

## Walter Johnson Mathematics Department

All students are required, by Maryland state law to enroll in math every semester of high school, and four math credits are required for graduation. The technology component of math courses requires the use of a TI-83 or TI-84 series graphing calculator.

Math teachers issue course recommendations for students prior to registration. Students should take the professional judgment of their math teacher seriously. Students should know that their math teacher cares about them and want them to be confident and successful.

### Typical Math Sequences for WJ Students

<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 Intro to Statistics AP <sup>®</sup> Statistics Quantitative Literacy
Geometry	→ 2YR Algebra 2 (Part 1)	→ 2YR Algebra 2 (Part 2)	→ Pre-Calculus Intro to Statistics AP <sup>®</sup> Statistics Quantitative Literacy
Geometry	→ Algebra 2	→ Pre-Calculus Intro to Stats	→ 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

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

### Math Course Descriptions

#### RELATED MATH A/B

**323100/323200**

Related Mathematics is taken in conjunction with Algebra 1. It reinforces the essential pre-algebra and algebra concepts and procedures necessary to function in authentic problem-solving situations. Students focus on concepts and applications related to success in Algebra 1 and use technology in the problem-solving process.

*Prerequisite:* Teacher recommendation

Grade Level: 9

#### ALGEBRA 1 A/B

**311100/311200**

Algebra 1 is designed to analyze and model real-world phenomena. Exploration of linear, exponential, and quadratic functions forms the foundation of the course. Key characteristics and representations of functions – graphic, numeric, symbolic, and verbal – are analyzed and compared. Students develop fluency in solving equations and inequalities. One- and two-variable data sets are interpreted using mathematical models.

Grade Level: 9-10-11-12

**GEOMETRY A/B** **320100/320200**

**GEOMETRY A/B, HONORS** **320300/320400**

Geometry formalizes deductive reasoning and mathematical argument. Theorems are used to prove relationships and solve problems about triangles, quadrilaterals, other polygons, and circles. Measurement of two- and three-dimensional objects includes circumference, area and volume. The rectangular coordinate system is used to verify relationships.

*Prerequisite:* Attainment of the outcomes of Algebra I A and B

*Honors Recommendation:* Completion of both semesters of Algebra 1 with at least a “B” average

*Grade Level:* 9-10-11-12

**2-YEAR ALGEBRA A/B** **331500/331600**

**2-YEAR ALGEBRA C/D** **331700/331800**

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

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

Curriculum 2.0 (C2.0) Algebra 2 formalizes and extends students’ algebra experiences from C2.0 Algebra 1. Building on their work with linear, quadratic, and exponential functions, students extend their repertoire of functions to include polynomial, rational, radical, and trigonometric functions. Students work closely with the expressions that define the functions, and continue to expand and hone their abilities to model situations and to solve equations, including solving quadratic equations over the set of complex numbers and solving exponential equations using the properties of logarithms. Students extend their knowledge of statistics and explore probability.

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

*2-Year Recommendation:* Completion of both semesters of Algebra 1 and Geometry with a “D” average

*On-Level Recommendation:* Completion of both semesters of Algebra 1 and Geometry with at least a “C” average

*Honors Recommendation:* Completion of both semesters of Honors Geometry with at least a “B” 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

Grade Level: 9-10-11-12

**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

Grade Level: 9-10-11-12

**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 Algebra 1 and Geometry

*Recommendation:* Completion of Algebra 2

Grade Level: 11-12

**Introduction to Statistics A/B****332200/332300**

Introduction to Statistics A/B is a two-semester course that provides preparation to maximize the potential for success in an AP Statistics or college statistics course. Topics include data analysis, probability, simulations, inferential statistics, normal and binomial distribution, techniques of sampling, confidence intervals, and hypothesis testing. Students use exploratory methods to identify patterns and make decisions. Emphasis is placed on applications and the use of statistics to solve real-life problems.

*Prerequisite:* Attainment of the outcomes of Algebra 2

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

Grade Level: 11-12

**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

Grade Level: 10-11-12

**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

Grade Level: 10 – 11 – 12

**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. 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

Grade Level: 10-11-12

**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

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

Grade Level: 10-11-12

**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 BC

Grade Level: 11-12