

Algebra II introduces students to advanced functions, with a focus on developing a strong conceptual grasp of the expressions that define those functions. 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 quadratic equations and functions; polynomial functions; rational expressions and functions; radical expressions and functions; exponential and logarithmic functions; trigonometric functions; modeling with functions; probability and inferential statistics; probability distributions; and sampling distributions and confidence intervals.

This course supports all students as they develop computational fluency and deepen conceptual understanding. Students begin each lesson by discovering new concepts through guided instruction, 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.

This course is built to Mississippi Standards of College and Career Readiness for Mathematics.

Length: Two Semesters

### UNIT 1: EXPRESSIONS, EQUATIONS AND INEQUALITIES

- Lesson 1: Algebraic Expressions
- Lesson 2: Solving Linear Equations
- Lesson 3: Solving Inequalities
- Lesson 4: Expressions, Equations, and Inequalities Wrap-Up

### UNIT 2: FUNCTIONS AND RELATIONS

- Lesson 1: Functions
- Lesson 2: Graphing Functions
- Lesson 3: Linear Functions
- Lesson 4: Linear Equations and Inequalities
- Lesson 5: Transforming Functions
- Lesson 6: Combining Functions
- Lesson 7: Inverse Functions
- Lesson 8: Functions and Relations Wrap-Up

### UNIT 3: QUADRATIC FUNCTIONS

- Lesson 1: Factoring  $x^2 + bx + c$
- Lesson 2: Factoring  $ax^2 + bx + c$
- Lesson 3: Special Cases
- Lesson 4: Solving Quadratic Equations
- Lesson 5: Completing the Square
- Lesson 6: The Quadratic Formula
- Lesson 7: Graphs of Quadratic Functions
- Lesson 8: Imaginary Numbers
- Lesson 9: Parabolas
- Lesson 10: Quadratic Functions Wrap-Up

## UNIT 4: SYSTEMS OF EQUATIONS AND INEQUALITIES

- Lesson 1: Linear Systems of Equations
- Lesson 2: Nonlinear Systems of Equations
- Lesson 3: Linear Systems of Inequalities
- Lesson 4: Systems of Equations and Inequalities Wrap-Up

## UNIT 5: POLYNOMIAL FUNCTIONS

- Lesson 1: Polynomial Functions
- Lesson 2: Synthetic Division
- Lesson 3: Factoring Polynomials Completely
- Lesson 4: Graphing Polynomial Functions
- Lesson 5: Polynomial Identities
- Lesson 6: Transformations of Polynomial Functions
- Lesson 7: Polynomial Functions Wrap-Up

## UNIT 6: RATIONAL EXPRESSIONS AND FUNCTIONS

- Lesson 1: Rational Expressions
- Lesson 2: Simplifying Rational Expressions
- Lesson 3: Multiplying and Dividing Rational Expressions
- Lesson 4: Adding and Subtracting Rational Expressions
- Lesson 5: Writing Rational Functions
- Lesson 6: Solving Rational Equations
- Lesson 7: Vertical Asymptotes
- Lesson 8: Graphing Rational Functions
- Lesson 9: Rational Expressions and Functions Wrap-Up

## UNIT 7: SEMESTER 2 REVIEW AND EXAM

- Lesson 1: Semester 2 Review and Exam