

# MATHEMATICS

*Haverhill High School offers a full array of courses in mathematics and computer programming. Whether a student is planning to attend college or move into the workplace, a sound mathematical background is necessary. All students at Haverhill High School are required to pass three non-elective math courses, including a complete course in Algebra I. Most colleges, universities, and applied technology institutions recommend that students successfully complete 3-4 years of mathematics. Four years of mathematics is highly recommended and often required.*

*Courses in grades 9 and 10 focus on the content, skills, and strategies assessed by the Mathematics MCAS test.*

*The goal of the mathematics department is to have all students achieve mathematical competence through a strong program that emphasizes reasoning, communication skills, problem solving, making connections, and technological literacy. All students are encouraged to purchase a TI 83 or TI 84 graphing calculator for use in their mathematics classes. It is important to know that the use of a graphing calculator is permitted on the MCAS, PSAT, SAT, ACT, and AP exams.*

*The mathematics staff at Haverhill High School is committed to maintaining high standards and encouraging all students to participate in academically challenging courses that will better prepare them for college and 21<sup>st</sup> century careers.*

<b>MCAS MATH PREP 10</b>	<b>CRS H2200</b>	<b>GRADES 10-12</b>	<b>CR½</b>	<b>S2</b>
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This is an elective course for 10<sup>th</sup>, 11<sup>th</sup>, and 12<sup>th</sup> graders who are preparing to take the MCAS Mathematics test. Students taking this course will work on many released MCAS test items and similar items. Instructors will concentrate on topics that will most benefit the students. The objective is to prepare students for the “high stakes” MCAS test by familiarizing them with the types of items, and teaching them strategies for answering MCAS questions. Students will be recommended by their teachers. **Passing students earn graduation credit but no mathematics credit.**

<b>FUNDAMENTALS OF MATHEMATICS</b>	<b>CRS H2201</b>	<b>GRADE 9</b>	<b>CR½</b>	<b>S1</b>
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This is an elective course for 9th graders who have been identified by diagnostic testing in grade 8 and middle school MCAS scores as having significant weaknesses with math concepts. The course is intended to provide support in foundational knowledge and skills for students taking Algebra I. Students taking this course will be working individually and in small groups to fill gaps in mathematics concepts, to prepare for MCAS, and to fully comprehend Algebra I. Larson Learning, a computer-based intervention program, will be used. **Passing students earn graduation credit but no mathematics credit**

<b>ALGEBRA 1 HONORS</b>	<b>CRS H2207</b>	<b>GRADE 9</b>	<b>CR1</b>	<b>Y</b>
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This in-depth and comprehensive course involves the systematic development of the properties of real numbers using modern mathematical concepts. Topics include the study of sets, integers, polynomials, factoring, linear and quadratic equations and inequalities, exponents and radicals, algebraic fractions, graphing of functions and relations, linear systems of equations, data analysis, and word problems. A TI 83 or TI 84 graphing calculator is recommended. *Prerequisites: Grade of C or better in a grade 8 Algebra I course or A- or better in grade 8 mathematics course, **proficient or above** scores on previous years’ standardized testing, and recommendation of mathematics teacher.*

<b>ALGEBRA 1 COLLEGE PREP</b>	<b>CRS H2209</b>	<b>GRADES 9-11</b>	<b>CR1</b>	<b>Y</b>
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This course involves the systematic development of the properties of real numbers using modern mathematical concepts. Topics include the study of sets, integers, polynomials, factoring, linear and quadratic equations and inequalities, exponents, graphing of functions and relations, linear systems of equations, data analysis, and word problems. A TI 83 or TI 84 graphing calculator is recommended. *Prerequisites: Grade of C or better in grade 8 mathematics course, satisfactory scores on previous years’ testing, and recommendation of mathematics teacher.*



**ALGEBRA 2 HONORS ACCELERATED    CRS H2221    GRADE 9    CR1    Y**

This is an Algebra 2 course for 9th-graders. After a brief review of Algebra I concepts, topics covered will include quadratic relations; polynomial, logarithmic and exponential functions; systems involving both linear and quadratic functions, the fundamental theorem of algebra, complex numbers, the binomial theorem, arithmetic and geometric progressions, and applications of these algebraic concepts. The course will be rigorous and involve proving theorems and justifying the steps used in a solution process. A TI 83 or TI 84 graphing calculator is required. *Prerequisites:* Grade of A in Grade 8 Algebra I, very strong performance on a district or standardized end-of-course Algebra I test, and recommendation of previous Algebra I instructor.

