Assignment – 4

Quadratic Equations

1. **Find the roots of the quadratic equation by factorization $2x^2 + 3x - 2 = 0$**

   Solution:

$$2x^2 + 3x - 2 = 0$$

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

$$2x\,(x+2) - 1\,(x+2) = 0$$

$$(2x-1)\,(x+2) = 0$$

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

$2x = 1$ or $x = -2$

$\therefore \quad x = \frac{1}{2}$ or $x = 2$

2. Find the discriminant of the equation $2x^2 - x + \frac{1}{5} = 0$.

Solution:

Discriminant $b^2 - 4ac$.

$= (-1)^2 - 4(2)\left(\frac{1}{5}\right)$

$= \frac{1}{1} - \frac{8}{5}$

$= \frac{5-8}{5}$

$= \frac{-3}{5}$

3. Find the roots of the quadratic equation by using formula $6x^2 - 10x + 4 = 0$.

Solution:

$$6x^2 - 10x + 4 = 0$$

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

$$x = \frac{-(-10) \pm \sqrt{(-10)^2 - 4(6)(4)}}{2 \times 6}$$

$$x = \frac{10 \pm \sqrt{100 - 96}}{12}$$

$$x = \frac{10 \pm 2}{12}$$

$$x = \frac{10 - 2}{12} \quad \text{or} \quad \frac{10 + 2}{12}$$

$$x = \frac{8}{12} \quad \text{or} \quad \frac{12}{12}$$

$$\therefore \quad x = \frac{2}{3} \quad \text{or} \quad 1$$

4. Find the value of k. Equation $x^2 + 6x + k = 0$ if the roots of the equation are real.

Solution:

Roots are real.

$\therefore \quad b^2 - 4ac \geq 0$

$(6)^2 - 4(1)(k) \geq 0$

$36 - 4k \geq 0$

$-4k \geq -36$

$\therefore \quad k \leq 9$