

MATHEMATICS

The philosophy of the Mathematics Department is to ensure that all students have the opportunity to acquire the mathematics education that is commensurate with their needs and abilities. The department has established the following program designed to enable students to realize their full potential and meet their particular needs while providing the proper background for future educational and occupational goals. All students are required to pass 4 credits in mathematics as a graduation requirement.

The Mathematics Department offers courses at several instructional levels. Please note that all the course levels offered are college preparatory and are aligned to the Massachusetts Mathematics Curriculum Frameworks (2017).

16200 GEOMETRY

Honors

(1 credit)

This course includes the study of plane, solid, and coordinate geometry as defined by the Massachusetts Curriculum Frameworks. Much attention is given to proving theorems and developing logical thinking. Assessments will routinely require students to apply concepts that they have learned to new situations. This course will include open-ended response assessments with an emphasis on critical thinking skills in preparation for the MCAS exam administered in the sophomore year.

Prerequisite: Students will be placed in this course based on MCAS, PARCC, and iReady Data. (Full year course)

16201/16101/26222/ GEOMETRY/GEOMETRY 9

College Prep

(1 credit)

This course includes the study of plane, solid, and coordinate geometry with the emphasis on reading and writing using appropriate mathematical language. The concept of proof will be developed and algebra concepts will be continually reinforced. This course will include open-ended response assessments with an emphasis on critical thinking in preparation for the MCAS exam administered in the sophomore year. (Full year course)

16111/26212 ALGEBRA I

College Prep

(1 credit)

Algebra I is the essential foundation for all following successive mathematics courses and covers the beginning concepts of algebra as defined by the Massachusetts Curriculum Frameworks. Algebraic concepts are introduced through an examination of the structure and the techniques of algebra. Topics studied include: patterns and relations, operations in algebra, solving equations, proportional reasoning, linear functions, inequalities and absolute value, systems of equations and inequalities, exponents and exponential functions, polynomials and factoring, quadratic and rational functions, radicals, and transformations. Probability, statistics, geometry, and the use of technology are integrated throughout the course. (Full year course)

16100 ALGEBRA I

Honors

(1 credit)

This course is a rigorous treatment of advanced algebra concepts. Topics include matrices, exponential and logarithmic functions, complex numbers, sequences and series, probability and statistics. Assessments will routinely require students to apply concepts that they have learned to new situations. This is the first course in a three-year program intended to prepare students for the AP Calculus exam at the end of senior year.

A graphing calculator is required.

Prerequisite: 75% or better in Geometry Honors, passing score and teacher recommendation. (Full year course)

16301/26242 ALGEBRA II

College Prep

(1 credit)

Algebra II is a comprehensive treatment of intermediate level algebra topics as defined by the Massachusetts Curriculum Frameworks. This course will include a thorough study of functions, sequences, variations, and related graphing. Also presented will be linear combinations, matrices, systems of equations, and quadratic expressions. Other topics covered will be imaginary numbers, exponential functions, radicals, logarithms, and polynomials. The students are strongly encouraged to obtain a graphing calculator.

Prerequisite: Successful completion of a Geometry and Algebra I course, or teacher recommendation (Full year course)

16341 ALGEBRA II EXTENDED

College Prep

(1 credit)

Students will utilize and build on knowledge gained in Advanced Quantitative Reasoning to gain a deep understanding of Algebra II topics. Topics covered include solving quadratics using complex numbers, solving rational expressions, and modeling using linear and quadratic functions and interpreting data from a statistical perspective.

Prerequisites: Successful completion of Advanced Quantitative Reasoning

16361 EXPLORING ALGEBRA II/TRIGONOMETRY College Prep (1 credit)

This course progresses at a deliberate pace that allows for skill development and reinforcement of concepts. It is designed to support the learning of students who may not have fully retained the skills and concepts covered in prior courses which will be reviewed when needed in the course. Mathematical concepts tend to be introduced at a concrete level and developed with an increasing level of abstraction. This course includes a review of fundamental algebra skills. Topics include functions and graphing, solving systems of equations and inequalities, quadratics, exponential functions, and radicals as well as an application-focused introduction to trigonometry.

Prerequisite: Successful completion of Algebra II. (Full year course)

16400 PRE-CALCULUS Honors (1 credit)

This course covers the most advanced algebra topics including Partial Fraction Decomposition, Conic Sections and a thorough treatment of trigonometry and complex numbers in polar form. Additionally, the last term is devoted to the derivation and concept of limits as will be applied in a calculus setting. Assessments will routinely require students to apply concepts that they have learned to new situations. This is the second course in a three-year program intended to prepare students for the AP Calculus exam at the end of senior year.

