

## MATHEMATICS DEPARTMENT

All students are required to take four credits in mathematics, including one credit in Algebra and one credit in Geometry. Students advancing to a Maryland State College or University are required to complete Algebra 2 for admission, and students advancing to a two-year college will be required to take mathematics courses without credit until they complete the equivalent of Algebra 2.

**The technology component of math courses Algebra 1 and higher requires the use of a TI-83+ or TI-84 graphing calculator.**

### POSSIBLE MATH SEQUENCES

<u>9<sup>th</sup> Grade</u>	→	<u>10<sup>th</sup> Grade</u>	→	<u>11<sup>th</sup> Grade</u>	→	<u>12<sup>th</sup> Grade</u>
Algebra 1		Geometry		Algebra 2		Pre-Calculus Stat. & Math Modeling AP <sup>®</sup> Statistics Quantitative Literacy
Algebra 1 with Related Math		Geometry		Bridge to Algebra 2		Algebra 2 Quantitative Literacy
Geometry		Bridge to Alg. 2		Algebra 2		Pre-Calculus Stat. and Math Modeling AP <sup>®</sup> Statistics Quantitative Literacy
Geometry		Algebra 2		Pre-Calculus Stat. & Math Modeling		Calculus with Apps. AP <sup>®</sup> Calculus AB AP <sup>®</sup> Statistics
Honors Geometry		Honors Algebra 2		H. Pre-Calculus		AP <sup>®</sup> Calculus AB or BC Calculus with Apps. AP <sup>®</sup> Statistics
Bridge to Algebra 2		Algebra 2		Pre-Calculus Stat. & Math Modeling		AP <sup>®</sup> Statistics Quantitative Literacy
Algebra 2		Pre-Calculus		Calculus w/Apps. AP <sup>®</sup> Calculus AB		AP <sup>®</sup> Calculus AB or BC AP <sup>®</sup> Statistics
Honors Algebra 2		H. Pre-Calculus		AP <sup>®</sup> Calculus AB or BC AP Statistics		MV Calc./AP Statistics AP <sup>®</sup> Statistics AP <sup>®</sup> Calculus AB or BC
H. Pre-Calculus		AP <sup>®</sup> Calculus AB AP <sup>®</sup> Calculus BC		AP <sup>®</sup> Statistics Multivariable Calculus		Multivariable Calculus AP <sup>®</sup> Statistics Other College-Level Math

**ALGEBRA 1 A/B with  
RELATED MATH A/B**

**Double Pd 311144 & 323144/311244 & 323244**

Related Math is taken concurrently with Algebra 1. Students enrolled will receive additional support in the concepts of Algebra 1 and will receive credit and a grade for both courses.

*Prerequisite:* Teacher recommendation

Grade Level: 9

**ALGEBRA 1 A/B**

**311100/311200**

This course studies the basic structure of real numbers, algebraic expressions, and functions. The topics include linear equations and functions, inequalities, linear systems, quadratic and polynomial equations and functions, exponential functions, as well as data analysis and probability. Mathematical modeling of real-life problems is emphasized.

*Prerequisite:* Attainment of the outcomes of Math C (8<sup>th</sup> grade math course)

**GEOMETRY A/B**

**320100/320200**

Geometry is studied as a mathematical system through the deductive development of relationships in the plane and space. Students formalize their understanding of geometric concepts, including congruence and similarity, circle chords, secants and tangent segments, parallel and perpendicular lines, angle and side measures in polygons, proofs, logic, transformations, the Pythagorean Theorem, constructions, coordinate geometry, and surface area and volume of solids.

*Prerequisite:* Attainment of the outcomes of Algebra 1

Recommendation: Completion of both semesters of Algebra 1 with at least a "C" average

**GEOMETRY A/B, HONORS**

**320300/320400**

Honors Geometry is an intensive, accelerated course which is studied through the deductive development of relationships in the plane and in space. Indicators include geometry in art and nature and as a mathematical system, congruency and similarity, constructions, transformations, the Pythagorean Theorem, angles and polygons, circle chords, secants and tangents, parallel and perpendicular lines, direct and indirect proofs, logic, angle and side measures in polygons, solids of revolution, and surface area and volumes of solids. Vectors and radian measure are also introduced.

