MATHEMATICS

Each student enrolled in a mathematics course is expected to have his or her own graphics calculator. The mathematics department recommends a TI-83 Plus but a TI-83 is appropriate if the student already has one.

Algebra I **Grade 9**

Algebra uses variables and symbols for unknown values to extend the laws of arithmetic. The student will apply algebraic concepts and skills to solve word problems as well as symbol based problems. This course will include the study of the real number system, linear equations and inequalities, properties of exponents, radicals, polynomials and rational expressions. Various factoring methods are presented. Concepts and applications of modeling, matrices and simple probability are introduced. Applications to real-world situations are woven throughout the course. A TI-84 / TI-83 Plus calculator is required. One credit

Algebra I Honors **Grade 9**

Prerequisite: Department recommendation

This course addresses topics at an honors level and is designed to accommodate the curricular needs of the most successful students with an established record of success in previous mathematics courses.

Algebra uses variables and symbols for unknown values to extend the laws of arithmetic. The student will apply algebraic concepts and skills to solve word problems as well as symbol based problems. This course will include the study of the real number system, linear equations and inequalities, properties of exponents, radicals, polynomials and rational expressions. Various factoring methods are presented. Concepts and applications of modeling, matrices and simple probability are introduced. Applications to real-world situations are woven throughout the course. A TI-84 / TI-83 Plus graphing calculator is required. One credit

Geometry **Grade 10**

Prerequisite: Algebra I

Geometry explores the basic structure of Euclidean plane and solid geometry through the use of deductive reasoning through proof and problem solving supported by algebraic concepts. Topics include proof, congruence, polygons, area, volume, elementary constructions, circles and coordinate geometry. The goals of this course are development of spatial and visualization skills, understanding of relationships between geometric elements and application of concepts to assist in problem solving. The course also emphasizes the development of logical reasoning based upon identification and use of valid premises and conclusions.

A TI-84 / TI-83 Plus graphing calculator is required. One credit

Geometry Honors **Grade 9 or 10**

Prerequisite: Algebra I Honors and department recommendation

This course addresses topics at an honors level and is designed to accommodate the curricular needs of the most successful students with an established record of success in previous mathematics courses.

Geometry explores the basic structure of Euclidean plane and solid geometry through the use of deductive reasoning by proof and problem solving supported by algebraic concepts. Topics include proof, congruence, polygons, area, volume, elementary constructions, circles and coordinate geometry. The goals of this course are development of spatial and visualization skills, understanding of relationships between geometric elements and application of concepts to assist in problem solving. The course also emphasizes the development of logical reasoning based upon identification and use of valid premises and conclusions.

A TI-84 / TI-83 Plus graphing calculator is required. One credit

Algebra II **Grade 11**

Prerequisite: Geometry.

This course is a continuation of the study of algebra. The use of abstractions and unknown quantities introduced in Algebra I is extended to a more thorough examination of polynomial, rational, exponential, logarithmic and radical functions and expressions. Sequences and elementary matrix operations are explored. Students are introduced to right-angle trigonometry, three-dimensional spaces, parametric and conics. Methods of factoring, originally introduced in Algebra I, are extended and refined. Particular emphasis is placed upon the properties of functions and refinement of problem-solving skills. A TI-84 / TI-83 Plus graphing calculator is required

One credit

Algebra II Honors **Grade 10 or 11**

Prerequisite: Geometry Honors and department recommendation.

This course addresses topics at an honors level and is designed to accommodate the curricular needs of the most successful students with an established record of success in previous mathematics courses.

Algebra II Honors is a continuation of the study of algebra. The use of abstractions and unknown quantities introduced in Algebra I is extended to a more thorough examination of polynomial, rational, exponential, logarithmic and radical functions and expressions. Sequences and elementary matrix operations are explored. Students are introduced to right-angle trigonometry, three-dimensional spaces, parametric and conics. Methods of factoring, originally introduced in Algebra I, are extended and refined. Particular emphasis is placed upon the properties of functions and refinement of problem-solving skills.

