

QUADRATIC EQUATIONS - LESSON PLAN 4

CLASS : 10 SUBJECT : MATHEMATICS TEACHER'S NAME : D. SREENIVASULU, S.A(MATHS) SCHOOL: ZPHS, CHINTHALAPALEM, KANIGIRI(M), PRAKASAM(Dt)

Name of the Unit	Topic		No. of periods required	Time line for teaching		Any specific information
				From	To	
QUADRATIC EQUATIONS	4.1	Introduction				
	4.2	Quadratic equations				
	4.3	Solution of a Quadratic Equation by Factorisation				
	4.4	Nature of Roots				
	4.5	Summary				
	TOTAL					

Prior Concept / Skills:

Every Pupil is expected to have basic knowledge and skills in

1. Basic information about Constant, Variable, terms, coefficients
2. Difference between algebraic expression and an equation
3. Different types of polynomials according to their degrees
4. Areas of geometrical shapes like square, rectangle, triangle.
5. Graphical representation of quadratic polynomial.
6. Know about finding zeroes of a polynomials and equations.
7. Algebraic Identities.

Learning Outcomes

After Completion of this lesson every student

- # able to express the given real-life situation in to quadratic equation
- # Give the examples of real-life situations which leads Quadratic equations (quadratic functions) verify the given equation is quadratic or not.
- # Learner able to find roots of Quadratic equations

- # Finding roots of quadratic equations using quadratic formula
- # Find Nature of roots for a quadratic equation
- # Finding discriminant and find the nature of roots
- # The comprehension and problem-solving skills
- # Apply the concept of quadratic equations In Situational problems based on quadratic equations related to day-to-day activities

# solve situational problems based on quadratic equations related to day-to-day activities	
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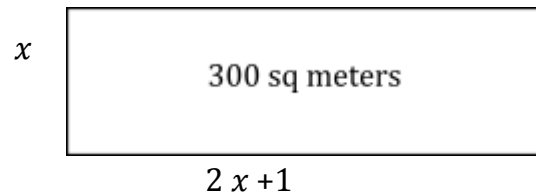
Teaching Learning Process	
INTRODUCTION /INDUCTION	Experience & Reflection

Teacher uses real life situations to introduce quadratic equations

Consider the following situation.

For instance, suppose a charity trust decides to build a prayer hall having a carpet area of 300 square metres with its length one metre more than twice its breadth. What should be the length and breadth of the hall?

(Teacher should give step by step instructions to prepare above situation in mathematically) Students in pairs read the statement and attempt to draw a mathematical model and present. Figure for the above data is drawn based on the discussion with the class..



Write the expression from the known situation.

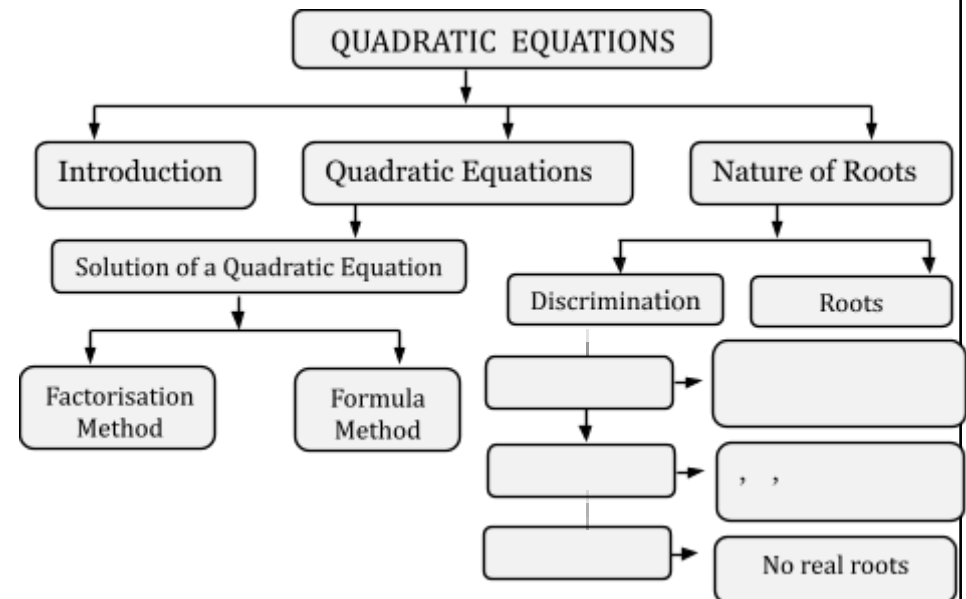
[Teacher guides to equate the area of the hall to 300 square meters. And prepare an equation.]

Area of the hall = $(2x + 1)x$ Sqm

$$2x^2 + x = 300 \text{ Sqm (Given)}$$

$$\therefore 2x^2 + x - 300 = 0$$

- Recall the types of polynomials
- Find the value of equation at given value to variable
- Check whether the given values are solution to the given quadratic equation or not
- Find the solutions of quadratic equations in different methods
 - (i) Factorization method
 - (ii) Formula method
 - Explicit the nature of solution of quadratic equations using Discriminant.
- Represent all concepts through Flow chart.



