Maths Assignment

Chapter - 4, Quadratic Equations

Class - X

Q.1 - Tick the correct answer for each of the following:

i) Which of the following is a quadratic equation?

(a) $(4-x)(3x+1) = 2 - 3x^2$ (b) $(x+3)^3 - 5 = x^2 + 9$

(c) $(k-4)x^2 - 3x = 9,\ k=4$ (d) $(x+1)^3 = x^3 - 5$

ii) The value of k for which 3 is a root of the equation $kx^2 - 7x + 3 = 0$ is

(a) 2 (b) -2 (c) 3 (d) -3

iii) If $ax^2 + bx + c = 0$ has equal roots, then b is equal to

(a) $2\sqrt{ac}$ (b) $-2\sqrt{ac}$ (c) $\pm 2\sqrt{ac}$ (d) $2ac$

iv) If the roots of the equation $(a^2+b^2)x^2 - 2b(a+c)x + (b^2+c^2) = 0$ are equal, then

(a) $2b = a+c$ (b) $b^2 = ac$ (c) $b = \frac{2ac}{a+c}$ (d) $b = ac$

v) The discriminant of the quadratic equation $3\sqrt{3}x^2 + 10x + \sqrt{3} = 0$ is

(a) 8 (b) 64 (c) $-\frac{1}{3\sqrt{3}}$ (d) $-\sqrt{3}$

Q.2 Find the value(s) of k for which the quadratic equation $(k+4)x^2 + (k+1)x + 1 = 0$ has equal roots.

Q.3 Find the value of k for which the quadratic equation $k^2x^2 - 2(2k-1)x + 4 = 0$ has real and equal roots.

Q.4 Find the roots of the following quadratic equations using the quadratic formula.

1) $6a^2x^2 - 7abx - 3b^2 = 0$, $a \neq 0$

2) $abx^2 + (b^2 - ac)x - bc = 0$

3) $\frac{x-1}{x-2} + \frac{x-3}{x-4} = 3\frac{1}{3}$, $x \neq 2, 4$

4) $\frac{4}{x} - 3 = \frac{2}{2x+3}$, $x \neq 0, -\frac{3}{2}$

Q.5 Find the roots of the following quadratic equations by the factorisation method.

1) $4x^2 - 4ax + (a^2 - b^2) = 0$

2) $\frac{x-1}{2x+1} + \frac{2x+1}{x-1} = 2$, $x \neq -\frac{1}{2}, 1$

Q.6 The difference of squares of two numbers is 88. If the larger number is 5 less than twice the smaller number, then find the two numbers.

Q.7 If the roots of the equation $(a^2+b^2)x^2 - 2(ac+bd)x + (c^2+d^2) = 0$ are equal, prove that $\frac{a}{b} = \frac{c}{d}$.

Q.8 Find a natural number whose square diminished by 84 is equal to thrice of 8 more than the given number.

Q.9 At present Asha's age (in years) is 2 more than the square of her daughter Nisha's age. When Nisha grows to her mother's present age, Asha's age will be one year less than 10 times the present age of Nisha. Find the present ages of Asha and Nisha.

Q,10 If the list price of a toy is reduced by ₹ 2, a person can buy 2 toys more for ₹ 360. Find the original price of the toy.

Q,11 Is it possible to design a rectangular park of perimeter 100 m and area 625 m^2? If so, find its length and breadth.

Q,12 Can a quadratic equation $ax^2 + bx = 0$ have non-real roots? Give reasons.

Q,13 Does there exist a quadratic equation whose co-efficients are all distinct irrational but both the roots are rationals? Justify your answer.

Q,14 Find the nature of the roots of the quadratic equation $x^2 + 5\sqrt{5}x - 70 = 0$. If the real roots exist, find them.