**ALGEBRA 2 HONORS FRESHMAN    CRS H2222    GRADE 9    CR1    Y**

This is an Algebra 2 course for 9th-graders. After a brief review of Algebra I concepts, topics covered will include quadratic relations; polynomials; systems involving both linear and quadratic functions, the fundamental theorem of algebra, complex numbers, the binomial theorem, and applications of these algebraic concepts. The course will be rigorous and involve proving theorems and justifying the steps used in a solution process. A TI 83 or TI 84 graphing calculator is required. *Prerequisites:* Grade of B or better in grade 8 Algebra, satisfactory performance on a district or standardized end-of-course Algebra I test, and recommendation of previous Algebra I instructor.

**ALGEBRA 2 HONORS    CRS H2223    GRADES 10-12 CR1    Y**

This course continues a rigorous presentation of the number system properties begun in Algebra 1 Honors. The content covered includes a review of the fundamental concepts of Algebra 1 followed by the study of quadratic relations; polynomial, logarithmic and exponential functions; systems involving both linear and quadratic functions, the fundamental theorem of algebra, complex numbers, the binomial theorem, arithmetic and geometric progressions, and applications of these algebraic concepts. The course will be rigorous and involve proving theorems and justifying the steps used in a solution process. A TI 83 or TI 84 graphing calculator is required. *Prerequisite:* Grade of B or better in both Algebra 1 and Geometry Honors. [NOTE: For enrollment by a sophomore, the recommendation of the freshmen teacher is necessary.]

**ALGEBRA 2 COLLEGE PREP A    CRS H2225    GRADES 10-12 CR1    Y**

This course is a continuation of the study of the number system begun in Algebra 1. The content covered includes a review of the fundamental concepts of Algebra 1 followed by the study of quadratic equations, complex numbers, exponential and logarithmic functions, polynomial functions, the binomial theorem, systems of equations and inequalities, and matrices. A TI 83 or TI 84 graphing calculator is required. *Prerequisites:* Grade of C or better in both Algebra 1 CPA and Geometry CPA, and recommendation of mathematics teacher. [NOTE: For enrollment by a sophomore, the recommendation of the freshmen teacher is necessary.]

**ALGEBRA 2 COLLEGE PREP B    CRS H2226    GRADES 11-12 CR1    Y**

This course is a continuation of Algebra 1 CPB. The content covered includes an extensive review of Algebra 1, including the properties and graphs of linear functions, followed by the study of functions, polynomials, rational expressions, complex numbers and quadratic relations and systems. A TI 83 or TI 84 graphing calculator is recommended. *Prerequisites:* Successful completion of Algebra 1 CPB and Geometry CPB, and recommendation of mathematics teacher.

**MATHEMATICAL DECISION MAKING    CRS H2260    GRADES 12    CR1    Y**

This course is a fourth-year applications-based course designed to prepare students for college majors that are not math intensive, for technical training, or for a range of career options. This course may also be useful to other students as an additional mathematics credit. Topics will include the analysis of information using statistical methods and probability, modeling change and mathematical relationships, mathematical decision making in finance and society, and spatial and geometric modeling. Instructional approaches will also focus on reasoning, communication, and problem solving through a project-based approach. A TI 83 or TI 84 graphing calculator is required. *Prerequisites:* Successful completion of Algebra II and recommendation of mathematics teacher.

**PRE-CALCULUS HONORS ACCELERATED CRS H2227    GRADE 11    CR1    Y**

This is a course in advanced algebra and functional analysis with a graphing approach. Topics covered include mathematical logic, trigonometric, logarithmic and exponential functions and functional analysis. A complete study of circular functions including all topics covered in trigonometry is included along with special topics such as mathematical induction vectors, complex numbers and polar coordinates. A TI 83 or TI 84 graphing calculator is required. *Prerequisite:* Grade of B or better in Algebra 2 Honors Accelerated and Geometry Honors Accelerated and recommendation of mathematics teacher.

