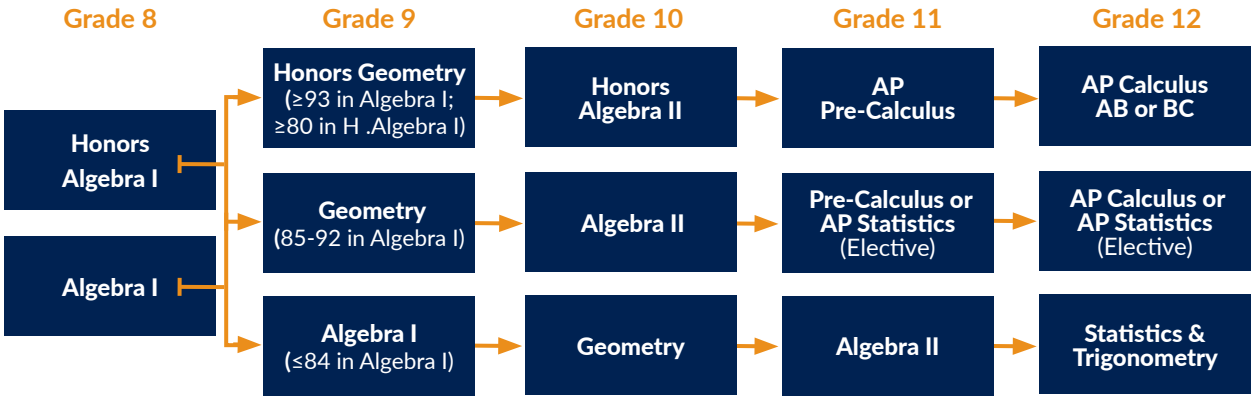
Mathematics

This chart shows the course sequencing and progression of Mathematics in Upper School. Four credits required to graduate. Check course descriptions for all prerequisites.



Algebra I

Students develop an algebraic fluency to solve equations and perform manipulations with numbers, variables, equations, and inequalities. Students learn to use number properties to simplify expressions or justify statements; describe sets with set notation and find the union and intersection of sets; simplify and evaluate expressions involving variables, fractions, exponents, and radicals; work with integers, rational numbers; and graph and solve equations, inequalities, and systems of equations. Students learn to determine whether a relation is a function and how to describe its domain and range; use factoring, formulas, and other techniques to solve quadratic and other polynomial equations; and translate word problems into mathematical equations and then use the equations to solve original problems.

Students who made an 84 or below in 8th grade math are required to take algebra I in 9th grade.

Prerequisite: none
Credit: 1.0 unit

Geometry

Students learn to recognize and work with geometric concepts in various contexts. Students learn to formulate and evaluate valid mathematical arguments using various types of reasoning. Students use visualizations, spatial reasoning and geometric modeling to solve problems. Topics of study include points, lines, and angles; triangles; right triangles; quadrilaterals and other polygons; circles; coordinate geometry; three dimensional solids; geometric constructions; symmetry; and geometric transformations.

Prerequisite: Algebra I or a minimum grade of 85 in 8th grade Algebra I

Credit: 1.0 unit

Honors Geometry

Students learn to recognize and work with geometric concepts in various contexts. Students learn to formulate and evaluate valid mathematical arguments using various types of reasoning and build upon the ideas of inductive and deductive reasoning, logic, concepts, and techniques to develop an understanding of mathematical structure, method and application of Euclidean plane and solid geometry. Students use visualizations, spatial reasoning and geometric modeling to solve problems. Topics of study include points, lines, and angles; triangles; right triangles; quadrilaterals and other polygons; circles; coordinate geometry; three dimensional solids; geometric constructions; symmetry; and geometric transformations and transformations on the coordinate plane.

Compared to Geometry, this course has a more rigorous pace and more challenging assignments and assessments. Although topics of study are similar, Honors Geometry places more emphasis on reasoning

skills, justification of theorems and producing valid arguments to support work.

Prerequisite: Minimum grade of 80 in Honors Algebra I or a mimumum grade of 93 in 8th grade Algebra I and an 88 or higher on the math ERB sections.
Out of Class Expectation: 1.5 - 2 hours/week
Credit: 1.0 unit

Algebra II

Algebra II builds upon the algebraic concepts covered in Algebra. Students extend their knowledge and understanding of solving open-ended problems and thinking critically. Topics include functions and their graphs, quadratic functions, inverse functions, polynomial functions and advanced polynomial functions, and conic sections. Students are introduced to rational, radical, exponential, and logarithmic functions; sequences and series; data analysis; and matrices.

