

# COURSE DETAILS



## MATHEMATICS

RAIS adopts the High School Mathematics Common Core State Standards Curriculum which increases rigor to prepare students with the knowledge and skills they need to be successful for college, career, and life. AP courses are aligned with the College Board. Our mathematics courses ensure our students to a smooth transition from high school to university. Our courses also help prepare our students to be successful in external exams such as SAT, MAP, and university entrance exams.

### Algebra II

This course focuses on four critical areas:

- Relating arithmetic of rational expressions to arithmetic of rational numbers
- Expanding understandings of functions and graphing to include trigonometric functions
- Synthesizing and generalizing functions and extend understanding of exponential functions to logarithmic functions
- Relating data display and summary statistics to probability and explore a variety of data collection methods.

Main topics include:

- Relations and Functions
- Quadratic Functions
- Polynomials and Polynomial Functions
- Inverses and Radical Functions
- Exponential and Logarithmic Functions
- Rational Functions
- Statistics and Probability
- Trigonometric Functions

### Geometry

The fundamental purpose of this course is to formalize and extend students' geometric experiences from the previous grades. Key areas include:

- Establishing criteria for triangle congruence and similarity
- Developing explanations of circumference, area, and volume formulas
- Applying the Pythagorean Theorem on the coordinate plane
- Proving basic geometric theorems
- Extending work with probability.

Main topics include:

- Tools of Geometry
- Reasoning and Proof
- Congruent Triangles
- Relationships Within Triangles
- Polygons and Quadrilaterals
- Similarity
- Right Triangles and Trigonometry
- Transformations
- Area, Surface Area, and Volume
- Circles
- Probability



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### Pre Calculus

This course integrates trigonometry, geometry, and algebra to prepare students for calculus. Emphasis is on conceptual understanding and problem-solving skills.

Main topics include:

- Functions from a Calculus Perspective
- Power, Polynomial, and Rational Functions
- Exponential and Logarithmic Functions
- Trigonometric Functions and Identities
- Systems of Equations and Matrices
- Conic Sections and Parametric Equations
- Vectors, Polar Coordinates and Complex Numbers
- Sequences and Series

### Statistics

This course introduces students to the major concepts and tools for collecting, analyzing, and interpreting data. Four themes are integrated:

- Exploring data
- Sampling and experimentation
- Probability and simulation
- Statistical inference

Units include:

- Exploring One-Variable Data
- Exploring Two-Variable Data
- Collecting Data
- Probability, Random Variables, and Probability Distributions
- Sampling Distributions
- Inference for Categorical Data: Proportions and Chi-Square
- Inference for Quantitative Data: Means and Slopes

### Calculus

This course provides an in-depth understanding of functions represented graphically, numerically, analytically and verbally. Important objectives of the calculus course are to develop and strengthen the students' problem-solving skills and to teach them to read, write, speak, and think in the language of mathematics. In particular, students learn how to apply the tools of calculus to a variety of problem situations.

Main topics include:

- Limits and Continuity
- Differentiation and its Applications
- Integration and its Applications
- Exponentials, Logarithms and Other Transcendental Functions
- Integration Techniques

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