Math 4 Prescriptive focuses on extending and applying students' knowledge of probability, statistics, and transcendental functions. Students see how function behaviors can be generalized across different function types, and apply their knowledge in real-world contexts. Students learn through discovery and application, developing the skills they need to break down complex challenges and demonstrate their understanding in new situations.

Course topics include graphing functions and function arithmetic, exponential and logarithmic functions, trigonometric functions and their applications, matrices, modeling data with linear and nonlinear functions, binomial and normal probability distributions, and statistical sampling and confidence intervals.

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: Functions

- What Is a Function?
- Graphing Functions
- Polynomial Basics
- Arithmetic of Functions
- Functions Wrap-Up

Unit 2: Exponential and Logarithmic Functions

- Exponential Functions
- Examples and Applications of Exponential Functions
- Graphs of Exponential Functions
- Logarithmic Functions
- Graphs of Logarithmic Functions
- Properties of Exponents and Logarithms
- Solving Exponential Equations

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- Solving Logarithmic Equations
- Applications of Logarithms
- Exponential and Logarithmic Functions Wrap-Up

Unit 3: Numbers and Matrices

- Imaginary Numbers
- Matrix Addition and Scalar Multiplication
- Matrix Multiplication
- Numbers and Matrices Wrap-Up

Unit 4: Trigonometry

- Right Triangles
- 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
- Identities and Proof
- Trigonometric Identities
- Trigonometry Wrap-Up

Unit 5: Applications of Trigonometry

- Law of Cosines
- Law of Sines
- Vectors
- Applications of Trigonometry Wrap-Up

Unit 6: Semester 1 Exam

Unit 7: Data and Mathematical Modeling

- Two-Variable Data and Scatterplots
- Fitting Linear Models to Data
- Nonlinear Models
- Data and Mathematical Modeling Wrap-Up

Unit 8: Discrete Probability Distributions

- Discrete Random Variables
- Binomial Probability
- Cumulative Binomial Probability Distributions
- Discrete Probability Distributions Wrap-Up

Unit 9: Continuous Probability Distributions

- Continuous Random Variables
- Normal Distributions
- z-Scores

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- Continuous Probability Distributions Wrap-Up

Unit 10: Sampling and Confidence Intervals

- Sample Means
- Sample Proportions
- Confidence Intervals: Sample Means
- Confidence Intervals: Sample Proportions
- Evaluating Statistical Studies
- Data Gathering and Inferential Statistics
- Experimental Design
- Applications of Statistical Techniques
- Sampling and Confidence Intervals Wrap-Up

Unit 11: Semester 2 Review and Exam

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