



Online Courses for High School Students

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Algebra I

Course Description:

Students explore the tools of algebra and learn to identify the structure and properties of the real number system; complete operations with integers and other rational numbers; work with square roots and irrational numbers; graph linear equations; solve linear equations and inequalities in one variable; solve systems of linear equations; use ratios, proportions, and percentages to solve problems; use algebraic applications in geometry, including the Pythagorean theorem and formulas for measuring area and volume; complete an introduction to polynomials; and understand logic and reasoning.

Prerequisites: None

Course Length: Two Semesters

Required Text: Algebra I: Reference Guide and Problem Sets (E-book is included within the course).

Materials List: Texas Instruments TI-84 Plus Graphics Calculator

SEMESTER I

Course Outline:

Unit 1: Algebra Basics

- Semester Introduction
- Foundations
- Expressions
- Variables
- Translating Words into Variable Expressions
- Equations
- Translating Words into Equations
- Replacement Sets
- Problem Solving
- Unit Review
- Unit Test

Unit 2: Properties of Real Numbers

- Number Lines
- Sets
- Comparing Expressions
- Number Properties
- Threaded Discussion Board

- Distributive Property
- Algebraic Proof
- Opposites and Absolute Value
- Unit Review
- Unit Test

Unit 3: Operations with Real Numbers

- Foundations
- Addition 1
- Addition 2
- Subtraction
- Multiplication
- Reciprocals and Division
- Unit Review
- Unit Test

Unit 4: Solving Equations

- Foundations
- Addition and Subtraction Equations
- Multiplication and Division Equations 1
- Multiplication and Division Equations 2
- Multiple Transformations
- Variables on Both Sides of an Equation
- Transforming Formulas
- Unit Review
- Unit Test

Unit 5: Solving Inequalities

- Foundations
- Inequalities
- Solving Inequalities
- Combined Inequalities
- Absolute Value Equations and Inequalities
- Applications: Inequalities
- Unit Review
- Unit Test

Unit 6: Applying Fractions

- Foundations
- Ratios 1
- Ratios 2
- Proportions
- Your Choice
- Percents 1
- Percents 2
- Applications: Percents
- Unit Review
- Unit Test

Unit 7: Linear Equations and Inequalities

- Foundations
- Graphs
- Equations in Two Variables
- Lines and Intercepts
- Slope
- Slope-Intercept Form
- Point-Slope Form
- Parallel and Perpendicular Lines
- Equations from Graphs
- Applications: Linear Models
- Graphing Linear Inequalities
- Unit Review
- Unit Test

Unit 8: Systems of Equations

- Foundations
- Systems of Equations
- Substitution Method
- Linear Combination
- Applications: Systems of Linear Equations
- Systems of Linear Inequalities
- Unit Review
- Unit Test

Unit 9: Semester Review and Test

- Semester Review
- Semester Test

SEMESTER II

Course Outline:

Unit 1: Relations and Functions

- Semester Introduction
- Foundations
- Relations
- Functions
- Function Equations 1
- Function Equations 2
- Absolute Value Functions
- Direct Linear Variation 1
- Direct Linear Variation 2
- Quadratic Variation
- Inverse Variation
- Unit Review

- Unit Test

Unit 2: Rationals, Irrationals, and Radicals

- Foundations
- Rational Numbers
- Terminating and Repeating Numbers
- Square Roots 1
- Square Roots 2
- Irrational Numbers
- Estimating Square Roots
- Radicals with Variables 1
- Radicals with Variables 2
- Using Square Roots to Solve Equations
- The Pythagorean Theorem
- Unit Review
- Unit Test

Unit 3: Working with Polynomials

- Foundations
- Overview of Polynomials
- Adding and Subtracting Polynomials
- Multiplying Monomials
- Multiplying Polynomials by Monomials
- Multiplying Polynomials
- The FOIL Method
- Unit Review
- Unit Test

Unit 4: Factoring Polynomials

- Foundations
- Factoring Integers
- Properties of Exponents
- Dividing Monomials
- Dividing Polynomials by Monomials
- Common Factors of Polynomials
- Factoring Perfect Squares
- Factoring Differences of Squares 1
- Factoring Differences of Squares 2
- Factoring Quadratic Trinomials
- Finding Roots of Polynomials
- Unit Review
- Unit Test

Unit 5: Quadratic Equations

- Foundations
- Solving Perfect Square Equations
- Completing the Square

- The Quadratic Formula
- The Discriminant
- Solving Quadratic Equations
- Equations and Graphs: Roots and Intercepts
- Applications: Area Problems
- Applications: Projectile Motion
- Unit Review
- Unit Test

Unit 6: Rational Expressions

- Foundations
- Simplifying Rational Expressions
- Multiplying Rational Expressions
- Dividing Rational Expressions
- Adding and Subtracting Rational Expressions 1
- Adding and Subtracting Rational Expressions 2
- Unit Review
- Unit Test

Unit 7: Logic and Reasoning

- Foundations
- Hypothesis and Conclusion
- Reasoning and Arguments
- Forms of Conditionals
- Inductive and Deductive Reasoning
- Analyzing and Writing Proofs
- Counterexample
- Unit Review
- Unit Test

Unit 8: Semester Review and Test

- Semester Review
- Semester Test