

Algebra 2: Functions, Modeling, and Quantitative Reasoning



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Course Description

This course provides students with the tools to develop a strong foundation in mathematical reasoning, analysis, and problem-solving, with an emphasis on real-world applications, and serves as preparation for ongoing study of higher-level mathematics. Breaking from traditional methods of instruction, asset-based and modeling learning strategies will lead students to explore, discover, and master essential concepts of functions and modeling including linear, quadratic, radical, polynomial, exponential, logarithmic, and rational functions. Students will expand their ability to reason quantitatively through an introduction to probability and statistics; number theory; and geometry and measurement. Problem solving and critical thinking skills, along with the use of technology, will be emphasized and reinforced throughout the course as students become actively involved in solving applied problems. Social-emotional learning (SEL) strategies are integrated to foster a supportive and collaborative classroom environment, helping students build resilience, confidence, and effective communication and academic skills while mastering mathematical concepts.

Course Learning Outcomes

By the end of the course, students will be able to:

- ❖❖ **(Function Families)** Identify key characteristics that define functions and be able to determine which relations are functions. They will identify patterns in data; assign suitable functional models; recognize and create multiple representations of these models; understand how these representations interrelate; and use the models to predict values. The functions covered will include linear, quadratic, radical, polynomials, rational, exponential, and logarithmic.
- ❖❖ **(Function Operations)** Use transformations to manipulate parent functions to model data, identify the domain and range, and describe function characteristics through graphing and the use of technology. They will also be able to perform operations including evaluating, factoring, combining, and composing functions; solve linear and nonlinear equations; and use functions for applications.
- ❖❖ **(Probability and Statistics)** Use mathematical reasoning to analyze statistical data, calculate probabilities, and make informed decisions based on an introductory study of probability and measures of center and spread. They will apply these concepts to real-world situations, interpret statistical results, and communicate findings effectively.

- ✿✿ **(Number Theory)** Articulate the hierarchy of the real number system; outline proofs and mathematical arguments fundamental to the development of the real number system; explore unanswered questions and recent developments; and compare and contrast the development of various number systems and their properties.
- ✿✿ **(Geometry and Measurement)** Understand that concepts of measurement can be applied in multiple dimensions; understand measurable attributes of objects; and the units, systems, and processes of measurement. They will apply mathematical arguments to geometric relationships and apply geometric principles to other disciplines.
- ✿✿ **(Critical thinking & problem-solving)** Implement a variety of problem-solving strategies to analyze and solve problems. They will demonstrate the ability to think critically, make connections between different mathematical concepts, and persevere through challenging problems. This includes evaluating the validity of their solutions, reflecting on their problem-solving processes to improve, and developing strategies for unfamiliar problems.
- ✿✿ **(Technology)** Effectively use technology to model, analyze, and solve problems involving functions and make informed decisions based on quantitative reasoning, probability, and statistical data. This includes enhancing understanding and enabling decision making based on mathematical analysis.
- ✿✿ **(Communication and Precision)** Demonstrate fluency with mathematical language and symbolic notation, including using appropriate units; equivalent forms of numbers, algebraic expressions, equations, and functions; function notation; and multiple representations including patterns, diagrams, tables, graphs, and equations.