Online Courses for High School Students
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Algebra 2

Semester A

Algebra 2 further extends the learner's understanding of major algebra concepts such as expressions, equations, functions, and inequalities. An emphasis will be placed on the use of appropriate functions to model real-world situations and solve problems that arise from those situations. A focus is also on graphing functions by hand and understanding and identifying the parts of a graph.

Prerequisite: Algebra 1
Course Length: Two Semester
Required Materials: A graphing calculator. Gcalc is a free download if you do not have a hand-held.

Equations, Inequalities and Linear Functions

- Evaluating Expressions
- Using Formulas
- Properties of Real Numbers
- Solving Equations
- Absolute Value Equations
- Solving Inequalities
- Compound Inequalities
- Absolute Value Inequalities
- Relations and Functions
- Writing Linear Equations

Quadratic Relations and Equations

- Graphing Quadratic Functions
- Solving Quadratic Equations by Graphing
- Solving Quadratic Equations by Factoring
- Solving Quadratic Equations Using Perfect Squares and Difference of Squares
- Adding and Subtracting with Complex Numbers
- Multiplying and Dividing Complex Numbers
- Completing the Square
- Quadratic Formula and Discriminant
- Graphing and Solving Quadratic Inequalities
- Transformation of Quadratic Graphs

Polynomial Functions and Equations

- Properties of Exponents
- Adding, Subtracting and Multiplying Polynomials
- Dividing Polynomials
- The Remainder Theorem and Factor Theorem
- Factoring Polynomials
- Solving Polynomial Equations
- Fundamental Theorem of Algebra, Roots and Zeros
- Finding Rational Zeros
- Graphing Polynomial Functions
- Modeling with Polynomial Functions

Radical Functions and Equations

- Adding and Subtracting Functions
- Multiplying and Dividing Functions
- Composition of Functions
- Inverse Relations and Functions
- nth Roots
- Operations with Radical Expressions
- Graphing Square Root Functions and Inequalities
- Rational Exponents
- Solving Radical Equations
- Solving Radical Inequalities

Exponential and Logarithmic Functions

- Exponential Growth
- Exponential Decay
- Exponential Equations and Inequalities
- Logarithmic Functions
- Graphing Logarithmic Functions
- Solving Logarithmic Equations and Inequalities
- Properties of Logarithms
- Common Logarithms
- The Number e and Natural Logarithms
- Exponential and Logistic Functions

Rational Functions and Relations

- Direct and Joint Variations
- Inverse and Combined Variations
- Graphing Reciprocal Functions
- Graphing Rational Functions
- Multiplying Rational Expressions
- Dividing Rational Expressions
- Finding the Least Common Multiple of Polynomials
- Adding and Subtracting Rational Expressions
- Solving Rational Equations

- Solving Rational Inequalities

Semester B

Algebra 2 builds on the concepts learned in the first semester and prepares the learners with the building blocks needed to dive deeper into trigonometry, pre-calculus, and advanced probability and statistics.

Sequences and Series

- Introduction to Sequences
- Arithmetic Sequences and Series
- Geometric Sequences and Series
- Infinite Geometric Series
- Recursive Rules for Sequences
- Fibonacci Sequence
- Iteration
- Pascal's Triangle
- The Binomial Theorem
- Proof by Mathematical Induction

Probability and Statistics

- Counting Methods
- Theoretical, Experimental and Compound Probabilities
- Probability of Independent and Dependent Events
- Data Distributions
- Probability Distributions
- Analyzing Probability Distributions
- Binomial Distribution
- Normal Distribution
- Confidence Intervals
- Hypothesis Testing

Conic Sections

- Midpoint Formula
- Distance Formula
- Equations of Parabolas
- Circles
- Equations of Ellipses
- Graphing Ellipses
- Hyperbolas
- Conic Sections
- Systems of Linear and Nonlinear Equations
- Linear and Nonlinear Systems of Inequalities

Trigonometric Functions

- Right Triangle Trigonometry
- Angles and Their Measures
- Trigonometric Functions and Angles

- Inverse Trigonometric Functions
- Law Sines
- Law of Cosines
- Circular Functions
- Periodic Functions
- Graphing Trigonometric Functions
- Translating Trigonometric Graphs

Trigonometric Identities

- Reciprocal Trigonometric Functions
- Trigonometric Identities
- Simplifying Expressions Using Trigonometric Identities
- Verifying Trigonometric Identities
- Using Sum and Difference Identities
- Using Double-Angle Identities
- Using Half-Angle Identities
- Solving Trigonometric Equations
- Extraneous Solutions in Trigonometric Equations
- Graphing Trigonometric Functions Using Technology

Algebra 2 Cumulative Review

- Review of Equations, Inequalities and Linear Functions
- Review of Quadratic Relations and Equations
- Review of Polynomial Functions and Equations
- Review of Radical Functions and Equations
- Review of Exponential and Logarithmic Functions
- Review of Functions and Relations
- Review of Sequences and Series
- Review of Probability and Statistics
- Review of Conic Sections
- Review of Trigonometric Functions
- Review of Trigonometric Identities