

CHAPTER 5 (QUADRATIC EQUATIONS IN ONE VARIABLE)

General direction for the students :-Whatever be the notes provided , everything must be copied in the Maths Copy and then do the Home work in the same Copy.

NATURE OF ROOTS OF A QUADRATIC EQUATION

Let the given equation be $ax^2 + bx + c = 0$, then the roots are $x = \frac{-b \mp \sqrt{b^2 - 4ac}}{2a}$, is known as Quadratic formula. Here $b^2 - 4ac$ is known as Discriminant (D or Δ) of the equation. Discriminant $D = b^2 - 4ac$

- i) If $b^2 - 4ac > 0$,then the roots are Real and Distinct.
- ii) If $b^2 - 4ac = 0$,then the roots are Real and Equal. Here the given quadratic is a perfect square.
- iii) If $b^2 - 4ac < 0$,then there is no real roots . Here the roots are Imaginary (Complex).
- iv) If $b^2 - 4ac \geq 0$,then the roots are Real .

If a, b, c are rational numbers and

- i) if $b^2 - 4ac$ is a perfect square , then the roots are Rational.
- ii) If $b^2 - 4ac$ is not a perfect square , then the roots are Irrational. Also the Irrational roots are conjugate to each other.

METHOD OF INTERVAL

If α and β are two real numbers such that $\alpha < \beta$ in $(x-\alpha)(x-\beta) \leq 0$ then

Step 1. Arrange α and β in a line in ascending order

Step 2. Put '+' in the RHS of β and put '-' in between α and β and then '+' LHS of α . This process should continue if many numbers are there.

Step 3. Select the region corresponding to the inequality.

EXERCISE 5.4

Q1 i). $3x^2 - 5x - 2 = 0$

Discriminant , $D = b^2 - 4ac$

$=(-5)^2 - 4.3. -2$

$=49 > 0$, roots are Real , Distinct and Rational

HOME WORK : Exercise 5.4 questions 1,2 and 3.