*Prerequisite:* Attainment of the outcomes of Algebra 1

Recommendation: Completion of both semesters of Algebra 1 with at least a "B" average

**BRIDGE TO ALGEBRA 2 A/B**

**305300/305400**

This course is designed for students who have completed Algebra 1 and Geometry and for whom additional support is recommended before taking Algebra 2. This course builds upon mathematical foundational concepts taught in Algebra 1 and engages students in exploring functional relationships in real-world contexts.

Recommendation: Completion of both semesters of Algebra 1 and Geometry with a grade of C or D

**ALGEBRA 2 A/B****330100/330200**

Algebra 2 is the study of the complex number system, symbolic manipulations, and functions. Advanced algebraic techniques incorporating technology enable students to model and solve real-world problems. Topics studied include properties of functions, matrices, and systems of equations. Linear, quadratic, polynomial, exponential, logarithmic, and rational functions are studied with an emphasis on making connections to other disciplines.

*Prerequisite:* Attainment of the outcomes of Algebra 1 and Geometry

*Recommendation:* Completion of both semesters of Algebra 1 and Geometry with at least a "C" average

**ALGEBRA 2 A/B, HONORS****331000/331100**

Honors Algebra 2 is an intensive, accelerated course intended to prepare students for more advanced mathematics courses by focusing on students' thinking and problem solving techniques while introducing advanced algebra. Students will analyze the properties and algebra of functions, including polynomial, exponential, logarithmic, piece-wise, radical, and rational functions. Matrices, systems of equations, sequences and series, complex numbers, and conics are studied as well.

*Prerequisite:* Attainment of the outcomes of Algebra 1 and Honors Geometry

*Recommendation:* Completion of both semesters of Honors Geometry with at least a "C" average or Geometry with an "A" average

**PRE-CALCULUS A/B****348900/349000**

This course extends the study of elementary functions begun in Algebra 2 along with the use of technology to model mathematics essential in the real world. The course provides a thorough study of functions and models, trigonometric functions and identities, rational, exponential, and logarithmic functions, vectors, parametrics, and discrete mathematics.

*Prerequisite:* Attainment of the outcomes of Algebra 2

*Recommendation:* Completion of both semesters of Algebra 2 with at least a "B" average

**PRE-CALCULUS A/B, HONORS****335000/335100**

Honors Pre-Calculus is an intensive, accelerated course that extends the study of elementary functions begun in Honors Algebra 2. The use of technology is introduced to model mathematics essential in the real world. The course provides a thorough study of functions and models, trigonometric functions and identities, rational, exponential, and logarithmic functions, vectors, parametric equations and motion, and discrete mathematics. The polar coordinate system and graphs of polar equations, trigonometric forms of complex numbers, and the three-dimensional coordinate system are also studied.

*Prerequisite:* Attainment of the outcomes of Honors Algebra 2 or Algebra 2

*Recommendation:* Completion of both semesters of Honors Algebra 2 with at least a "B" average or Algebra 2 with an "A" average

**QUANTITATIVE LITERACY****312100/312200**

Quantitative Literacy is designed to enhance students' abilities in mathematical decision-making and financial literacy. Topics in mathematical decision-making include issues in health and social sciences, the mathematics of chance, the mathematics of democracy, and mathematics around the house. Financial literacy topics include individual budgeting, investing, credit, and loans. Also covered are business topics including starting and maintaining a business. Emphasis is on the mathematical aspects of the topics.

*Prerequisite:* Completion of Bridge to Algebra 2

*Recommendation:* Completion of Algebra 2

**STATISTICS AND MATHEMATICAL MODELING A/B****332200/332300**

Topics in the first semester include data analysis, probability, simulations, inferential statistics, normal and binomial distributions, techniques of sampling, confidence intervals, and hypothesis testing. Students use exploratory methods to identify patterns and make decisions. By using the hands-on approach and simulations, students gain a strong understanding of statistical concepts. Emphasis is placed on applications and the use of statistics to solve real-life problems. The second semester of this course is a survey of College Algebra and Trigonometry. Emphasis will be on concepts tested on the Accuplacer and other similar college math placement tests.

