

# MATHEMATICS

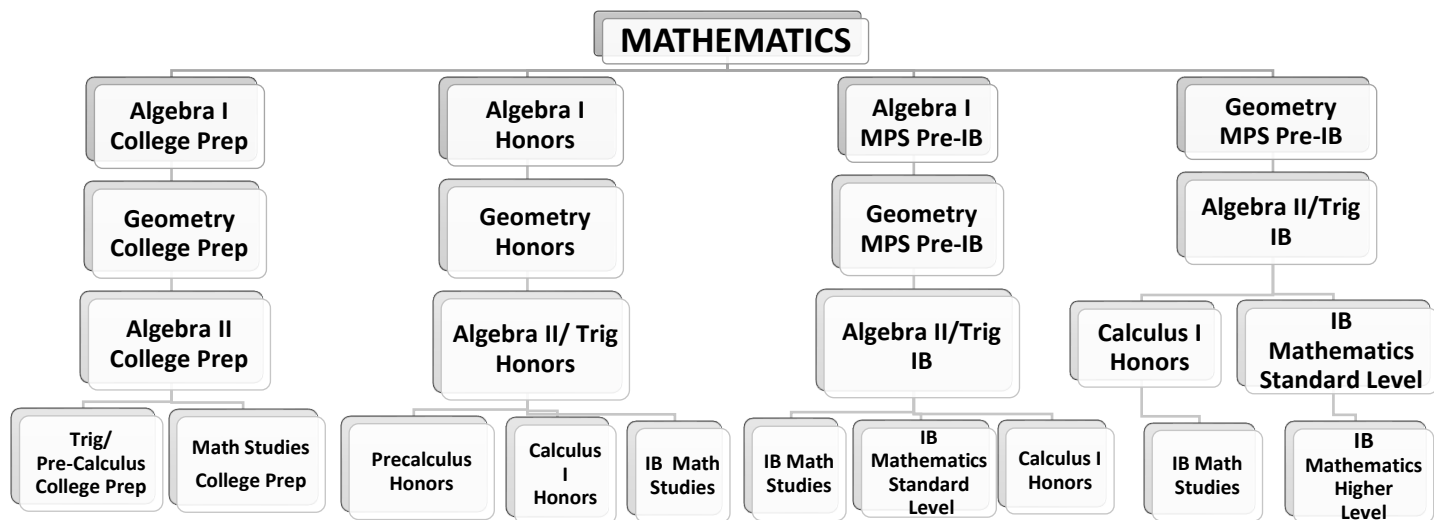
*Mathematics is the alphabet with which God has written the Universe.*

- Galileo

The mathematics department prepares students to cope with their futures. The curriculum is designed to give maximum competency for post high school academia. Graduation requirement: 3 credits

Offering different levels of mathematics, we have designed a curriculum that will fit the needs of any student. Although the titles tend to be typical (Algebra I - Geometry - Algebra II) the courses will integrate other topics of math such as logical reasoning, measurement, probability, statistics, and real life applications.

Incoming freshmen will be given an entrance exam prior to selecting their courses. This test, along with their current teacher recommendation, will determine the level of mathematics recommended by our department. Some students, who show *exceptional* ability and who have had an eighth grade algebra course, may be retested for appropriate placement in the sequence.



Please note: There is mobility among College Prep, Honors, Standard Level IB, and Higher Level IB based on teacher and/or department recommendations.

Yearlong Electives: Probability and Statistics -H

Term Electives: SAT Math Prep

## ALGEBRA I PLUS - COLLEGE PREP

#3000

Freshman

1.00 credit

Yearlong

The students in this course will meet daily and will begin with a pre-algebra refresher course. Students will spend first term studying topics such as fractions and decimals, operations with positive and negative integers, percents, ratios and proportions, and strategies for solving word problems. Second and third terms will be spent as a CP Algebra 1 course. Topics such as simplifying algebraic expressions, substitution, solving equations, using formulas, graphing on the coordinate plane, solving systems of equations and inequalities, and factoring will be explored. Students then apply these concepts to real life situations and integrate concepts from other branches of mathematics.