**PRE-CALCULUS HONORS CRS H2229 GRADES 11-12 CR1 Y**

This is a course in advanced algebra and functional analysis with a graphing approach. Topics covered include mathematical logic, ordered fields, sequences and series, logarithmic and exponential functions, vectors and analytic geometry. The course topics include a complete study of circular functions, including all topics covered in trigonometry, along with special topics such as mathematical induction and polar coordinates. A TI 83 or TI 84 graphing calculator is required. *Prerequisite: Grade of B or better in Algebra 2 Honors or A in Algebra 2 CPA, and recommendation of mathematics teacher.*

**CALCULUS HONORS CRS H2232 GRADE 12 CR1 Y**

Calculus Honors is a survey course dealing with topics from first and second semesters of a college calculus course. The topics covered include an extensive review of pre-calculus and trigonometry topics, limits, continuity, derivatives and their applications, integrals and their applications. Applications covered include area and volume, optimization problems, and related rate problems. A TI 83 or TI 84 graphing calculator is required. *Prerequisite: Grade of C or better in Pre-Calculus and recommendation of mathematics teacher.*

**CALCULUS AP—AB CRS H2234 GRADE 12 CR1 Y**

This course is an introduction to the fundamentals of differential and integral calculus for students planning to take advanced mathematics courses in college. Topics covered include limits, continuity, derivatives, integrals and their applications as well as all other topics in the College Board's topical guide provided for Calculus AB. Calculus AB is the equivalent of one semester of college calculus with supplementary material designed to strengthen the student's background in advanced algebra and trigonometry. Students in this course are required to take the Calculus AB Advanced Placement exam. A TI 83 or TI 84 graphing calculator is required. *Prerequisites: Grade of B or better in Pre-Calculus Honors Accelerated or A in Pre-Calculus Honors, and recommendation of mathematics teacher.*

**CALCULUS AP—BC CRS H2235 GRADE 12 CR1 Y**

This course is an introduction to the fundamentals of differential and integral calculus for students planning to take advanced mathematics courses in college. Topics covered include limits, continuity, derivatives, integrals and their applications as well as all other topics in the College Board's guide for BC Calculus. Calculus BC is the equivalent of two semesters of college calculus. Students in this course are required to take the Advanced Placement exam for Calculus AB or Calculus BC, based on the teacher's recommendation. A TI 83 or TI 84 graphing calculator is required. *Prerequisite: Grade of B+ or better in Pre-Calculus Honors Accelerated or A+ in Pre-Calculus Honors and recommendation of mathematics teacher.*

**PROBABILITY AND STATISTICS [E] CRS H2237 GRADES 11-12 CR1 Y**

This course will cover topics including random variables, statistical measure of data, and statistical description of data. Computer software (Minitab and Excel) will be used. This course is offered as an elective for college preparatory credit and for a mathematics credit. *Prerequisite: Grade of B or better in Algebra 2 and recommendation of mathematics teacher.*

**STATISTICS AP CRS H2238 GRADE 12 CR1 Y**

This course is equivalent to a college statistics course and covers all the topics in the College Board guide for AP Statistics. Students will be introduced to the major concepts and tools for collecting, analyzing, and drawing conclusions from data. Students are exposed to four broad conceptual themes: describing patterns and departures from patterns, planning and conducting a study, exploring random phenomena using probability, and estimating population parameters and testing hypotheses. Students in this course are required to take the Advanced Placement exam for Statistics. A TI 83 or TI 84 graphing calculator is required. *Prerequisite: Seniors only, with a grade of C or better in Pre-Calculus Honors or Honors Accelerated, or, with the recommendation of the previous mathematics teacher, a grade of B or better in Algebra 2 Honors if this course is taken concurrently with Pre-Calculus or Senior Math and Trigonometry.*

**MATH TEACHER ASSISTANT CRS H2214 GRADES 11-12 CR ½ S**

Assistants are assigned to a mathematics class to work under the direction of a mathematics teacher. Responsibilities may include tutoring, preparing classroom materials, guiding small groups or individuals through math activities, and encouraging students to the understanding that learning math takes time and effort. Positive peer interaction will benefit all students and promote higher motivation and achievement. *Prerequisite: Grade of B or higher in Algebra II and Geometry (or beyond), recommendation of teacher, and approval of mathematics supervisor.*