*Prerequisite:* Attainment of the outcomes of Algebra 2

*Recommendation:* Completion of Algebra 2 with at least a "C" average

**AP<sup>®</sup> STATISTICS A/B****332000/332100**

Students should have well-developed quantitative reasoning ability and strong reading and writing skills. Throughout the year, students will be involved in collecting and analyzing data from a variety of sources, reading and analyzing newspaper and magazine articles, and designing and completing projects that demonstrate an understanding of the principles that are studied in each unit. There is an increased emphasis on data collection and conceptual understanding and decreased emphasis on theoretical proofs and formulas. The use of technology facilitates the analysis of real-life data sets. Statistics is an excellent option for an advanced mathematics credit, as an additional credit with Pre-Calculus or Calculus, or as a course beyond AP<sup>®</sup> Calculus. The course addresses the increasing demand for a required statistics course in a variety of college majors, and it is equivalent to a non-calculus based introductory college statistics course. Students enrolled in the course are expected to take the AP<sup>®</sup> Statistics exam.

*Prerequisite:* Attainment of the outcomes of Algebra 2 or Honors Algebra 2

*Recommendation:* Completion of Honors Algebra 2 with at least a "B" average

**CALCULUS WITH APPLICATIONS A/B****335600/335700**

The introductory topics of this course include limits and continuity of functions, derivatives of functions, and their application to problems. Students find derivatives numerically, represent derivatives graphically, and interpret the meaning of a derivative in real-world applications. The relationship between the derivative and the integral is developed, and students model real-world situations involving rates of change using differential equations and applications of the integral. It is not the intent of this course to prepare students for the Advanced Placement® Calculus exam.

*Prerequisite:* Attainment of the outcomes of Pre-Calculus/Honors Pre-Calculus

*Recommendation:* Completion of Pre-Calculus with at least a "B" average or Honors Pre-Calculus with at least a "C" average

**AP® CALCULUS AB A/B****345200/345300**

The topics studied are those traditionally offered in one semester of calculus in college, and the course is designed specifically for students who wish to obtain advanced placement in mathematics in college. Concepts are communicated graphically, numerically, analytically, and verbally. The basic topics include limits and continuity of functions, derivatives and integrals of algebraic and transcendental functions and their applications in problems. BC level students also study convergence tests for series, the Taylor series, elementary differential equations, and hyperbolic functions. Students enrolled in this course are expected to take the AP® Calculus exam.

*Prerequisite:* Attainment of the outcomes of Honors Pre-Calculus or Pre-Calculus

*Recommendation:* Completion of both semesters of Honors Pre-Calculus with a "B" average or Pre-Calculus with an "A" average

**AP® CALCULUS BC A/B****349100/349200**

The topics studied are those traditionally offered in two semesters of calculus in college, and the course is designed specifically for students who wish to obtain advanced placement in mathematics in college. Concepts are communicated graphically, numerically, analytically, and verbally. The basic topics include limits and continuity of functions, derivatives and integrals of algebraic and transcendental functions and their applications in problems, convergence tests for series, the Taylor series, elementary differential equations, and hyperbolic functions. Students enrolled in this course are expected to take the AP Calculus exam.

*Prerequisite:* Attainment of the outcomes of Honors Pre-Calculus or Pre-Calculus

*Recommendation:* Completion of both semesters of Honors Pre-Calculus with a "B" average

**MULTIVARIABLE CALCULUS A/B****304800/304900**

This highly advanced course includes extensive work with vector analysis, partial derivatives, multiple integrals, and line integrals. Students will also complete projects that incorporate these concepts. Differential equations are introduced in the second semester.

*Prerequisite:* Attainment of the outcomes of AP® Calculus