Mathematics Department

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Mathematics Graduation Requirement: 4 Years / 20 Credits

Course Title	Level	Course Number	Grade Level	Semester	# of Periods	Credits
STEM Applications M	College Prep	2103	9	All	6	7.5
Math Applications I	Introductory	2102	9	All	4	5
Mathematical Applications II	Introductory	2132	10	All	4	5
Algebra I	Honors	2114	9	All	4	5
Algebra I	College Prep	2113	9-10	All	4	5
Continuing Algebra I / Geometry	Honors	2124	9	All	4	5
Continuing Geometry / Algebra II	Honors	2224	10	All	4	5
Continuing Algebra II	Honors	2324	11	All	4	5
Geometry	High Honors	2205	9	All	4	5
Geometry	Honors	2204	9-10	All	4	5
Geometry	College Prep	2203	10-11	All	4	5
Math Lab	College Prep	2063	9-11	All	2	2.5
Algebra II	High Honors	2305	10	All	4	5
Algebra II	Honors	2304	10-11	All	4	5
Algebra II	College Prep	2303	11-12	All	4	5
Statistics and Probability	Honors	2414	12	All	4	5
Pre-Calculus	High Honors	2405	11	All	4	5
Pre-Calculus	Honors	2404	11-12	All	4	5
Personal Finance	College Prep	2313	12	All	4	5
Personal Finance	Honors	2314	12	All	4	5
Calculus	Honors	2504	12	All	4	5
AP Calculus AB	Advanced Placement	2505	12	All	4	5

AP Calculus BC	Advanced Placement	2515	12	All	4	5
Drafting Technology I	College Prep	6113	9-12	All	4	5
Drafting Technology II	College Prep	6123	10-12	All	4	5
Drafting Technology III	College Prep	6133	11-12	All	4	5

Grade 8 to Grade 9 Transition Rubric

If you have questions, please contact your child's 8th grade teacher and/or the Math Program Administrator. The Grade 8 teacher recommendation in determining a student's Grade 9 math course is made using the following guidelines:

Grade 8: Algebra Math Performance

Grade 9 Course	Mid-Year Grade	Content Recall Test	Diagnostic Test
Geometry High Honors	94%	90%	90th Percentile
Geometry Honors	87%	80%	80th Percentile
Continuing Algebra/Geometry Honors	80%	70%	70th Percentile
Algebra I Honors	60%	60%	40th Percentile

Grade 8: Pre-Algebra Performance

Grade 9 Course	Mid-Year Grade	Content Recall Test	Diagnostic Test
Algebra I Honors	85%	85%	40th Percentile
Algebra I College Prep	70%	70%	10th Percentile
Mathematical Applications I Introductory	Teacher Recommendation		

Typical Sequence of Mathematics Courses

Grade 9	Grade 10	Grade 11	Grade 12
Mathematical Applications I Introductory or STEM Applications	Algebra I College Prep	Geometry College Prep	Algebra II College Prep, Personal Finance College Prep, Drafting II College Prep
Algebra I College Prep or Honors	Geometry College Prep or Honors	Algebra II College Prep or Honors	Personal Finance College Prep or Honors Pre-Calculus Honors, Statistics
Continuing Algebra/Geometry Honors	Continuing Geometry/Algebra II Honors	Continuing Algebra II/Pre-Calculus Honors	Calculus Honors Personal Finance Honors, Statistics
Geometry Honors or High Honors	Algebra II Honors or High Honors	Pre-Calculus Honors or High Honors	Statistics Calculus Honors AP Calculus AB AP Calculus BC

MATHEMATICAL APPLICATIONS I Introductory Course # 2102
Prerequisite: By recommendation only
This course is designed to help students develop a stronger number sense while exposing students to Massachusetts Common Core Standards. Topics will include selected algebra and geometry concepts such as manipulating irrational numbers, evaluating exponents, solving and graphing linear equations, geometric transformations, and using the Pythagorean theorem. Students from this course may be recommended for Mathematical Applications II or Algebra I.

