

MATHEMATICS DEPARTMENT

Graduation Goals:

In alignment with the SAT, all students will be able to solve real-world and theoretical problems using:

- Basic arithmetic concepts and operations;
- Geometry and coordinate geometry;
- Graphs, statistics, charts and probability;
- Algebraic concepts and operations.

In addition, all students will be able to:

- Organize and manage information to solve multi-step problems;
- Use logical reasoning;
- Recognize mathematical patterns and equivalencies.

Honors Algebra 1

310 Year 1.0 Freshman

Using a strong foundation of math before high school, students will explore topics such as data analysis, order of operations, properties of real numbers, equations, inequalities, ratios, proportions, various representations of linear equations and solving systems of linear equations.

Approval: Students will be placed in Honors Algebra 1 based on previous grades and standardized testing scores.

Algebra 1

311, 312 Year 1.0 Freshman

This first year course in algebra covers topics extended from concepts such as operations with fractions, decimal and whole numbers learned before high school. Students will explore topics such as data analysis, order of operations, properties of real numbers, equations, inequalities, ratios, proportions, various representations of linear equations and solving systems of linear equations.

Algebra 1 Lab

315 Year 1.0 Freshman

Taken concurrently with Algebra I, this course provides additional practice, review of skills essential to success in Algebra 1 and higher mathematical disciplines, and a continual review of essential algebraic concepts learned throughout the year. This lab will include learning activities that stimulate multiple intelligences.

Approval: Students will be placed in Algebra 1 Lab based on previous grades and standardized testing scores. Note: Students who are required to take Algebra 1 Lab are expected to accrue a total of at least five credits in math for graduation.

Honors Geometry

320 Year 1.0 Freshman, Sophomore

Geometry is a branch of mathematics that deals with the measurement, properties, and relationships of points, lines, angles, surfaces, and solids. This course addresses topics such as distance, congruence and similarity of figures, circles, triangles, areas, volumes, Pythagorean Theorem and methods of coordinate geometry. Students will learn to use logic and deductive reasoning to solve real-world problems. This course also reestablishes specific algebraic skills so students will recognize how algebra and geometry complement each other. *All sophomores being considered for the International Baccalaureate Diploma Programme must take Honors Geometry or Honors Algebra 2.*

Approval: Sophomores wishing to take Honors Geometry will need a departmental recommendation, based on performance, initiative and work habits in Algebra 1. Freshmen will be placed in Honors Geometry based on grades in previous courses, standardized testing, and a successful score on the ACHS math placement exam.

Geometry

321, 322 Year 1.0 Freshman, Sophomore

Geometry is a branch of mathematics that deals with the measurement, properties, and relationships of points, lines, angles, surfaces, and solids. This course addresses topics such as distance, congruence and similarity of figures, circles, triangles, areas, volumes, Pythagorean Theorem and methods of coordinate geometry. Students will learn to use logic and deductive reasoning to solve real-world problems. This course also reestablishes specific algebraic skills so students will recognize how algebra and geometry complement each other.

Approval: Freshmen will be placed in Geometry based on grades in previous courses, standardized testing, and a successful score on the ACHS math placement exam. Sophomores must have successfully completed Algebra 1.

Mathematical Problem Solving & Test Prep

323 Semester 0.5 Sophomore

This course, formerly known as Geometry Lab, will include learning activities that stimulate the multiple intelligences, review essential algebraic concepts and reinforce geometric topics. This course will also explore concepts and topics covered on the SAT. This course is an elective strongly recommended for sophomores who are not taking Honors Geometry or Algebra 2.

Pre-Requisite: Successful completion of Algebra 1.

Honors Algebra 2

330 Year 1.0 Sophomore, Junior

This second-year course in algebra extends topics such as linear equations and inequalities before exploring the families of functions. This course explores quadratic, rational, exponential and logarithmic functions and their real-world applications. Students will learn problem-solving strategies and critical thinking that will help them on

the SAT. *All sophomores being considered for the International Baccalaureate Diploma Programme must take Honors Geometry or Honors Algebra 2.*

Approval: Students will be placed in Honors based on performance and work habits in their Geometry course.

Algebra 2

331, 332 Year 1.0 Sophomore, Junior

This second year course in algebra extends topics such as linear equations and inequalities before exploring the families of functions. This course explores quadratic, rational, exponential and logarithmic functions and their real-world applications. Students will learn problem-solving strategies and critical thinking that will help them on the SAT.

Pre-Requisite: Successful completion of Geometry.

Honors Pre-Calculus

340 Year 1.0 Junior, Senior

This course will use and apply extensive problem solving skills to study exponential and logarithmic functions, trigonometry, the unit circle and the inverses of functions. Students will explore the real-world applications of these topics in careers such as business, chemistry, engineering, medicine, physics and statistics. This course will also study polar coordinates, probability, series and sequences, two-dimensional and three-dimensional vectors and the concept of limits.

Approval: Students placed in this course must have departmental approval and must have successfully completed Algebra 2 or Advanced Math.

Trigonometry and Analytic Geometry

351, 352 Year 1.0 Junior, Senior

This intermediate course is designed to prepare students for a college-level calculus class. This course covers topics such as conic sections, exponential, logarithmic, and rational functions, and trigonometric functions, identities and their applications. Students will improve their analytical thinking and problem-solving skills by using mathematical concepts to solve real-world problems. Basic sections of this course will engage in sustained review of quadratic relations, polynomials, rational and irrational functions, and identities, and will have a strong focus on real-world applications. Regular sections of this course will also explore parametric equations, polar coordinates, vectors and limits.

Approval: Students placed in this course must have departmental approval and must have successfully completed at least Algebra 1, Geometry and Algebra 2.

I.B. Mathematical Studies 11

380 Year 1.0 Junior

The purpose of this course is to expose students to mathematics that is challenging, thoughtful and relevant to their lives and the lives of others. In alignment with the I.B. Math Studies SL curriculum, students in the course will study elements of Algebra 2, functions, sets, probability, geometry, and trigonometry.

Approval: This course is for I.B. Diploma Candidates. I.B. Math placements will be made by the department; typically, I.B. Math Studies will be the course chosen for students who have completed Algebra 1 and Geometry.

I.B. Mathematical Studies 12

382 Year 1.0 Senior

Through classwork and extended mathematical investigations, this course will continue the real-world focus of I.B. Math Studies 11 through the study of sequences, series and statistics; an introduction to differential calculus; and financial mathematics.

Approval/Prerequisite: Successful completion of I.B. Math Studies 11.

I.B. Mathematics 11

384 Year 1.0 Junior

Consistent with the I.B. Mathematics SL curriculum, the first year of the course will be an in-depth analysis of advanced algebra, trigonometry, matrices, vectors, probability and statistics. Students will learn to use technology and other manipulative strategies to solve problems and will generate mathematical models from real life cases. In addition to the regular coursework, students will complete two portfolio items of the course, as part of the internal assessment component required by the IB.

Approval: This course is for I.B. Diploma Candidates. I.B. Math placements will be made by the department; typically, I.B. Mathematics will be the course chosen for students who have completed at least Geometry and Algebra 2 at the high school level.

I.B. Mathematics 12

386 Year 1.0 Senior

The second year of the course will deal with calculus-related topics such as concepts of limits, continuity, derivatives, and anti-derivatives of algebraic functions.

Approval/Prerequisite: Successful completion of I.B. Mathematics 11.