Grade 8 Pre-Algebra delivers instruction, practice, and review designed to develop computational fluency, deepen conceptual understanding, and apply mathematical practices. In this course, students focus on understanding functions — what they are, how to represent them in different ways, and how to write them to model mathematical and real-world situations. In particular, students investigate linear functions by learning about slope and slope-intercept form. Students' understanding of linear functions is extended to statistics, where they make scatter plots and use linear functions to model data. They solve linear equations and equations involving roots, and explore systems of linear equations. Additional topics include exponents, powers of ten, scientific notation, and irrational numbers. Students learn about transformations, and extend that understanding to an investigation of congruence and similarity. Other geometric concepts explored include the Pythagorean theorem, angle relationships, and volumes of cylinders, cones, and spheres.

The two-semester course is arranged in themed units, each with three to five lessons. Each lesson includes a variety of activities such as direct instruction, application of skills, performance tasks, and formative and summative assessments. Students engage with the subject matter in an interactive, feedback-rich environment as they progress through standards-aligned content and demonstrate their learning through computer- and teacher-scored assignments. By constantly honing the ability to apply their knowledge in abstract and real-world scenarios, students build the depth of knowledge and higher-order skills required to demonstrate their mastery when put to the test.

This course is built to state standards.

Length: Two Semesters

Unit 1: The Number System

- Square and Cube Roots
- The Real Number System
- Approximating Irrational Numbers
- Ordering Real Numbers
- Operations with Real Numbers
- Wrap-Up: The Number System

Unit 2: Exponents

- Properties of Exponents
- Simplifying Expressions with Exponents
- Scientific Notation
- Operations with Scientific Notation
- Wrap-Up: Exponents

Unit 3: Functions

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- Identifying Functions
- Functions and Variables
- Graphs of Functions
- Proportional and Non-proportional Linear Relationships
- Wrap-Up: Functions

Unit 4: Linear Functions

- Slope
- Slope-Intercept Form
- Writing Linear Functions
- Modeling with Linear Functions
- Wrap-Up: Linear Functions

Unit 5: Semester Wrap-Up

Unit 6: Linear Equations and Inequalities

- Solving Linear Equations
- Solving Systems of Linear Equations by Graphing
- Solving Linear Inequalities
- Wrap-Up: Linear Equations and Inequalities

Unit 7: Triangles

- The Pythagorean Theorem
- Identifying and Classifying Triangles
- Distance on the Coordinate Plane
- Similar Triangles
- Wrap-up: Triangles

Unit 8: Angle Relationships

- Angle Relationships
- Angle Relationships in Triangles
- Interior Angles of Polygons
- Wrap-Up: Angle Relationships

Unit 9: Transformations, Congruence, and Similarity

- Transformations and Congruence
- Translations and Reflections on the Coordinate Plane
- Rotations on the Coordinate Plane
- Similarity and Dilations
- Wrap-Up: Transformations, Congruence, and Similarity

Unit 10: Data Analysis and Probability

- Scatterplots
- Linear Models in Data
- Probabilities of Repeated Experiments
- Wrap-Up: Data Analysis and Probability

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Unit 11: Semester 2 Exam

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