

## Chapter 04

### QUADRATIC EQUATIONS

#### Procedure To Find Roots Of A Quadratic Equation By Formula:

##### Example:

Solve  $x^2 - 4x = -1$  using the quadratic formula.

##### Solution:

**Step-1:** Make the given equation free from fractions and radicals and put it into the standard form,

$$ax^2 + bx + c = 0$$

$$\Rightarrow x^2 - 4x + 1 = 0.$$

**Step-2:** Compare the equation so obtained with the equation  $ax^2 + bx + c = 0$  to know the values of  $a$ ,  $b$ , and  $c$ .

Compare with  $ax^2 + bx + c = 0$

$$\therefore a = 1, b = -4, c = 1.$$

**Step-3:** Use the formula:

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

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

$$= \frac{4 \pm \sqrt{16 - 4}}{2}$$

$$= \frac{4 \pm \sqrt{12}}{2}$$

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

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

$$= \frac{2(2 \pm \sqrt{3})}{2}$$

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

$\therefore$  Solution Set  $= 2 \pm \sqrt{3}$ .

