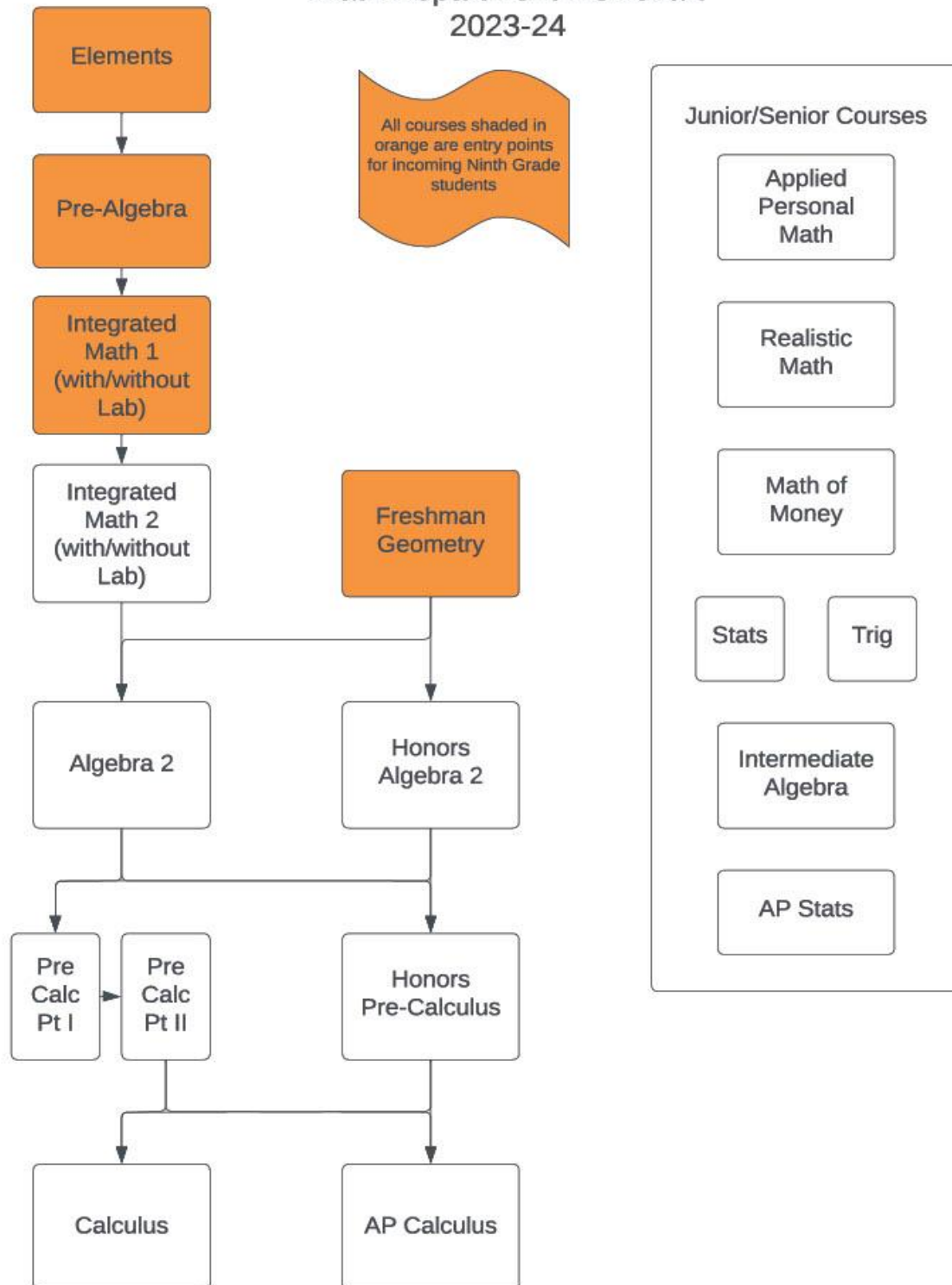


MATHEMATICS

Math Department Flowchart 2023-24



The BHS Mathematics Program offers all students a preparation in the knowledge and skills necessary for competence in mathematics, as well as preparation for further training and study. All courses in mathematics aim to increase understanding of the basic concepts in mathematics. Attention is given to providing a deeper knowledge of our number system, experience with quantitative reasoning, study of the nature of proof and of the techniques of critical thinking, and knowledge of the contributions mathematics has made and is making to the progress of civilization. An appreciation and enjoyment of mathematics as a way of thinking is sought.

BHS Graduation Requirement

The Burlington High School graduate uses a variety of mathematical methods and appropriate technology to solve problems and functions confidently in a mathematically sophisticated world.