## ALGEBRA I - COLLEGE PREP

#3003

Freshman

1.00 credit

Yearlong

This course is the foundation for high school mathematics courses. It introduces all of the important concepts in algebra. Topics such as simplifying algebraic expressions, substitution, solving equations and inequalities, using formulas, graphing on the coordinate plane, factoring, and data analysis are explored. Students then apply these concepts to real life situations and integrate concepts from other branches of mathematics.

### **ALGEBRA I – HONORS**

#3004 Freshman 1.00 credit Yearlong

This course is designed for students who have been introduced to a variety of algebraic concepts and have met with success when applying them informally. These academically mature students will now be trained in a more rigorous approach to the subject. Topics such as simplifying algebraic expressions, substitution, solving equations, using formulas, graphing on the coordinate plane, and factoring are covered comprehensively. Students will be challenged to develop levels of competence necessary for success in more advanced areas of mathematics.

### **ALGEBRA I – MPS PRE-IB**

#3006 Freshman 1.00 credit Yearlong

This course is designed for students who already have a good understanding of basic algebraic concepts. In preparation for the IB exam, the entire text - along with supplemental information - is covered. Students will be challenged with an accelerated pace as well as with a penetrating investigation of the curriculum. Topics such as simplifying algebraic expressions, substitution, solving equations, using formulas, graphing on the coordinate plane, and factoring are reviewed. In addition, students also study logarithms, probability, sophisticated algebraic expressions and higher order equations. Students then apply these concepts to real life situations and integrate concepts from other branches of mathematics.

### **GEOMETRY – COLLEGE PREP**

#3007 Sophomore 1.00 credit Yearlong

Prerequisite: Algebra I or department recommendation

This course introduces students to the fundamental properties of geometry. Topics such as angles, lines, triangles, quadrilaterals, polygons, and circles are explored. Algebraic concepts and formal proofs are used to examine geometric properties and theorems. Students are able to apply basic geometric principles to real life situations.

### **GEOMETRY – HONORS**

#3008 Freshman, Sophomore 1.00 credit Yearlong

Prerequisite: Algebra I Honors/Pre IB (grade B or above) or department recommendation

This course introduces students to the fundamental properties of geometry. Topics such as angles, lines, triangles, quadrilaterals, polygons, and circles are explored in depth. Algebraic concepts and formal proofs are used to examine geometric properties and theorems. Numerous types of real life problems will be explored as well.

### **GEOMETRY – MPS PRE-IB**

#3010 Freshman, Sophomore 1.00 credit Yearlong

Prerequisite: Algebra I Honors/Pre IB (grade B or above) or department recommendation

This course introduces students to the fundamental properties of geometry. Topics such as angles, lines, triangles, quadrilaterals, polygons, and circles are explored in depth. Algebraic concepts and formal proofs are used to examine geometric properties and theorems. In preparation for the IB curriculum, students will do practice problems from past IB tests. Such enrichment will enable students to better recognize, early in their academic careers, the vital role mathematics plays in the overall process of discovery.

### **ALGEBRA II – COLLEGE PREP**

#3013 Junior 1.00 credit Yearlong

Prerequisite: Geometry

This course begins by reviewing the important concepts of algebra I. The students will explore the properties and the graphs of special functions such as absolute value, quadratic, and polynomial functions. Other topics include rational and radical expressions, complex numbers, data analysis and matrices. Incorporated throughout the year will be SAT strategies. Students are required to have a graphing calculator. **A TI-83 OR TI-84 IS STRONGLY RECOMMENDED.**

### **ALGEBRA II/TRIGONOMETRY – HONORS**

#3014

Sophomore, Junior

1.00 credit

Yearlong

Prerequisite: Geometry Honors/Pre IB (grade B or above) and Algebra I Honors/Pre IB (grade B or above) or department recommendation

