

UPPER SCHOOL MATH DEPARTMENT COURSE DESCRIPTIONS

Math Department Notes:

- *4.0 credits of Math are required for Graduation.*
- *As a minimum, all students must complete Algebra I, Geometry, Algebra II, and Precalculus.*
- *1.0 credits of Math must be taken each year of enrollment in the Upper School.*
- *Advanced math students may enroll in two math courses in grade 11/12 in which case one course will count as an elective.*
- *All full year (1.0 credit) AP math courses require summer assignments.*

Algebra I (1.0 Credits)*

This course is a course in fundamental algebraic concepts. Primary emphasis is placed on working with real numbers, solving and graphing linear equations and inequalities, simplifying rational expressions, factors and operations of polynomials, and solving quadratic equations. Application and problem solving skills will be integrated into all topics.

Prerequisite: PreAlgebra

Textbook: Algebra 1, 2018 (McGraw Hill/Glencoe), ISBN: 9780079039897

**Note - this course is usually completed in the 8th grade and is considered an Upper School course and counts toward the student's Upper School Cumulative GPA.*

Algebra I Honors (1.0 Credits)*

This is a more intense study of Algebra I where irrational numbers are introduced and more challenging problems are assigned. This class moves at a faster pace and covers more content in terms of units of study and the depth of knowledge..

Prerequisite: PreAlgebra I Honors

Algebra I Honors Course Enrollment Standards:

- Teacher recommendation.
- Test average of 85 or higher in PreAlgebra I Honors.

Textbook: Algebra 1, 2018 (McGraw Hill/Glencoe), ISBN: 9780079039897

**Note - this course is usually completed in the 8th grade and is considered an Upper School course and counts toward the student's Upper School Cumulative GPA.*

Geometry (1.0 Credits)

The basis of this course is traditional Euclidean geometry with emphasis on logical thinking, proof writing, and algebraic applications. Areas of study include angles, parallel lines, congruent

and similar triangles, polygons, circles, area, volume, and the Pythagorean Theorem. Plane coordinate geometry and an introduction to right triangle trigonometry is also included.

Prerequisite: Algebra I

Textbook: Geometry, 2018 (McGraw Hill/Glencoe), 9780079039941

Geometry Honors (1.0 Credits)

This honors class offers a more intense study of the traditional Euclidean geometry with emphasis on analytical thinking, proof writing, and algebraic applications. Areas of study include angles, parallel lines, congruent and similar triangles, polygons, circles, area, volume, and the Pythagorean Theorem. Plane coordinate geometry, transformations, and an introduction to right triangle trigonometry is also included.

Prerequisite: Algebra I Honors.

Geometry Honors Course Enrollment Standards:

- Teacher recommendation.
- Test average of 85 or higher in Algebra I Honors.

Textbook: Geometry, 2018 (McGraw Hill/Glencoe), 9780079039941

Algebra II (1.0 Credits)

This course is a continuation of subject matter introduced in Algebra I. It covers standard Algebra II topics such as the quadratic formula, completing the square, irrational and complex numbers, matrices, and determinants. Emphasis is on the application of algebraic concepts and deductive reasoning to problems of increasing difficulty.

Prerequisite: Algebra I and Geometry

Textbook: Algebra 2, 2018 (McGraw Hill/Glencoe), 9780079039903

Algebra II Honors (1.0 Credits)

As a more in-depth and intense study of Algebra II, this course includes polynomial functions, quadratic relations and systems, exponents, and logarithms. Problem solving is emphasized. Teacher recommendation required.

Prerequisite: Algebra I Honors and Geometry Honors. Students must also meet rigorous academic requirements and be recommended by their teacher on an annual basis.