Prerequisite: Algebra I and Geometry
Credit: 1.0 unit

Honors Algebra II

Honors Algebra II builds upon algebraic concepts covered in Algebra I and prepares students for advanced-level courses. Students extend their knowledge of open-ended problems and thinking critically. Topics include functions and their graphs, quadratic functions, inverse functions, polynomial functions and advanced polynomial functions, and conic sections. Students are introduced to rational, radical, exponential, and logarithmic functions; sequences and series; data analysis; and matrices.

Honors Algebra II includes all the topics of Algebra II but incorporates more challenging assignments and assessments including more applications of the skills to problem solving activities.

Prerequisite: Algebra I, Honors Geometry and teacher recommendation
Out of Class Expectation: 2.5 hours/week
Credit: 1.0 unit

Pre-Calc

Pre-Calculus combines the previous studies of algebra, geometry, and functions in a preparatory course for Calculus. The course focuses on the mastery of critical skills and exposure to new skills necessary for success in Calculus. Topics include linear, quadratic, exponential, logarithmic, radical, polynomial, and rational functions; systems of equations; conic sections; trigonometric ratios and functions; inverse trigonometric functions; applications of trigonometry, including vectors and laws of sine and cosine; polar functions and notation; and parametric functions.

Prerequisite: Algebra I, Geometry, Algebra II
Credit: 1.0 unit

AP Pre-Calculus

Honors Pre-Calculus combines the previous studies of algebra, geometry, and functions in a preparatory course for Calculus. The course focuses on the mastery of critical skills and exposure to new skills necessary for success in Calculus. Topics include linear, quadratic, exponential, logarithmic, radical, polynomial, and rational functions; systems of equations; conic sections; trigonometric ratios and functions; inverse trigonometric functions; applications of trigonometry, including vectors and laws of sine and cosine; polar functions and notation; and parametric functions.

Honors Pre-Calculus is a course designed to prepare the exceptional mathematics student for AP and BC Calculus and a college major in a mathematics related field of study. Honors Pre-Calculus covers all the topics of Pre-Calculus, but the pace of study is faster and the rigor of assignments and assessments is more challenging.

Prerequisite: Honors Geometry, Honors Algebra II and teacher recommendation
Out of Class Expectation: 4 - 5 hours/week
Credit: 1.0 unit

AP Calculus AB

AP Calculus AB provides a detailed introduction to the mathematics of differential and integral calculus. It covers theory and mathematical applications of the limit, the derivative, and the integral (definite and indefinite). The course is equivalent to an introductory college level calculus course and follows the AP Calculus syllabus as described by the College Board. All students are required to take the A.P. Exam at the end of the second semester.
Prerequisite: AP Pre-Calc and teacher recommendation
Out of Class Expectation: 4 - 5 hours/week
Credit: 1.0 unit

AP Calculus BC

AP Calculus BC is a full-year, 90-minute class (two periods of the day) to develop a student's understanding of the concepts of calculus. Calculus BC includes all the topics of Calculus AB plus additional techniques and materials to round out

a year of college calculus. These additional topics include parametric, polar, and vector functions, and infinite sequences and series. All students are required to take the BC exam at the end of the second semester.

Prerequisite: AP Pre-Calc and teacher recommendation
Out of Class Expectation: 4 - 5 hours/week
Credit: 1.0 unit

Statistics & Trig

Trigonometry and statistics is a two semester course. Trigonometry is taught in the first semester and statistics in the second semester. Topics in trigonometry include: sequences and series, the Unit Circle, applications of the Unit Circle, graphing trigonometry functions, solving trigonometry equations, application of the double and half angle formulas. Finally, a unit in matrices and determinants are studied. The second semester topics in statistics is studied. Topics that are covered include: categorical and quantitative data, the Normal Distribution Curve, two variable data, collecting data and probability.

Prerequisite: Algebra II
Credit: 1.0 unit

AP Statistics (Elective)

AP Statistics is designed to introduce students to the major concepts and tools for collecting, analyzing, and drawing conclusions from data. The course curriculum is designed around four major topics: exploring data, planning a study, probability as it relates to distribution data, and inferential reasoning. The course follows the statistics AP syllabus as described by the College Board and all students are required to take the AP Statistics Exam at the end of the course.

Prerequisite: Honors Algebra II and teacher recommendation
Out of Class Expectation: 2.5 hours/week
Credit: 1.0 unit