

Mathematics

The mathematics program of the Maine Township High Schools is designed to provide students with the opportunity to develop their mathematical talents to the fullest. Appropriate course sequences exist for all students commensurate with their interests, aptitudes, and abilities.

An understanding of the problems of a technological age requires training in the quantitative and abstract thinking that is provided by courses in mathematics. It is recommended that college preparatory students take four years of mathematics. This is in accord with the recommendations of many colleges and universities.

FRESHMAN COURSES

Freshman placement in mathematics is dependent upon the results of the high school placement tests and/or the recommendations of the eighth grade teacher.

Pre-Algebra

Length: Two semesters
One period

Credit: 1 credit

Grade: 9

Prerequisite: Qualification based on Incoming test scores

Pre-Algebra is designed to prepare students for the study of algebra and geometry by providing a strong foundation in skills and problem solving. Topics covered include rational numbers, decimal numbers, integers, solving equations, number theory, ratios, percents, proportions, solving inequalities, graphing, measurement, polynomials, statistics and probability.

Algebra 1 Extended

Length: Two semesters
1 ½ periods

Credit: 1 credit

Grade: 9

Prerequisite: None

Algebra 1 is a first course in algebra. Students study the properties of the real numbers, the fundamental operations with real numbers, the solution of linear and quadratic equations, the solution of systems of equations and inequalities, graphs of relations and functions, and problem solving. Students are encouraged to understand the abstract development of algebra and to acquire computational skills, which will enhance problem solving.

Algebra 1

Length: Two semesters
One period

Credit: 1 credit

Grade: 9

Prerequisite: Pre-Algebra
(8th grade)

Algebra 1 is a first course in algebra. Students study the properties of the real numbers, the fundamental operations with real numbers, the solution of linear and quadratic equations, the solution of systems of equations and inequalities, graphs of relations and functions, and problem solving. Students are encouraged to understand the abstract development of algebra and to acquire computational skills, which will enhance problem solving.

Algebra 2 Freshman
Length: Two semesters
One period
Credit: 1 credit
Grade: 9

Prerequisite: Algebra 1 and satisfactory performance on the high school algebra placement test.

Algebra 2 Freshman is designed for freshmen who have completed the study of Algebra 1 and were not selected for the Accelerated Algebra 2 course. This course is a second year course in algebra. Topics covered include linear and quadratic equations, systems of equations, matrices and determinants, functions (linear, quadratic, inverse, exponential, logarithmic, polynomial, and rational), powers, roots, radicals, and quadratic relations.

Accelerated Algebra 2
Length: Two semesters
One period
Credit: 1 credit
Grade: 9

Prerequisite: Algebra I and strong performance on the high school algebra placement test.

Accelerated Algebra 2 is designed for freshmen with exceptional ability and interest in mathematics who have completed the study of Algebra 1. This course is the first in a sequence designed to prepare students for success in Advanced Placement Calculus courses. Topics covered include linear and quadratic equations, systems of equations, matrices and determinants, functions (linear, quadratic, inverse, exponential, logarithmic, polynomial, and rational), powers, roots, radicals, quadratic relations, sequences and series.

SOPHOMORE COURSES

Sophomore Algebra
Length: Two semesters
One period
Credit: 1 credit
Grade: 10,11

Prerequisite: Pre-Algebra

Sophomore Algebra is the second course in a two-year sequence (Pre-Algebra and Sophomore Algebra). This course is a basic Algebra 1 course for those students who have successfully completed Pre-Algebra. It continues the study of variables, equations, functions, and graphing started in Pre-Algebra.

Algebra 2-10
Length: Two semesters
One Period
Credit: 1 credit
Grade: 10

Prerequisite: Algebra 1

Algebra 2 is designed to be a comprehensive second year course in algebra. Topics covered include linear and quadratic equations, systems of equations, matrices and determinants, functions (linear, quadratic, inverse, exponential, logarithmic, polynomial and rational), powers, roots, radicals, and quadratic relations.

