Math 3 incorporates advanced functions, trigonometry, geometry, and statistical analysis as students synthesize their prior knowledge and solve increasingly challenging problems. 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 inverse functions and graphs; polynomial functions, rational, and logarithmic relationships; trigonometric functions; the unit circle; circles; quadrilaterals; polygons; and three-dimensional solids.

This course supports all students as they develop computational fluency, deepen conceptual understanding, and apply the standards for mathematical practice. 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 to the revised North Carolina Math standards adopted in 2016.

Length: Two Semesters

Unit 1: Statistical Analysis

- Data Gathering and Inferential Statistics
- Evaluating Published Reports
- Applications of Statistical Techniques
- Statistical Analysis Wrap-Up

Unit 2: Functions and Graphing

- Linear Functions
- Graphing Functions
- Graphs of Quadratic Functions
- Functions and Graphing Wrap-Up

Unit 3: Transforming Functions

- Inverses
- Graphs of Inverses
- Parent Functions
- Shifting Functions
- Stretching Functions Vertically

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- Transformation of Parent Functions
- Arithmetic of Functions
- Performance Task: Transforming Functions
- Transforming Functions Wrap-Up

Unit 4: Systems of Linear and Nonlinear Equations

- Linear Systems
- Nonlinear Systems of Equations
- Nonlinear Systems of Inequalities
- Systems of Linear and Nonlinear Equations Wrap-Up

Unit 5: Polynomial Functions

- Polynomial Basics
- Adding and Subtracting Polynomials
- Polynomial Functions
- Synthetic Division
- Factoring Polynomials Completely
- Solving Polynomial Equations
- Graphing Polynomial Functions
- Polynomial Functions Wrap-Up

Unit 6: Rational Expressions and Functions

- 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 7: Semester 1 Exam

Unit 8: Exponential and Logarithmic Functions

- Rational and Irrational Numbers
- Exponential Functions
- Examples and Applications of Exponential Functions
- Graphs of Exponential Functions
- Logarithmic Functions
- Properties of Exponents and Logarithms
- Solving Exponential Equations
- Comparing and Analyzing Function Types
- Linear, Quadratic, and Exponential Models
- Exponential and Logarithmic Functions Wrap-Up

Unit 9: Trigonometry

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- Right Triangle Trigonometry
- Angles and Radians
- Trigonometric Ratios and the Unit Circle
- Graphs of Sine and Cosine
- Graphs of Other Functions
- Simple Transformations of Sinusoids
- General Transformations of Periodic Graphs
- Trigonometry Wrap-Up

Unit 10: Quadrilaterals and Other Polygons

- Parallelograms and Proofs
- Tests for Parallelograms
- Rectangles
- Rhombi and Squares
- Trapezoids
- Quadrilaterals and Other Polygons Wrap-Up

Unit 11: Circles

- What Is a Circle?
- Chords
- Circles with Coordinates and Proofs
- Arcs
- Chord and Arc Relationships
- Circles, Angles, and Proofs
- Secants, Tangents, and Proofs
- Circumference and Arc Length
- Area and Sectors
- Circles and Triangles
- Circles Wrap-Up

Unit 12: Three-Dimensional Solids

- Three Dimensions
- What Is a Polyhedron?
- Cylinders and Cones
- Volume
- Spheres
- Three-Dimensional Solids Wrap-Up

Unit 13: Semester 2 Exam

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