

Algebra 1

Gyaanbhoomi Academic Curriculum

Course Description

Algebra 1 provides a formal development of the algebraic skills and concepts necessary for students to succeed in future mathematics courses. Key concepts include understanding and working with linear, quadratic, and exponential functions, solving equations and systems of equations, and analyzing data.

Topics Covered

Unit 1: Foundations of Algebra

- The Real Number System and its Properties
- Solving Multi-Step, Absolute Value, and Literal Equations
- Solving and Graphing Linear and Compound Inequalities
- Introduction to Function Transformations

Unit 2: Linear Functions

- Graphing Linear Equations in Various Forms
- Writing Equations of Lines (Parallel and Perpendicular)
- Linear Regression and Correlation
- Arithmetic Sequences and their Relation to Linear Functions

Unit 3: Systems of Equations and Inequalities

- Solving Systems of Linear Equations by Graphing, Substitution, and Elimination
- Modeling with Linear Systems
- Solving Systems of Linear Inequalities by Graphing
- Introduction to 3x3 Systems

Unit 4: Exponents and Exponential Functions

- Properties of Exponents (Integer and Rational)
- Graphing Exponential Functions
- Exponential Growth and Decay Models
- Geometric Sequences and their Relation to Exponential Functions

Unit 5: Polynomials and Factoring

- Operations with Polynomials (Addition, Subtraction, Multiplication)
- Factoring Polynomials: GCF, Trinomials ($x^2 + bx + c$, $ax^2 + bx + c$), Difference of Squares, Grouping
- Solving Polynomial Equations in Factored Form

Unit 6: Quadratic Functions and Equations

- Graphing Quadratic Functions ($y = ax^2 + bx + c$); Vertex, Axis of Symmetry
- Solving Quadratic Equations by Factoring, Completing the Square, and the Quadratic Formula ($x = \frac{-b \pm \sqrt{b^2 - 4ac}}{2a}$)
- The Discriminant and Nature of Roots
- Applications of Quadratic Functions (Projectile Motion)

Unit 7: Radical and Rational Expressions

- Simplifying Radical Expressions
- Operations with Radicals and Solving Radical Equations
- Simplifying, Multiplying, and Dividing Rational Expressions
- Adding and Subtracting Rational Expressions

Unit 8: Data Analysis and Statistics

- Measures of Central Tendency and Dispersion (Standard Deviation)
- Box-and-Whisker Plots and Histograms
- Two-Way Frequency Tables
- Direct and Inverse Variation