Prerequisite: 75% or better in Algebra II Honors, or departmental approval. (Full year course open to grades 11 and 12)

16401 PRE-CALCULUS College Prep (1 credit)

This course is a preparation for college calculus. The topics of trigonometry are discussed extensively with an emphasis on applications. The concepts of limit and differential calculus are developed with applications stressed rather than theory.

Prerequisite: Successful completion of Algebra II (Full year course, open to grades 11 and 12)

16429 AP STATISTICS Advanced Placement (1 credit)

This college level course provides a rigorous and extensive treatment of statistics. The content consists of those topics as prescribed in the "Guide to the Advanced Placement Statistics Test" administered by the College Board.

Prerequisite: Successful completion of Algebra II (Honors) and department approval. In order to earn AP credit in this course, a student must take the AP exam. (Full year course)

16421 STATISTICS College Prep (1 credit)

This course provides students with a conceptual understanding of statistics through active learning while the students use technology to analyze and interpret genuine data. The topics covered include data collection and analysis, measures of central tendency and standard deviation, correlations, random behavior and statistical inferences. This course also stresses the importance of students' communication skills through reading, writing, and discussion.

Prerequisite: Successful completion of Algebra II. (Full year course)

16420 STATISTICS Honors (1 credit)

This course is a college level statistics course. The content is similar to that described by the College Board; however, the emphasis is more on the application of principles rather than on theory.

Prerequisite: Grade of 75% or better in Pre-Calculus Honors or departmental approval. (Full year course)

16431 SPORTS STATISTICS College Prep (1 credit)

This course provides students with an understanding of statistics through their use in sports both from an analytical and a decision-making perspective. The course uses sports as a basis for studying many topics including data collection and analysis, measures of central tendency and standard deviation, correlations, random behavior and statistical inferences. Students will also examine the reasoning behind utilizing different statistical approaches in sports-related decision-making such as the decision to use SABRmetrics statistics over traditional statistics such as batting average.

Prerequisite: Successful completion of Algebra II. (Full year course)

16459 AP CALCULUS BC Advanced Placement (1 credit)

This college level course provides a rigorous and extensive treatment of calculus. The content consists of those topics as prescribed in the "Guide to the Advanced Placement BC Calculus Test" administered by the College Board. Topics covered include limits of functions, differential calculus with applications, integral calculus with applications, various

integration and differentiation techniques, convergence of series, Taylor series and polynomials and integration of parametric and polar functions. The subject matter covered is equivalent to roughly two semesters of college calculus. Additionally, students will spend time preparing for the AP examination. In order to earn AP credit in this course, a student must take the AP exam.

Prerequisite: Department approval. (Full year course, open to grade 12)

16449 AP CALCULUS AB

Advanced Placement

(1 credit)

This college level course provides a rigorous and extensive treatment of calculus. The content consists of those topics as prescribed in the “Guide to the Advanced Placement AB Calculus Test” administered by the College Board. Topics covered include limits of functions, differential calculus with applications, integral calculus with applications and various integration and differentiation techniques. The subject matter covered is equivalent to roughly one semester of college calculus. Additionally, students will spend time preparing for the AP examination. This course is more rigorous than the Honors Calculus course with a faster pace in order to be prepared for the AP test in late April/early May.

Prerequisite: Department approval. In order to earn AP credit in this course, a student must take the AP exam. (Full year course, open to grade 12)

16430 CALCULUS

Honors

(1 credit)

This course is similar to a college level calculus course. The content is similar to that described by the College Board; however, the topics are not covered in the same depth as in the advanced placement course. The emphasis is more on the application of principles rather than on theory.

Prerequisite: Successful completion of Pre-Calculus ~~Honors~~ with a grade of 75% or better or departmental approval. (Full year course)

16651 INTRODUCTION TO CALCULUS

College Prep

(1 credit)

This course provides a bridge between PreCalculus and college level Calculus. The course begins with a review of advanced Algebra II and PreCalculus topics. Students then delve into the beginnings of Calculus including limits, derivatives and an introduction to the integral. This course moves at a significantly slower pace than Honors Calculus and is intended to help prepare students to take Calculus at the college level.

Prerequisite: Successful completion of PreCalculus CP.