To achieve the graduation requirement, a student must meet the following department graduation proficiencies:

- *Communicate their mathematics knowledge using appropriate vocabulary, proper context, and correct units when answering questions.*
- *Solve questions using different methods utilizing multiple formulas and/or math tools.*
- *Connect math concepts to real-world situations.*

GENERAL COURSE INFORMATION

Ninth Graders have these points of entry in Mathematics: Elements of Math, Pre-Algebra, Integrated Math 1, or Freshman Geometry.

One of the three recommended credits for graduation is Integrated Math 1 (either with or without lab).

Students who take Mathematics of Money must be Seniors who have a knowledge of functions (from a previous Integrated Math 1 course or an Algebra course). College-bound students generally should complete at least Integrated Math 2 and Algebra II.

Students wishing to transfer into Honors courses should have an A average in their previous math course and complete a summer packet of preparatory work supplied by the Honors teacher.

Upon teacher recommendation, some students may double up with math courses in order to progress more quickly through the sequence of classes.

Some students may also complete math requirements through VTVLC, EL, Instructional Services, and technical center classes.

COURSE OFFERINGS

52159

Foundations of Mathematics

1.0 Credit (Mathematics)

Grades 9-12

Foundations of Math is a year-long, co-taught course designed to introduce students to important concepts in numeracy, basic operations, financial literacy, operation of rational numbers, percentages, decimals, problem-solving, budgeting, measurements, units, and proportional reasoning. These concepts will enable students to engage with and answer the course essential question: *How can we integrate transition skills with real-life math to make these concepts more accessible to all our emerging mathematicians?* In addition to exploring the essential question, students will develop and practice basic math skills that will enable them to be successful learners both inside and outside of the classroom.

Prerequisites: Special Educator referral required.

Primary Graduate Expectations: Critical Thinking and Problem Solving; Curiosity and Creativity; Effective Communication; Personal Development.

52402

Elements of Mathematics

1.0 Credits (Math)

Grades 9-10

This is a foundation course designed to improve arithmetic skills for students who are still mastering the cornerstones of math. Students in this course meet every day for half a block and cover the Elements curriculum Semester 1, and if the pace of the course allows, Pre-Algebra curriculum Semester 2. Topics include the four basic operations, factoring, fractions and percentages, working with variables, solving equations, proportion and probability problems, and work with measurement in geometric problems. Proficiency in this course will provide the student the prerequisites to go on to study Pre-Algebra. Students enrolled in Elements of Mathematics may also be concurrently enrolled in Math Intervention.

Prerequisite: Middle school teacher recommendation

Primary Graduate Expectations: Critical Thinking & Problem Solving

52405

Pre-Algebra

1.0 Credit (Math)

Grades 9-11

This course is designed for students who have a basic understanding of arithmetic and want to enhance their mathematics skills. It is designed to give students the foundation of understanding mathematics at a moderate pace. Topics will include an extensive arithmetic review, working with variables, solving equations, proportions and probability problems. Essential material will be covered to prepare the students for Integrated Math 1.

Prerequisite: Middle school teacher recommendation or successful completion of Elements

Primary Graduate Expectations: Critical Thinking & Problem Solving.

52441

Integrated Math 1

1.0 Credit (Math)

Grades 9-10

This course is designed to give students a firm foundation in secondary mathematics. The concepts and topics that are covered include

- Solving linear equations and inequalities (compound Inequalities).

- Intro to functions (domain and range).

- Linear functions (graphing, writing, modeling, regression).

- Systems of linear equations and inequalities, modeling.

- Properties of exponents.

- Similarity, ratios, proportions

- Right triangles (slope)

- Supplementary/Complementary angles

- Parallel and perpendicular lines

- Coordinate plane rigid congruence

Technology will include the use of eMathInstruction, Khan Academy, and student chromebooks. The online graphing tool Desmos will be incorporated into this course to help students effectively work with data.

Prerequisite: Middle school teacher recommendation or C (or better) grade in Pre-Algebra

Primary Graduate Expectations: Critical Thinking & Problem Solving.

52440

Integrated Math 1 Lab

0.5 Credit (Elective)

Grades 9-10

This course is designed to provide support for students in the Integrated Math 1 course. Typical routines could include pre-teaching content, support with current IM1 content, and strengthening prerequisite skills required for success in Integrated Math 1.

Prerequisite: Middle school teacher recommendation or grade below B in Pre-Algebra

Primary Graduate Expectations: Critical Thinking & Problem Solving.

52443

Integrated Math 2

1.0 Credit (Math)

Grades 10-11

This course is designed to give students a firm foundation in secondary mathematics. The concepts and topics that are covered include

- Solving and graphing quadratic equations (Pythagorean Theorem)

- Polynomials

- Factoring quadratic and polynomial equations.