This course completes and combines the algebraic techniques and the trigonometry needed to prepare students for the study of calculus. Functions will be studied throughout the course, both their properties and their graphs. Linear, polynomial, rational, exponential, logarithmic, and trigonometric functions will be covered in depth. Topics from trigonometry are investigated such as the basic trigonometric functions, radian measure, trigonometric identities, solving trig equations, and solving right and oblique triangles. Students are required to have a graphing calculator for course work. **A TI-83 or TI-84 IS STRONGLY RECOMMENDED.**

### **ALGEBRA II/TRIGONOMETRY – IB**

#3016

Sophomore, Junior

1.00 credit

Yearlong

Prerequisite: Geometry Honors/Pre IB (grade B or above) and Algebra I Honors/Pre IB (grade B or above) or department recommendation

This course completes and combines the algebraic techniques and the trigonometry needed to prepare students for the study of calculus. Functions will be studied throughout the course, both their properties and their graphs. Linear, polynomial, rational, exponential, logarithmic, and trigonometric functions will be covered in depth. Topics from trigonometry are investigated such as the basic trigonometric functions, radian measure, trigonometric identities, solving trig equations, and solving right and oblique triangles. Students are required to have a graphing calculator for course work. This is the first of a two year sequence to prepare the students for the standard level IB exams in math. **A TI-83 or TI-84 IS STRONGLY RECOMMENDED.**

### **MATH STUDIES (WITH TRIGONOMETRY) – COLLEGE PREP**

#3027

Senior

1.00 credit

Yearlong

Prerequisite: Algebra II (grade C or above) **and** department recommendation

This course explores a variety of math topics. The trigonometry unit will explore definitions of the trig functions as circular functions, the identities associated between the trig functions, how to solve trigonometric functions including the use of identities in solving these equations, the behavior of these functions through their graphs, and lastly, the definitions of the trig functions as they pertain to right triangles. The probability and statistics unit will work with data: collecting, analyzing, and drawing conclusions. Specifically, students will look at exploring data, sampling and experimentation, anticipating patterns and statistical inference. The students will also be introduced to the basic probability rules and explore the likelihood of events occurring. The practical life applications unit will include topics such as interest, sequences, series and geometric transformations and tessellations.

### **TRIGONOMETRY/PRE-CALCULUS – COLLEGE PREP**

#3025

Senior

1.00 credit

Yearlong

Prerequisite: Algebra II (grade C or above) or department recommendation

The main objective of this course is to learn the prerequisite topics important to the study of calculus. The trigonometry unit will explore definitions of the trig functions as circular functions, the identities associated between the trig functions, how to solve trigonometric functions including the use of identities in solving these equations, the behavior of these functions through their graphs, and lastly, the definitions of the trig functions as they pertain to right and oblique triangles. The pre-calculus portion will undertake an in-depth study of several common functions and their graphs. Two important functions that we will focus on are the exponential function and the logarithmic function. A brief study of the conic sections will conclude this unit with an emphasis on the standard form of the equation of each along with the general second degree equation. Students are required to have a graphing calculator. **A TI-83 OR TI-84 IS STRONGLY RECOMMENDED.**

### **PRE-CALCULUS – HONORS**

#3038 Junior, Senior 1.00 credit Yearlong

Prerequisite: Algebra II/Trig Honors

This course prepares students for an honors level calculus class. After a review of trigonometry, this course will focus on a variety of different topics. The topics include but are not limited to the following: systems of nonlinear equations, partial fractions, linear programming, sequences, series, probability, conic sections, vectors and limits. Students are required to have a graphing calculator. **A TI-83 OR TI-84 IS STRONGLY RECOMMENDED.**

