

**QUADRATIC
EQUATIONS**

STD 10 MATHEMATICS PART I

CHAPTER 2

LONG QUESTIONS

Q. 1

Two numbers differ by 3. The sum of twice the smaller number and thrice the greater number is 19, find the numbers. (navneet 52)

SOLUTION:

Let the greater number be x and the smaller number be y

According to the first condition, two numbers differ by 3

$$x - y = 3 \quad \dots (i)$$

According to the second condition, the sum of twice the smaller number and thrice the greater number is 19

$$3x + 2y = 19 \quad \dots (ii)$$

Multiplying equation (i) by 2, we get

$$2x - 2y = 6 \quad \dots (iii)$$

Adding equations (ii) & (iii), we get

$$3x + 2y = 19$$

$$\underline{+2x - 2y = +6}$$

$$5x = 25$$

$$\therefore x = 5$$

Substituting $x = 5$ in equation (i) we get,

$$5 - y = 3$$

$$5 - 3 = y$$

$$y = 2$$

Ans.: The required Numbers are 5 & 2

Q. 2 (n39)

If $x = 3$ is one root of the equation $kx^2 - 10x + 3 = 0$, Find the value of k .

SOLUTION:

$x = 3$ is the root of the given equation. Therefore, substituting $x = 3$ in given equation we get,

$$k(3)^2 - 10(3) + 3 = 0$$

$$9k - 30 + 3 = 0$$

$$9k - 27 = 0$$

$$9k = 27$$

$$\therefore k = 3$$

Ans.: The value of k is 3

Q. 3 (n40)

Solve the following quadratic equation by factorization method.

$$x^2 + x - 20 = 0$$

SOLUTION:

$$x^2 + x - 20 = 0$$

$$\therefore x^2 + 5x - 4x - 20 = 0$$

$$\therefore x(x + 5) - 4(x + 5) = 0$$

$$\therefore (x + 5)(x - 4) = 0$$

$$\therefore x + 5 \text{ or } x - 4 = 0$$

$$\therefore x = -5 \text{ or } x = 4$$

Ans.: -5 or 4 are the roots of the given quadratic equation.

Q. 4 (n41)

Complete the following activity to solve the quadratic equation by factorization method

$$\sqrt{2x^2} + 7x + 5\sqrt{2} = 0$$

SOLUTION:

$$\sqrt{2x^2} + 7x + 5\sqrt{2} = 0$$

$$\therefore \sqrt{2x^2} + 5x + 2x + 5\sqrt{2} = 0$$

$$\therefore x(\sqrt{2x} + 5) + \sqrt{2}(\sqrt{2x} + 5) = 0$$

$$\therefore (\sqrt{2x} + 5)(x + \sqrt{2}) = 0$$

$$\therefore \sqrt{2x} + 5 = 0 \text{ OR } (x + \sqrt{2}) = 0$$

$$\therefore x = \frac{-5}{\sqrt{2}} \text{ OR } x = -\sqrt{2}$$

Ans.: The roots of quadratic eqn. are $\frac{-5}{\sqrt{2}}$ and $-\sqrt{2}$

Q. 5

Determine whether the values given against following quadratic equations are the root of the quadratic equation or not.

$$2m^2 - 5m = 0, \left(m = 2, \frac{5}{2}\right)$$

SOLUTION:

Substituting $m = 2$,

$$\text{LHS} = 2(2)^2 - 5(2)$$

$$= 2(4) - 10$$

$$= 8 - 10$$

$$= -2$$

$\therefore \text{LHS} \neq \text{RHS}$

Therefore, $m = 2$ is not the root of the given quadratic equation

Substituting $m = \frac{5}{2}$,

$$\text{LHS} = 2\left(\frac{5}{2}\right)^2 - 5\left(\frac{5}{2}\right)$$