Geometry
Length: Two semesters
One period
Credit: 1 credit
Grade: 10

Prerequisite: Algebra 2 (Fr)

Geometry offers an enriched treatment of the topics of plane geometry. Emphasis is placed on an axiomatic development of plane and solid geometry as an integrated course, with particular attention to the meaning and application of deductive reasoning. Coordinate geometry is introduced and applied in geometric proofs.

Accelerated Geometry and Trigonometry

Length: Two semesters
One period

Credit: 1 credit

Grade: 10

Prerequisite: Accelerated Algebra 2
(C or better)

Accelerated Geometry and Trigonometry is a continuation of the program for students with superior ability in mathematics. The course offers an introduction to logic, an integrated treatment of plane and solid geometry, an introduction to convexity and transformations, and the development of trigonometry. It encourages original thinking by providing an atmosphere of challenge and creativity.

Plane Geometry

Length: Two semesters
One period

Credit: 1 credit

Grade: 10,11

Prerequisite: Sophomore Algebra/
Algebra I Extended

Plane Geometry is a course designed to take a thematic approach to geometry. Emphasis is placed on understanding and applying the basic properties and relationships of points, lines, angles, triangles, quadrilaterals, circles, transformations and solid figures, with numerical problems that integrate arithmetic, algebra, and geometry. The process of applying logic and deductive reasoning is studied.

JUNIOR COURSES

Geometry and Trigonometry

Length: Two semesters
One period

Credit: 1 credit

Grade: 11, 12

East only

Prerequisite: Algebra 2-10 or
equivalent (B or better)

Geometry and Trigonometry continues the development of mathematics introduced in Algebra 1 and Algebra 2-10. Geometric concepts and proofs are introduced early and receive continued attention for much of the year. Heavy emphasis is placed on all phases of trigonometry: trigonometric functions, their inverses, and graphs, along with applications. Practice in the fundamental skills of algebra, geometry, and trigonometry is provided while additional topics are introduced and practiced. Problem solving is an important part of this course.

Accelerated Math Analysis

Length: Two semesters
One period

Credit: 1 credit

Grade: 11

Prerequisite: Accelerated Alg II and
Accelerated Geo/Trig

Accelerated Math Analysis is the third course in a sequence designed for students with exceptional ability and interest in mathematics. Successful completion of this course will prepare students for the study of Advanced Placement Calculus the following year. Topics covered include functions (polynomial, rational, exponential, logarithmic, trigonometric, and inverse), analytic trigonometry, systems of equations and inequalities, sequences and probability, and analytic geometry.

Geometry for Juniors

Length: Two semesters
One period

Credit: 1 credit
Grade: 11

Prerequisite: Algebra 2 – 10 or equivalent

Geometry for Juniors is designed to be a comprehensive course in geometry. The course will offer a more in-depth treatment of the topics in Plane Geometry. Emphasis will not only be placed on understanding and applying basic geometric properties and relationships, but also on the use of deductive reasoning. Algebra will be integrated throughout the course and technology will be regularly incorporated as a tool for investigation.

Algebra 2

Length: Two semesters
One period

Credit: 1 credit
Grade: 11,12

Prerequisite: Plane Geometry

Algebra 2 is designed to be a comprehensive second year course in algebra. Topics covered include linear and quadratic equations, systems of equations, matrices and determinants, functions (linear, quadratic, inverse, exponential, logarithmic, polynomial, and rational), powers, roots, radicals and quadratic relations.

Pre-Calculus

Length: Two semesters
Credit: One period
Grade: 11

Prerequisite: Geometry

Pre-Calculus continues the study of functions, including their graphs, inverses, and applications to problem solving. Functions covered include polynomial, rational, exponential, logarithmic, trigonometric, and a variety of special functions. This course also integrates the concepts of algebra and geometry through the study of analytic geometry. Included are the conic sections, trans-formation of coordinates, parametric equations, vectors, algebraic equations of higher degree, and curve fitting. Students are introduced to the study of calculus.