Algebra II Honors Course Enrollment Standards:

- Teacher recommendation
- Test average of B+ or higher in Geometry Honors

Textbook: Algebra 2, 2018 (McGraw Hill/Glencoe), 9780079039903

Functions and Trigonometry (1.0 Credits)

This course is designed to increase students' understanding of functions and trigonometry. This course includes an in-depth analysis of functions, including linear, quadratic, radical, exponential, logarithmic, and trigonometric functions. Additionally, students will deepen their knowledge of solving complex equations in contextual applications, including linear, quadratic, radical, exponential, logarithmic, and trigonometric contexts. This course will also increase students' knowledge of arithmetic and geometric sequences and series, as well as introduce topics in data analysis, such as statistics, probability, linear regression, and visual representations of data. This course is designed to prepare students for successful work in Precalculus

Prerequisite: Algebra II

Textbook: Algebra & Trigonometry, 6th edition, 2017 (Pearson), 978-0134463216

Precalculus (1.0 Credits)

This course provides a thorough preparation for the study of calculus, discrete mathematics, and other related courses. Traditional topics from college algebra topics such as a linear, quadratic, polynomial, exponential, and logarithmic functions. This course will also increase students' knowledge of right triangle trigonometry, non-right triangle trigonometry, trigonometric graphs, and their applications. Additionally, this course will introduce students to conics, vectors, polar curves, and parametric curves.

Prerequisite: Algebra II

Textbook: Precalculus (McGraw Hill/Glencoe), 9780076641833

Precalculus Honors (1.0 Credits)

This course provides a thorough preparation for the study of calculus, discrete mathematics, and other related courses. Traditional topics from college algebra topics such as a linear, quadratic, polynomial, exponential, and logarithmic functions. This course will also increase students' knowledge of right triangle trigonometry, non-right triangle trigonometry, trigonometric graphs, and their applications. Additionally, this course will introduce students to conics, vectors, polar curves, parametric curves, and limits. Theory is emphasized. This course is designed to prepare students for successful work in college mathematics, as well as AP Calculus AB, AP Calculus BC, and AP Statistics.

Prerequisite: Algebra II Honors.

Precalculus Honors Course Enrollment Standards:

- Teacher recommendation
- Test average of B+ or higher in Algebra II Honors

Textbook: Precalculus (McGraw Hill/Glencoe), 9780076641833

Honors Calculus (1.0 Credits)

Topics include the limit of a function, the derivative of algebraic, trigonometric, exponential, and logarithmic functions, the indefinite integral, and the definite integral. Applications of the derivative are covered in detail, including approximations of error using differentials, maxima and minima problems, and curve sketching using calculus, and motion applications using the derivative. There is also a brief review of selected precalculus topics at the beginning of the course.

Prerequisite: Precalculus or Precalculus Honors

Textbook: Calculus: Early Transcendental Functions, 4th Edition, 978-0073532325

Advanced Placement (AP) Calculus AB (1.0 Credits)

This course covers the topics listed in the Calculus AB syllabus by the Advanced Placement Program of the College Board. Topics include limits along with calculation and applications of derivatives and integrals. The Advanced Placement exam is required in the spring.

Prerequisite: Precalculus Honors

AP Calculus AB Course Enrollment Standards:

- Teacher Recommendation
- An A test/exam average in Precalculus Honors
- ACT Score of 25 or higher

Textbook: Calculus for the AP Course (Sullivan and Miranda), 3rd Edition, 9781319244316

Advanced Placement (AP) Calculus BC (1.0 Credits)

This course covers the topics listed in the Calculus BC syllabus by the Advanced Placement Program of the College Board. Topics include limits along with calculation and applications of derivatives and integrals, sequences, series, parametric curves, polar curves, and vectors. The Advanced Placement exam is required in the spring.

Prerequisite: Precalculus Honors

AP Calculus BC Course Enrollment Standards:

- Teacher Recommendation
- An A test/exam average in Precalculus Honors
- ACT Score of 27 or higher

Textbook: Calculus for the AP Course (Sullivan and Miranda), 3rd Edition, 9781319244316

Advanced Placement (AP) Statistics (1.0 Credits)

The AP Statistics course is equivalent to an introductory, non-calculus-based college course in statistics. The course introduces students to the major concepts and tools for collecting, analyzing, and drawing conclusions from data. There are four themes in the AP Statistics course: exploring data, sampling and experimentation, anticipating patterns, and statistical inference.

Students use technology, investigations, problem solving, and writing as they build conceptual understanding.

Prerequisite: Algebra II Honors, Precalculus Honors, or Precalculus

AP Statistics Course Enrollment Standards:

- Teacher Recommendation
- An A test/exam average in Precalculus Honors or Precalculus
- ACT Score of 25 or higher

Textbook: The Practice of Statistics, 9781464108730