STEM Applications M College Prep Course #2103
Credits: 7.5 (5 Math, 2.5 Science)
Prerequisites: Teacher Recommendation. Must be enrolled concurrently in the science section
STEM Applications will develop the science and math skills to prepare students for studying math and science topics in the future. This course is designed to help students build a stronger number sense and cultivate the science and engineering practices that are part of the Massachusetts Common Core and Science and Engineering Standards. The course will include algebra and geometry concepts by applying them within the context of experimental design, data collection and analysis, math and science practices, science inquiry, and modeling. ***Students taking this course in grade 9 will take the MCAS exam in grade 10.***

MATHEMATICAL APPLICATIONS II Introductory Course # 2132
This course is a continuation of Mathematical Applications I and will further expose students to Massachusetts Common Core Standards. Topics will include line of best fit, manipulating irrational numbers, solving and graphing systems of linear equations, working with similar and congruent polygons, working with inequalities, the distance between two points, and volume of 3-dimensional shapes. Throughout the year student learning will be enhanced and reinforced through the use of calculators.

ALGEBRA I **Honors** **Course # 2114**

Prerequisite: Fulfills the requirements outlined in the Transition Rubric and Teacher Recommendation

The content of this course includes the study of integers, rational numbers, equations and inequalities, exponents and polynomials, factoring, systems of equations, inequalities and absolute values, rational expressions and equations, radical expressions and equations, relations and functions, and quadratic equations. Students are introduced to problem solving strategies and applications of algebra to real-world problems.

ALGEBRA I **College Prep** **Course # 2113**

Prerequisite: Fulfills the requirements outlined in the Transition Rubric and Teacher Recommendation

The content of this course includes the study of integers, rational numbers, equations and inequalities, exponents and polynomials, factoring, systems of equations, inequalities, and absolute values, rational expressions and equations, radical expressions and equations, and relations, functions and graphs. Students are introduced to problem solving strategies and applications of algebra to real-world problems.

CONTINUING ALGEBRA I / GEOMETRY / ALGEBRA II SEQUENCE

This three-year sequence of courses covers the second half of Algebra I, a full course in Geometry, and an enriched Algebra II course including Pre-Calculus [including trigonometry]. Students beginning this sequence are expected to take it for three years, unless placement in another course becomes appropriate. By the end if the sequence, students are prepared to take our Calculus Honors class. Summer work will be needed after junior year to accelerate to AP Calculus AB.

CONTINUING ALGEBRA I/
INTRO TO GEOMETRY **Honors** **Course # 2124**

Prerequisite: Fulfills the requirements outlined in the Transition Rubric and Teacher Recommendation

This two-semester course covers the second semester of Algebra I and the first semester of Geometry. The course begins with a review of concepts covered in the grade 8 Algebra curriculum, including: number properties, ratios and proportions, solving, graphing, and writing linear equations and linear inequalities, and solving systems of linear equations. Following this review, students will be introduced to powers and exponents, quadratic equations, polynomials and factoring, proportions, functions and radicals. The second semester of this course covers the first half of a full year Geometry course, including: the introduction of key concepts using points, lines and planes, deductive reasoning and proofs, congruent triangles and properties of triangles and polygons.

CONTINUING GEOMETRY/
ALGEBRA II **Honors** **Course # 2124**

Prerequisite: Teacher recommendation

The first semester of this two semester course begins with a review of concepts covered in the second semester of the Continuing Algebra/Introduction to Geometry course. Following this review, students will be introduced to ratio and proportions, similar polygons, properties of right triangles, circles, area of plane figures, and areas and volumes of solids. The second semester of this course resumes the study of Algebra, beginning with a review and enrichment of algebraic concepts covered in the Continuing Algebra/Introduction to Geometry course, including: linear equations, systems of linear equations and inequalities, and quadratic equations. The remainder of the semester will focus on: linear programming, solving systems of linear equations in three variables, quadratic equations and parabolas, and relations and functions. If time allows, matrices and determinants will be introduced.