### **IB MATH STUDIES STANDARD LEVEL**

#3028 Junior, Senior 1.00 credit Yearlong

Prerequisite: Algebra II/Trigonometry IB/Honors

This class (along with Algebra II/Trigonometry IB) prepares the student for the IB Mathematics Studies exam. Topics include sequences and series, sets, logic, probability and statistics, introductory differential calculus, and financial mathematics. Students will complete a yearlong project which will be submitted to IBO. An IB approved graphing calculator is required. **A TI-84 IS STRONGLY RECOMMENDED.**

### **CALCULUS I - HONORS**

#3030 Junior, Senior 1.00 credit Yearlong

Prerequisite: Algebra II/Trig Honors/IB (grade B or above) **and** department recommendation

This course is an introduction to differential and integral calculus. Topics will include limits, derivatives of algebraic and transcendental functions, and methods of integration. The outline of a college calculus I course will be followed with topics from a calculus II course also being introduced. The students will learn when and how to apply derivatives and integrals. The use of the TI-83 or TI-84 calculator will be incorporated into the course.

### **IB MATHEMATICS STANDARD LEVEL (with CALCULUS)**

#3032 Junior, Senior 1.00 credit Yearlong

Prerequisite: Algebra II/Trig IB (grade B or above) **and** department recommendation

This rigorous course (along with Algebra II/Trigonometry IB) prepares the student for the IB Mathematics Standard Level exam, which encompasses their four years of study. An investigation of the topics covered in this course includes sequences and series, vectors, probability and statistics, and differential and integral calculus. Students will complete a yearlong project which will be submitted to IBO. An IB approved graphing calculator is required. **A TI-84 IS STRONGLY RECOMMENDED.**

### **IB MATHEMATICS HIGHER LEVEL**

#3036 Junior, Senior 1.00 credit Yearlong

Prerequisite: IB Mathematics Standard Level **and** department recommendation.

This advanced course is designed to prepare students to take the rigorous Mathematics HL IB examination in May. The course is comprised of two components: Mathematical Statistics and Calculus. The Mathematical Statistics portion includes probability theory, combinatorics, calculus-based development of statistical theory, and a look at the theory and application of hypothesis testing. The Calculus portion consists of advanced differentiation and integration techniques and their application, vector analysis in two and three dimensions, complex numbers theory and an understanding of a few proof writing techniques. Students will also complete a yearlong research project which will be submitted to IBO. This course is for a serious and dedicated student of mathematics and will be a challenge even to a student with a history of success in previous mathematics courses. An IB approved graphing calculator is required. **A TI-84 IS STRONGLY RECOMMENDED.**

## **MATHEMATICS ELECTIVES**

*These courses do not count toward the mathematics graduation requirement.*

### **PROBABILITY AND STATISTICS- HONORS**

#3040

Junior, Senior

1.00 credit

Yearlong

Prerequisite Algebra II with department recommendation:

Our society is completely overtaken by data. Today, collecting and analyzing data and drawing accurate conclusions from it are indispensable parts of many human endeavors such as social sciences, laboratory sciences, clinical studies, business, marketing and product quality control. In this course, students will work with data: collecting, analyzing, and drawing conclusions. Specifically, students will look at exploring data, sampling and experimentation, anticipating patterns and statistical inference. The students will also be introduced to the basic probability rules and explore the likelihood of events occurring. Various types of probability distributions are also discussed. This course is equivalent to a one-semester, introductory, non-calculus based college statistics course. Students are required to have a graphing calculator. **A TI-84 IS STRONGLY RECOMMENDED.**

### **SAT MATH PREPARATION - COLLEGE PREP**

#3103

Junior, Senior

.33 credit

Term course

This course is designed to prepare students to take the SAT and other standardized tests for college entrance. It will familiarize students with good test taking strategies and will review math concepts contained in the SAT test. The course will allow students to understand how the test is scored and how colleges use that score to determine enrollment. Students will have the opportunity to do practice questions under formal and informal testing situations. Students are required to have a graphing calculator. **A TI-83 OR TI-84 IS STRONGLY RECOMMENDED.**