- Quadratic functions (graphing, writing, modeling, regression)

- Exponential functions (growth and decay), modeling with financial math.

- Area, surface area, volume

- Right triangle Trigonometry

- Intro to Statistics

Technology will include the use of eMathInstruction, Khan Academy and student chromebooks. The online graphing tool Desmos will be incorporated into this course to help students effectively work with data.

Prerequisite: C (or better) grade in Integrated Math 1

Primary Graduate Expectations: Critical Thinking & Problem Solving.

52442

Integrated Math 2 Lab

0.5 Credit (Elective)

Grades 10-11

This course is designed to support students in their Integrated Math 2 course. Typical routines could include pre-teaching content, support with current IM2 content, and strengthening prerequisite skills required for success in Integrated Math 2.

Prerequisite: Teacher recommendation and/or grade less than B- in Integrated Math 1

Primary Graduate Expectations: Critical Thinking & Problem Solving.

524081

Freshman Geometry

1.0 Credit (Math)

Grade 9

This course is designed for the motivated math student with an above average interest in mathematics. Geometry is the study of the properties and relationships of angles, triangles, polygons, and circles. This course focuses on intuitive discovery, constructions, simple proofs, and spatial reasoning through applications of area and volume. Areas of emphasis include logical deductive reasoning, solid and coordinate geometry, transformations, and trigonometry. Knowledge and use of Algebra skills will be required.

Prerequisite: Middle school teacher recommendation

Primary Graduate Expectations: Critical Thinking & Problem Solving; Effective Communication.

52410

Algebra II

1.0 Credit (Math)

Grades 10-12

Algebra II is one of the most useful and necessary courses for future work in math, science, and other applied fields of study. Students will study quadratic and higher degree polynomial functions, as well as exponential and logarithmic functions and their application in the real world. A graphing calculator will be used proficiently by students throughout the year.

Prerequisite: C (or better) in Integrated Math 2 and teacher recommendation or completion of Freshman Geometry; 9th graders by permission of instructor.

Primary Graduate Expectations: Critical Thinking & Problem Solving.

52411

Honors Algebra II

1.0 Credit (Math)

Grades 10-11

This course is for students prepared to work at an accelerated pace. Students will study polynomial and rational functions, polynomial and rational inequalities, the real and complex number systems. The graphing calculator (TI-84) will be used to supplement instruction throughout the year, as well as web based calculators such as Desmos. It is expected that each student will have a graphing calculator (TI-84) and iPad/Chromebook to use.

Prerequisite: Grade of B+ (or better) in Freshman Geometry AND teacher recommendation

Primary Graduate Expectations: Critical Thinking & Problem Solving.

524121

Pre-Calculus Part I

(Fall only)

0.5 Credit (Math)

Grades 11-12

This course is designed for students who plan to study higher level math or science in their academic futures. Part I of this course focuses on trigonometry, specifically the six trigonometric functions and how they are applied with right triangles, oblique triangles, and how their graphs compare when translated. Students will prove various trigonometric identities, solve trigonometric equations, and utilize the Laws of Sine and Cosine to apply these calculations to real life situations. Each student is required to have a TI-83 or TI-84 graphing calculator. Any student that cannot acquire a calculator may be able to sign one out from the classroom for the duration of the school year.

Prerequisite: Grade of B+ (or better) in Algebra II and teacher recommendation or C (or better) in Honors Algebra II and teacher recommendation.

Primary Graduate Expectations: Critical Thinking & Problem Solving; Effective Communication

524122

Pre-Calculus Part II

(Spring only)

0.5 Credit (Math)

Grades 11-12

The students in this course must have already successfully completed Pre-Calculus Part I. This course is an in-depth review of polynomial, rational, exponential, and logarithmic functions, as well as an introduction to sequences and series. Each student is required to have a TI-83 or TI-84 graphing calculator. Any student that cannot acquire a calculator may be able to sign one out from the classroom for the duration of the school year.

Prerequisite: Grade of C (or better) in Pre-Calculus Part I and teacher recommendation.

Primary Graduate Expectations: Critical Thinking & Problem Solving; Effective Communication

52413

Honors Pre-Calculus

1.0 Credit (Math)

Grades 10-11

This is an accelerated course designed for motivated math students with an above average interest in mathematics. The course will cover topics such as exponential and logarithmic functions, trigonometric functions, analytic trigonometry, applications of trigonometric functions, polar coordinates, analytic geometry (conic sections), sequences and series, binomial theorem, counting and probability, and the idea of limits. Students will be provided with graphing calculators to use in class.

Prerequisite: Grade of B+ (or better) in Honors Algebra II or A- (or better) in Algebra II and teacher recommendation

Primary Graduate Expectations: Critical Thinking & Problem Solving; Curiosity & Creativity.