CONTINUING ALGEBRA II/
PRE-CALCULUS **Honors** **Course # 232**

Prerequisite: Teacher recommendation

This course is the third course in the Continuing sequence. It begins with a review of topics covered in the Introduction to Algebra II portion of the previous course, including quadratic equations, relations, and functions. Following the review, students explore powers, roots, and radicals, exponential and logarithmic functions, polynomials and polynomial functions, rational functions, conic sections, sequences and series. Students will conclude the year with a study of trigonometry including right triangle trigonometry, inverse trig functions, Law of Sines and Cosines, graphing and identities.[l2]

GEOMETRY **High Honors** **Course # 2205**

Prerequisites: Fulfills the requirements outlined in the Transition Rubric and Teacher Recommendation

Aligned to the Common Core State Standards, our Geometry course covers the fundamentals of Geometry, constructions, transformations, congruence, similarity, right triangle trigonometry, circles, geometric measurement and dimension, and coordinate Geometry. Proofs of theorems is embedded in each unit.

GEOMETRY **Honors** **Course # 2204**

High School Prerequisites: Teacher Recommendation
Middle School to High School Prerequisites: The student fulfills the requirements outlined in Transition Rubric and Teacher Recommendation.

Aligned to the Common Core State Standards, our Geometry course covers the fundamentals of Geometry, constructions, transformations, congruence, similarity, right triangle trigonometry, circles, geometric measurement and dimension, and coordinate Geometry. Proofs of theorems is embedded in each unit.

GEOMETRY **College Prep** **Course # 2203**

Prerequisite: Teacher recommendation

Aligned to the Common Core State Standards, our Geometry course covers the fundamentals of Geometry, constructions, transformations, congruence, similarity, right triangle trigonometry, circles, geometric measurement and dimension, and coordinate Geometry. Proofs of theorems is embedded in each unit. Greater emphasis is placed on applications of properties than on proofs; however, students are expected to develop a basic understanding of the deductive reasoning that supports a given conjecture.

ALGEBRA II **High Honors** **Course # 2305**

Prerequisite: Teacher recommendation

Functions are the lens through which all work in Algebra II is done. The course begins with a review of linear functions and systems of equations and continues with in-depth work with polynomial functions, especially quadratics, rational functions, radical functions, and logarithmic and exponential functions. Statistics and probability is reviewed from past courses. Conic sections and/or sequences and series are also covered if time allows. Algebra II is aligned to the Common Core State Standards.

ALGEBRA II **Honors** **Course # 2304**

Prerequisite: Teacher recommendation

Functions are the lens through which all work in Algebra II is done. The course begins with a review of linear functions and systems of equations and continues with in-depth work with polynomial functions, especially quadratics, rational functions, radical functions, and logarithmic and exponential functions. Statistics and probability is reviewed from past courses. Algebra II is aligned to the Common Core State Standards.

ALGEBRA II **College Prep** **Course # 2303**

Prerequisite: Teacher recommendation

Functions are the lens through which all work in Algebra II is done. The course begins with a review of linear functions and systems of equations and continues with in-depth work with polynomial functions, especially

quadratics, rational functions, radical functions, and logarithmic and exponential functions. Statistics and probability is reviewed from past courses. Algebra II is aligned to the Common Core State Standards.

Math Lab **College Prep** **Course # 2063**

Prerequisite: Teacher recommendation only.

This course provides students with math support, especially those with gaps in their prior math knowledge and in need of remediation. This minor course is intended for students in Geometry, Algebra II or Pre-Calculus and is by teacher recommendation only. Progress monitoring will be ongoing and students may place out of Math Lab if the support is no longer necessary. Grades are on a pass/fail basis.

PRE-CALCULUS **High Honors** **Course # 2405**

Prerequisite: Teacher recommendation

This course begins with a brief review and enrichment of previously learned concepts involving functions, graphs, and applications, followed by a study of trigonometric concepts. Topics include linear and quadratic functions, polynomial functions, inequalities, exponents and logarithms, and analytic geometry, trigonometric functions, trigonometric equations and applications, triangle trigonometry, trigonometric addition formulas, polar coordinates and complex numbers, sequences and series, limits, properties of limits, techniques for evaluating limits, infinite limits, and continuity. The course also introduces student to the concept of a derivative, a derivative at a point, first and second derivatives of functions, applications, and computations of derivatives. Students are expected to complete a major research project.