EXPLICIT TEACHING/TEACHER MODELLING (I DO)	GROUP WORK (WE DO)	INDEPENDENT WORK (YOU DO)	NOTES
4.1. Introduction: Introduce the concept of quadratic equations by considering the situations like The area of a rectangular plot is 528 m^2. The length of the plot (in meters) is one more than twice its breadth. We need to find the length and breadth of the plot Area of the rectangular plot $= (2x + 1) \times x\text{ Sqm}$ $2x^2 + x = 528\text{ Sqm}$ (Given) $\therefore 2x^2 + x - 528 = 0$	Give the examples of real-life situations which leads quadratic equations verify the given equation is quadratic or not.	Each student will actively participate in the activity and will recall their previous knowledge on Degree of the polynomial, Types of polynomial, Equations	
4.2. Quadratic Equations: Explained the general form of quadratic equation and its standard form. Any equation of the form $P(x) = 0$, where $P(x)$ is a polynomial of degree 2 is a quadratic equation. I. When we write the terms of $P(x)$ in descending order of their degrees, then it is called the standard form of quadratic equation. II. Explain some applications of quadratic equations III. Explain how to convert real life situations into quadratic equations in Example.1	The standard form of quadratic equation is $ax^2 + bx + c = 0, a \neq 0$. Check whether the given equations are quadratic or not in Example.2 with the help of teacher.	Represent the given situations in the form of Quadratic Equations Solve problems 1 and 2 of Exercise.-4.1	A polynomial which has the highest degree equal to two is a quadratic equation which is expressed in the form of $ax^2 + bx + c = 0$, where x is the variable and a, b, c are the real numbers & $a \neq 0$.

EXPLICIT TEACHING/TEACHER MODELLING (I DO)	GROUP WORK (WE DO)	INDEPENDENT WORK (YOU DO)	NOTES
4.3 Solutions of a Quadratic Equation by Factorisation : Recall the zeros of a quadratic polynomial, how to factorize a quadratic polynomial. In general a real number α is called a root of the quadratic equation $ax^2 + bx + c = 0$, $a \neq 0$, if $a\alpha^2 + b\alpha + c = 0$. we also say that $x = \alpha$ is a solution of the quadratic equation, or that α satisfies the quadratic equation. 4.4 Nature of Roots: The nature of roots is described with the discriminant of the equation. The formula $b^2 - 4ac$ determines whether the quadratic equation $ax^2 + bx + c = 0$ has real roots or not. $b^2 - 4ac$ is called the discriminant of the quadratic equation. A quadratic equation $ax^2 + bx + c = 0$ has i) two distinct real roots, if $b^2 - 4ac > 0$ ii) two equal real roots, if $b^2 - 4ac = 0$ iii) no real roots, if $b^2 - 4ac < 0$ 4.5 Summary:	Recall that a quadratic polynomial can have at most two zeroes. So, any quadratic equation can have at most two roots. And also learnt how to factorise quadratic polynomials by splitting their middle terms. We shall use this knowledge for finding the roots of a quadratic equation. By taking an example and explain how to find roots by using splitting the middle term i.e, factorization method. - Solve the Example-3 in page No.84 - learn about what are the roots of a quadratic equation, how to determine the nature of roots of a quadratic equation specifying different cases, and solve examples based on the nature of roots - Explain the quadratic formula - The roots of a quadratic equation $ax^2 + bx + c = 0$ are given by $x = \frac{-b \pm \sqrt{b^2 - 4ac}}{2a}$ - Students have studied the key points of this chapter	Solve the example Problems as well as the problems of Exercise 4.2 on their own under the guidance of teacher Solve the example Problems as well as the problems of Exercise 4.3 on their own under the guidance of teacher	Note that the zeroes of the quadratic polynomial $ax^2 + bx + c$ and the roots of quadratic equation $ax^2 + bx + c = 0$ are the same.

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CHECK FOR UNDERSTANDING QUESTIONS	
1. Factual	1) What is a quadratic equation? 2) The general form of a quadratic equation is _____ 3) Check if $x(x + 1) + 8 = (x + 2)(x - 2)$ is in the form of quadratic equation. 4) What is a quadratic equation's discriminant? 5) Find the discriminant of the equation: $2x^2 - 6x + 3 = 0$
2. Open Ended/Critical Thinking	1) Is it possible to design a rectangular park of perimeter 80m and area $400m^2$? If so, find its length and breadth. 2) Represent the any situation in the form of quadratic equation 3) If the discriminant of a quadratic equation is negative, then the roots are _____ 4) Find the roots of $x^2 + 4x + 5 = 0$, if any exist, using quadratic formula.
3. Student Practice questions & Activities	1. Represent the following situations in the form of quadratic equations: (i) The area of a rectangular plot is $528 m^2$. The length of the plot (in metres) is one more than twice its breadth. We need to find the length and breadth of the plot. (ii) The product of two consecutive positive integers is 306. We need to find the integers. (iii) Rohan's mother is 26 years older than him. The product of their ages (in years) 3 years from now will be 360. We would like to find Rohan's present age. (iv) A train travels a distance of 480 km at a uniform speed. If the speed had been 8 km/h less, then it would have taken 2) Solve the quadratic equation $2x^2 + x - 300 = 0$ using factorisation. 3) Rahul and Rohan have 45 marbles together. After losing 5 marbles each, the product of the number of marbles they both have now is 124. How to find out how many marbles they had to start with. 4) Solve the quadratic equation $2x^2 + x - 528 = 0$, using quadratic formula.
4. Assessment	1) Write three quadratic equations which are having i) two distinct roots ii) equal roots iii) no real roots 2) Worksheet on quadratic equation 3) Quiz to be conducted on quadratic equation.

Signature of the Teacher

Signature of the Headmaster

Signature of the visiting officer with Remarks