A TI-84 / TI-83 Plus graphing calculator is required One credit

Fundamentals of Trigonometry, Probability and Advanced Mathematics **Grade 12**

Prerequisite: Algebra II

This course is designed to enrich the mathematics experience for students not intending to study calculus at Athens Academy, but who desire to prepare for success in collegiate mathematics. Emphasis is placed upon reinforcement of previously introduced algebra concepts. Course content includes an emphasis on advanced trigonometry and conics, as well as a more in-depth examination of linear, quadratic, polynomial, exponential, logarithmic, rational and radical functions. Elementary probability and statistical methods are introduced. Additionally, this course contains a SAT (mathematics) component which refines skills and strategies in preparation for the SAT. A TI-84 / TI-83 Plus graphing calculator is required One credit

Precalculus AB **Grade 11 or 12**

Prerequisite: Algebra II Honors and department recommendation.

This course is designed for the successful and well-motivated mathematics student desiring preparation for the study of calculus, either at the collegiate level or in Advanced Placement Calculus AB. Course content includes a thorough study of polynomial, trigonometric, exponential, logarithmic, rational and radical functions, as well as function transformations, sequences and series, vectors, polar and parametric equations, inequalities and conics. Emphasis is placed upon refinement of previously acquired algebraic skills; however, the successful student must possess mastery of algebra and geometry achieved through the algebra / geometry sequence. Students are introduced to the process of limits as the transition from algebra to calculus. A TI-89 graphing calculator is required One credit

Precalculus BC **Grade 11**

Prerequisite: Algebra II Honors and mathematics department recommendation.

This is a rigorous course designed to prepare the highly motivated and successful mathematics student for

Advanced Placement Calculus BC. Course content includes a thorough study of polynomial, trigonometric, exponential, logarithmic, rational and radical functions, as well as function transformations including rotation and translation of axis, matrices, partial fractions, mathematical induction, sequences and series, limits including the formal ε,δ proof, vectors, polar and parametric equations, inequalities, conics in both rectangular and polar form, functions of two variables, and quadric surfaces. Emphasis is placed upon refinement of previously acquired algebraic skills; however, the successful student must possess a mastery of algebra achieved through the algebra / geometry sequence. Students are introduced to the foundations of differential and integral calculus, including the Fundamental Theorem of Calculus, substitution and integration by parts, volumes of revolution by discs, washers, and shells. This course requires the use of a TI-89 graphing calculator.

One credit

Advanced Placement (AP) Calculus AB **Grade 12**

Prerequisite: Precalculus AB and mathematics department recommendation.

This course provides a study of elementary and transcendental functions in calculus. Course content corresponds to the syllabus established by the College Board Advanced Placement Program and equates to approximately 1 semester of college calculus. Students will take the AP Calculus (AB) Examination in May from which placement and/or credit may be awarded at the collegiate level if a qualifying score is achieved. Topics include limits and their properties, differentiation, applications of the derivative, curve sketching, integration, applications of integration including area and volume, logarithmic differentiation, simple differential equations and slope fields. This course requires the use of the TI-89 graphing calculator.

Advanced Placement (AP) Calculus BC **Grade 12**

Prerequisites: Precalculus BC and mathematics department recommendation.

This course provides an advanced study of elementary and transcendental functions in calculus. Course content includes topics outlined in the syllabus by the College Board Advanced Placement Program. The successful student will be prepared to participate in the AP Calculus (BC) Examination in May. Topics include limits, differentiation and applications of the derivative, numerical integration, integration and applications of the integral, volume of irregular figures, differential equations and slope fields, integration by partial fractions, integration by parts, differentiation and integration of parametrically defined equations, polar area, work, liquid force, centroids, arc length, surface area, improper integrals, hyperbolic and inverse hyperbolic functions, sequences and series including Taylor polynomials, Maclaurin series, power series, and vector functions including curvature, tangential, and normal components of acceleration. This course requires the use of the TI-89 graphing calculator. One credit

Statistics I **Grade 12**

Prerequisites: Fundamentals of Trigonometry, Probability and Advanced Mathematics.

This course provides an introduction to the science of probability and statistics. Students will address fundamental aspects of probability, as well as statistical sampling methods, mean, variance, expected value, measures of deviation, The Central Limit Theorem and hypothesis testing methods. A TI-84 / TI-83 Plus graphing calculator is required 0.5 credit

Statistics II **Grade 12**

Prerequisite: Statistics I

This is a continuation of Statistics I that examines previously introduced topics in greater depth. Additional topics are addressed including correlation and regression techniques as analytic tools in statistics. Students will make extensive use of the statistics application software, Fathom. A TI-84 / TI-83 Plus graphing calculator is required. 0.5 credit