SENIOR COURSES

Trigonometry

Length: One semester
One period

Credit: $\frac{1}{2}$ credit
Grade: 12

Prerequisite: Algebra 2 or its equivalent

Trigonometry is a course in plane trigonometry, with applications to the solution of triangles and to the rectangular and polar description of points, vectors and complex numbers. Other topics include trigonometric equations, identities, the inverse circular functions and functions of multiple angles.

Probability and Statistics

Length: One semester
One period

Credit: $\frac{1}{2}$ credit

Grade: 12

Prerequisite: Algebra 2

Probability and Statistics is a course designed for students who wish to further their study of mathematics in the understanding and application of statistical techniques. The course is a systematic development of probability theory and how probability methods are applied in statistical investigations. The course begins with such topics as random variables, organization and presentation of data, frequency distributions, calculation of mean and standard deviation, correlation and decision making under uncertainty. This course will establish a foundation for further study in economics, education, the physical sciences, the social sciences, and many other fields.

Calculus AB

Length: Two semesters
One and one-half periods

Credit: 1 credit

Grade: 12

Prerequisite: Pre-Calculus or Geo/Trig
(C or better)

Calculus AB is an integrated course of analytic geometry and differential and integral calculus. Topics include limits and derivatives; differentiation of algebraic and transcendental functions; applications of the derivative in curve sketching, rates of change, extrema and the conic sections; the definite integral as a limit of a sum; anti-derivatives; elementary and advanced integration with application to areas, volumes, work, arc-length and mean values; parametric equations and polar coordinates with applications; numerical methods for approximating definite integrals; and an introduction to vector calculus. A student may earn one semester of college credit by performing satisfactorily on the Advanced Placement examination in May.

College Algebra/Trig

Length: Two semesters
One period

Credit: 1 credit

Grade: 12

Prerequisite: Geo/Trig

College Algebra and Trigonometry is a course designed for students who have already completed study of geometry and a second year course in algebra. Topics include equations, inequalities, functions and their graphs, polynomial functions, rational functions, conics, exponential and logarithmic functions, trigonometry, systems of equations and inequalities, matrices and determinants, and sequences.

Calculus BC

Length: Two semesters
 1½ periods
 Credit: 1 credit
 Grade: 12

Prerequisite: Accelerated Math Analysis

Calculus BC is an expanded version of Calculus AB. It includes all of the topics covered in that course along with parametric, polar and vector functions, Euler's method, L'Hospital's Rule, applications of integrals that model physical, biological or economic situations, additional techniques and applications of antidifferentiation, concept of series, series of constants and Taylor series. A student may earn 2 semesters of college credit by performing satisfactorily on the Advanced Placement examination in May.

ELECTIVE COURSES**Statistics AP**

Length: Two semesters
 One and a half periods
 Credit: 1 credit
 Grade: 11,12

Prerequisite: Accelerated Math Analysis or Pre-Calculus (or concurrently enrolled)

Statistics AP covers the analysis of data, data structures, and statistical inference that is required for college students entering the health fields, business, and humanities. A student may earn college credit by performing satisfactorily on the advanced placement examination in May.

Computer Science 1

Length: One semester
 One period
 Credit: ½ credit
 Grade: 9,10,11,12

Prerequisite: Algebra I

Computer Science I is an introductory course designed to build a strong foundation in the basics of programming. Topics covered will include data types, conditional statements, and control statements.

Computer Science 2

Length: One semester
 One period
 Credit: ½ credit
 Grade: 9,10,11,12

Prerequisite: Computer Science 1

Computer Science 2 covers basic data types, input/output statements, conditional statements, looping, methods, text files, and arrays. This course provides an excellent background for A.P. Computer Science and for most college computer courses.

AP Computer Science A

Length: Two semesters
 One period
 Credit: 1 credit
 Grade: 10,11,12

Prerequisite: Algebra II and department approval

AP Computer Science covers topics included in a full-year introductory college course in computer science. It emphasizes programming methodology (including recursion) and procedural abstraction. Also included is the study of algorithms, algorithmic analysis, data structures (including dynamic data structures), and data abstraction. A student may earn college credit by satisfactory performance on the advanced placement examination in May.