Coordinate Algebra is a state-designed mathematics course that develops students' mathematical understanding of algebraic concepts alongside statistics applications and includes coordinate geometry to bridge into more in-depth geometrical topics in other successive high school math courses. It primarily builds students' command of linear, quadratic, and exponential relationships. 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 problem-solving with basic equations and formulas; an introduction to functions and problem solving; linear equations and systems of linear equations; exponents and exponential functions; sequences and functions; geometric foundations and coordinate geometry; and descriptive statistics.

This course supports students as they develop computational fluency, deepen conceptual understanding, and apply mathematical knowledge. Students discover new concepts through guided instruction and confirm their understanding in an interactive, feedback-rich environment.

A variety of activities allow for students to think mathematically in a variety of scenarios and tasks. In Discussions, students exchange and explain their mathematical ideas. Modeling activities ask them to analyze real-world scenarios and mathematical concepts. Journaling activities have students reason abstractly and quantitatively, construct arguments, critique reasoning, and communicate precisely. And in Performance Tasks, students synthesize their knowledge in novel, real-world scenarios, make sense of multifaceted problems, and persevere in solving them.

This course is built to match the Georgia state Standards of Excellence (GSE). Throughout the course, students are evaluated by a variety of assessments designed to prepare them for the content, form, and depth of state exams.

Length: Two Semesters

Unit 1: Foundations of Algebra

- Rational and Irrational Numbers
- Algebraic Properties and Expressions
- Solving Linear Equations
- Foundations of Algebra Wrap-Up

Unit 2: Solving Equations and Inequalities

- Solving Multistep Linear Equations

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- Solving Linear Inequalities
- Literal Equations
- Measurement and Units
- Performance Task: Problem Solving with Inequalities
- Solving Equations and Inequalities Wrap-Up

Unit 3: Functions

- Domain and Range
- Identifying Functions
- Graphs of Functions
- Functions Wrap-Up

Unit 4: Linear Equations

- Slope
- Slope-Intercept Equation of a Line
- Point-Slope Equation of a Line
- Parallel and Perpendicular Lines
- Linear Inequalities
- Linear Equations Wrap-Up

Unit 5: Systems of Linear Equations

- Two-Variable Systems: Graphing
- Two-Variable Systems: Substitution
- Two-Variable Systems: Elimination
- Two-Variable Systems of Inequalities
- Systems of Linear Equations Wrap-Up

Unit 6: Exponents and Exponential Functions

- Exponents
- Exponential Functions
- Graphs of Exponential Functions
- Exponents and Exponential Functions Wrap-Up

Unit 7: Semester 1 Exam

Unit 8: Sequences and Functions

- Arithmetic Sequences
- Geometric Sequences
- Understanding Number Sequences
- Exponential and Linear Growth
- Sequences and Functions Wrap-Up

Unit 9: Foundations of Geometry

- Induction: The Search for Rules and Patterns
- Deduction: Making a Case
- The Look and Language of Logic

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- Introduction to Proofs
- Basic Postulates in Geometry
- Planes and the Space of Geometry
- Intersecting Lines and Proofs
- Parallel Lines and Proofs
- Foundations of Geometry Wrap-Up

Unit 10: Coordinate Geometry

- Midpoint Formula
- The Distance Formula
- Equations of Parallel and Perpendicular Lines and Proofs
- Coordinate Geometry with Polygons
- Area of a Triangle with Coordinate Geometry
- Area and Perimeter of Polygons with Coordinate Geometry
- Transformations
- Coordinate Geometry Wrap-Up

Unit 11: Descriptive Statistics

- Measures of Center and Spread
- Dot Plots, Box Plots, and Histograms
- Describing Distributions
- Two-Way Frequency Tables
- Descriptive Statistics Wrap-Up

Unit 12: Data and Mathematical Modeling

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

Unit 13: Semester 2 Exam

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