

Algebra 2 introduces students to advanced functions, with a focus on developing a strong conceptual grasp of the expressions that define them. Students learn through discovery and application, developing the skills they need to break down complex challenges and demonstrate their knowledge in new situations.

Course topics include functions and transformations, quadratic and polynomial functions; rational expressions and functions; radical expressions and functions; sequences and functions; exponential functions; and modeling with functions.

This course supports all students as they develop computational fluency, deepen conceptual understanding, and apply South Carolina College and Career Ready (SCCCR) Mathematical Process Standards. Students begin each lesson by discovering new concepts through guided instruction, and then confirm their understanding in an interactive, feedback-rich environment. Modeling activities equip students with tools for analyzing a variety of real-world scenarios and mathematical ideas. Journaling activities allow students to reason abstractly and quantitatively, construct arguments, critique reasoning, and communicate precisely. Performance tasks prepare students to synthesize their knowledge in novel, real-world scenarios and require that they make sense of multifaceted problems and persevere in solving them. Throughout the course, students are evaluated through a diversity of assessments.

This course is built for the South Carolina College and Career Ready (SCCCR) Algebra II standards.

Length: Two Semesters

Unit 1: Expressions, Equations, and Inequalities

- Algebraic Expressions
- Solving Linear Equations
- Solving Linear Inequalities
- Solving Absolute Value Equations and Inequalities
- Solving Literal Equations and Formulas
- Expressions, Equations, and Inequalities Wrap-Up

Unit 2: Functions and Relations

- What Is a Function?
- Graphing Functions
- Linear Functions
- Linear Equations and Inequalities
- Linear Systems
- Functions and Relations Wrap-Up

Unit 3: Quadratic Functions

- Factoring $x^2 + bx + c$
- Factoring $ax^2 + bx + c$
- Special Cases
- Solving Quadratic Equations
- Completing the Square
- The Quadratic Formula
- Graphs of Quadratic Functions
- Imaginary Numbers
- Nonlinear Systems of Equations
- Nonlinear Systems of Inequalities
- Quadratic Functions Wrap-Up

Unit 4: Transforming Functions

- Parent Functions
- Shifting Functions
- Stretching Functions Vertically
- Transformation of Parent Functions
- Transforming Functions Wrap-Up

Unit 5: Polynomial Functions

- Polynomial Basics
- Polynomial Functions
- Synthetic Division
- Solving Polynomial Equations
- Graphing Polynomial Functions
- Transformations of Polynomial Functions
- Polynomial Functions Wrap-Up

Unit 6: Semester 1 Exam

Unit 7: Rational Expressions and Functions

- Proportions
- Rational Expressions
- Simplifying Rational Expressions
- Multiplying and Dividing Rational Expressions
- Adding and Subtracting Rational Expressions
- Solving Rational Functions
- Vertical Asymptotes
- Graphing Rational Functions
- Rational Expressions and Functions Wrap-Up

Unit 8: Radical Expressions and Functions

- Basics of Radicals
- Multiplying and Dividing Radicals
- Adding and Subtracting Radicals
- Rationalizing Denominators

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- Solving Radical Functions
 - Radical Expressions and Functions Wrap-Up

Unit 9: Sequences and Functions

- Finding Patterns
- Arithmetic Sequences
- Geometric Sequences
- Applications of Number Sequences
- Sequences and Functions Wrap-Up

Unit 10: Exponential Functions

- Exponents
- Exponential Functions
- Examples and Applications of Exponential Functions
- Graphs of Exponential Functions
- Solving Exponential Equations
- Comparing and Analyzing Function Types
- Exponential Functions Wrap-Up

Unit 11: Semester 2 Review and Exam