PRE-CALCULUS **Honors** **Course # 2404**

Prerequisite: Teacher recommendation

This course begins with a study of functions, exponentials and logarithms, and conic sections. The second part of the year is focused on trigonometry. Topics include linear and quadratic functions, polynomial functions, inequalities, exponents and logarithms, and analytic geometry, trigonometric functions, trigonometric equations and applications, triangle trigonometry, trigonometric addition formulas, and sequences and series.

STATISTICS AND PROBABILITY **Honors** **Course # 2414**

This course will provide students with a student-centered resource of to investigate statistical concepts. Emphasis is on active learning, conceptual understanding, use of genuine real-world data, and technology integration including the TI-84 graphing calculator and spreadsheets. Topics of study will include: data analysis and pattern study, measures of central tendency, variation, confidence intervals and significance tests, the normal distribution, planning and conducting a survey, hypothesis testing, accessing the validity and margin of error of polls, and probability.

CALCULUS **Honors** **Course # 2504**

Prerequisite: Teacher recommendation

This course will prepare students for a first semester college Calculus course. The course begins with a thorough review of families of functions and trigonometry. Following the review, students investigate limits and continuity, and then begin a comprehensive study of the concept of a derivative, a derivative at a point, first and second derivatives of functions, applications, and computations of derivatives. Time permitting, students will then explore concepts involving integrals.

A.P. CALCULUS AB **Advanced Placement** **Course # 2505**

Prerequisite: Teacher recommendation

This course covers the AB syllabus of the Advanced Placement curriculum, beginning with a brief review of families of functions, graphs, and limits. Following this review, students are introduced to the concept of a derivative, a derivative at a point, first and second derivatives of functions, applications, and computations of derivatives. Following the study of derivatives, students explore concepts involving integrals, including Riemann sums, interpretation of properties of definite integrals, elementary and advanced applications of

integrals, the Fundamental Theorems of Calculus techniques of anti-differentiation, applications of anti-differentiation, and numerical approximations of definite integrals,

A.P. CALCULUS BC **Advanced Placement** **Course # 2515**

Prerequisite: Teacher recommendation

This course covers the BC syllabus of the Advanced Placement curriculum, beginning with a brief review of families of functions, graphs, and limits. Following this review, students are introduced to the concept of a derivative, a derivative at a point, first and second derivatives of functions, applications, and computations of derivatives. Following the study of derivatives, students explore concepts involving integrals, including Reimann sums, interpretation of properties of definite integrals, elementary and advanced applications of integrals, the Fundamental Theorems of Calculus techniques of anti-differentiation, applications of anti-differentiation, and numerical approximations of definite integrals. The remainder of the course covers advanced topics involving integration techniques, L'Hopital's Rule, improper integrals, sequences and series, including Taylor polynomials, Taylor series, geometric series, parametric and polar forms and vector valued functions.

PERSONAL FINANCE **College Prep** **Course # 2313**
Honors **Course # 2314**

Through a series of simulations, projects, and teamwork activities, students will prepare for their personal lives while becoming economically responsible. Areas of study will include: fundamental economics concepts, personal financial planning; financial pitfalls, budgeting, income, and money management (checking, savings, money market accounts, etc); spending, mortgages, student loans, credit and debt management; asset/insurance protection; financial statements; payroll; retirement planning; taxation; consumer practices and purchases: rights, responsibilities, and decision making processes. In each unit of the course, math skills will be emphasized and students will learn the value of applied mathematics. Course is open to 12th Graders. Course is only open to eleventh graders, who are taking Personal Finance concurrent with another mathematics course.

DRAFTING TECHNOLOGY COURSES IN THE MATHEMATICS DEPARTMENT

DRAFTING TECHNOLOGY I (Major) **College Prep** **Course #6113**

Prerequisite: None

DRAFTING TECHNOLOGY II (Major) **College Prep** **Course #6123**

Drafting Technology **majors** can be counted as one of the four (4) years of mathematics required for graduation

Prerequisite: Drafting Technology I (#6113 or #6103)

DRAFTING TECHNOLOGY III (Major) **College Prep** **Course #6133**

Drafting Technology **majors** can be counted as one of the four (4) years of mathematics required for graduation

Prerequisite: Drafting Technology I and II

See course descriptions in Technology Education section.