16552 STRATEGIES FOR SUCCESS: MATH

Un-leveled

(.5 credit)

This course provides a review of topics found in the five strands of the Massachusetts Curriculum Framework. Students will analyze open response questions and write appropriate solutions. Diagnostic software will be used to identify weaknesses and strengths as well as to track student progress. The focus is on both MCAS preparation and MCAS remediation with emphasis on test taking strategies and content specific weaknesses. Students will be automatically placed in this course based on MCAS scores, iReady results and teacher recommendation. *This course does not meet the mathematics requirement for graduation.* (Full year course, meeting three or four times in a seven day cycle)

16172 MATH LAB

Un-leveled

(.5 credit)

Math Lab is a full year course, meeting either three times in a seven day cycle with one extended block or four times in a seven day cycle. Math Lab is a class designed to help students develop a strong foundation in mathematical principles, concepts, and computations. Students in this class are given skills and strategies to help them develop competency in a number of mathematic arenas as outlined in the Massachusetts Mathematics Frameworks. Students may be assigned to the Math Lab by teacher recommendation. *This course does not fulfill any Math requirement for graduation.* (Full year course, meeting three or four times in a seven day cycle.) (Open to grades 9, 10, 11, 12)

MATHEMATICS - Standards Based Exploring Computer Science & Technology (SBECST) Computer Science Strand

A strong background in computer science and programming gives students an advantage as we become a more technologically advanced society. At Weymouth High School students have the opportunity to take computer science and programming-based courses from grades 9-12. In order to accommodate student interest and schedules students may enter at almost any point along the pathway.

H16520 (H) / H16521 (CP) EXPLORING COMPUTER SCIENCE I HONORS/COLLEGE PREP (.5 credit)

This course is designed to introduce students to the fundamental concepts of computer science. Topics include human computer interactions, problem solving, and web design utilizing html and css and a brief introduction to programming. The Honors student will be held to a more rigorous standard, completing more projects with greater depth. Honors students will also be expected to work independently and in teams. (Half year course, open to grades 9, 10, 11, 12)

H16560(H) / H16561(CP) EXPLORING COMPUTER SCIENCE II HONORS/COLLEGE PREP (.5 credit)

This course is a direct continuation of Exploring Computer Science I. Topics include a deeper exploration of programming, computing and data analysis, as well as an introduction to programming with Javascript. The Honors student will be held to a more rigorous standard, completing more projects with greater depth. Honors students will also be expected to work independently and in teams. (Half year course, open to grades 9, 10, 11, 12 with successful completion of ECS I)

16500(H) / 16501(CP) JAVA PROGRAMMING I Honors/ College Prep (.5 credit)

This course is designed to introduce students to the fundamental concepts of computer programming using Java. Topics developed include algorithm and program design, modifying classes, data types, flow of control, top down design using functions, and testing and debugging of programs. The Honors student will be held to a more rigorous standard, completing more programs with greater depth. The Honors students will also be expected to work independently at most times. (Half year course, open to grades 10, 11, 12)

16510(H) / 16511(CP) JAVA PROGRAMMING II Honors/ College Prep (.5 credit)

This course is an extension of JAVA Computer Programming I. Advanced programming techniques will be taught including use of files, more flow of control options, strings and abstract classes. The Honors student will be held to a more rigorous standard, completing more programs with greater depth. The Honors student will also be expected to work independently at most times. (Half year course, open to grades 10, 11, 12 with successful completion of Java 1)

16369/16360 AP/Honors COMPUTER SCIENCE PRINCIPLES Advanced Placement/Honors (1 credit)

This course offers a multidisciplinary approach to teaching the underlying principles of computation. The course will introduce students to creative aspects of programming, using abstractions and algorithms, working with large data sets, understandings of the Internet and issues of cybersecurity, and impacts of computing that affect different populations. Computer Science Principles will give students the opportunity to use current technologies to solve problems and create meaningful computational artifacts including using block programming techniques to design functional mobile applications for Android devices. Students enrolled in the AP level will be held to a higher level of rigor and will be expected to take the Advanced Placement exam in May. In order to earn AP credit in this course the student must take the AP exam.

(Full year course open to grade 11 and 12 who have completed Algebra 2)

16539/16530 AP/Honors COMPUTER SCIENCE Advanced Placement/Honors (1 credit)

This course provides a rigorous study of programming techniques using Java. Topics will include public classes, inheritance hierarchies, designing subclasses, designing abstract classes and interfaces, package concepts, exception concepts, recursion, and wrapper classes. Students enrolled in the AP level will be held to a higher level of rigor and will be expected to take the Advanced Placement exam in May. In order to earn AP credit in this course the student must take the AP exam. (Full year course open to grades 11 and 12 who have completed Java 1)