{3 \pm \sqrt{(3)^2 - 4(1)(-1)}}{2 \times 1}$$

$$\Rightarrow x = \frac{3 \pm \sqrt{13}}{2}$$

$$\Rightarrow x = \frac{3 + \sqrt{13}}{2}, \frac{3 - \sqrt{13}}{2}$$

***** END *****