52414

Calculus

1.0 Credit (Math)

Grade 12

This is an advanced (but non-AP) course for mostly seniors who plan to study mathematics or a social sciences-related field in college. This course offers much of the topics covered in college introductory calculus, with less focus on proofs and theorems. Thus, most of our attention will be devoted to authentic application of concepts. The first part of the course covers the concepts of limits, continuity, differentiability and derivatives of a variety of functions as well as application of derivatives to optimization problems and related rates. During the second part of the

course, students learn various techniques of integration and their applications. Each student will be required to have a graphing calculator (TI-84) to use. Any student that cannot acquire a calculator may be able to sign one out from the classroom for the duration of the school year. Students who are in this class do not prepare for the Advanced Placement Exam.

Prerequisite: Minimum of Final Grade of C in Honors Pre-Calculus or B in both Pre-Calculus Parts I and II

Primary Graduate Expectations: Critical Thinking & Problem Solving; Curiosity & Creativity.

52415

AP Calculus AB

1.0 Credit (Math)

Grade 11-12

Calculus is a valuable course for students who eventually want to major in mathematics, science, engineering, or computer science. During the first part of the course, students will study limits, continuity, and derivatives and differentials of algebraic and transcendental functions. Then students apply the derivative to sketching and to problems in related rates, maxima and minima, and curvature. During the second part of the course, students learn various techniques and applications of integration. Students are required to take the Advanced Placement Examination in Calculus (Calculus AB) which is given in May of each year. Each student will be required to have a graphing calculator (TI 83 Plus or TI 84) to use. Any student that cannot acquire a calculator may be able to sign one out from the classroom for the duration of the school year. Students are required to take the Advanced Placement Examination in May.

Prerequisite: Final Grade of B or higher in Honors Pre-Calculus and recommendation, or final grade of A or higher in Pre-Calculus Parts I and II and teacher recommendation.

Primary Graduate Expectations: Critical Thinking & Problem Solving, Curiosity & Creativity.

JUNIOR/SENIOR ELECTIVES

52407

Applied Personal Mathematics

1.0 Credit (Math)

Grades 11-12

This course integrates the review of basic math skills with practical knowledge students need to become informed financial decision-makers. Areas covered will include calculating wages, taxes, banking services, credit card buying, housing and automobile purchases.

Prerequisite: The student must have two math credits and Junior or Senior standing.

Primary Graduate Expectations: Critical Thinking & Problem Solving; Personal Development.

Realistic Mathematics & Applications of Algebra

1.0 Credit (Math)

Grades 11-12

Have you ever wondered how mathematics is relevant to your life? Are you curious about the ways mathematics plays a role in our larger society? If so, this course is for you. In Realistic Math and Applications of Algebra, students will learn to apply mathematics to their daily lives. We will gather authentic data and utilize numerical, graphical, and algebraic methods to illuminate basic algebra concepts. We will cover special topics from statistics, probability, linear, quadratic, exponential, and logarithmic functions in our quest to answer relevant questions such as:

- 1) How much do speeding tickets cost in different New England states? What are the financial and social implications of accumulating several speeding tickets?
- 2) Are car insurance premiums fair? Who pays the cheapest insurance premium and why?
- 3) Can you afford any type of loan? Who gets a loan?

Prerequisite: Students must have at least one credit of mathematics and be recommended by the previous math teacher

Primary Graduate Expectation: Personal Development, Effective Communication, Critical Thinking and Problem Solving, Cultural Understanding and Civic Engagement, and Curiosity and Creativity

52421

Mathematics of Money

1.0 Credit (Math)

Grade 12

This course will cover mathematics material with an emphasis on money and finances. This is an applications-based learning approach that will include the stock market, modeling a business, banking services, credit cards, mortgages and loans. We will also explore automobile and home ownership, while including household budgeting. Also included will be a look at employment basics, commissions, benefits, Social Security, looking into retirement planning. The course includes a strong review of basic algebra formulas with variables, equations, functions, systems of equations, graphs and statistics. Selected advanced mathematics topics such as, piecewise functions, regression limits, exponential functions, and linear/quadratic systems are also addressed. Much of the daily computations will be spreadsheet and/or Desmos based. Students will learn how to program complex financial formulas and results. Proficiency is based on daily attitude, participation, quizzes, questions, tests, presentations, and projects.

Prerequisite: 12th grade standing and knowledge of functions.

Primary Graduate Expectations: Critical thinking and problem solving; Effective Communication; Personal Development.

524161

Trigonometry

(Fall only)

0.5 Credit (Math)

Grade 12

This course is designed for those students who have successfully completed Algebra II and want to continue studying mathematics at a slower pace than Pre-Calculus. Students will review special right triangles and learn the definitions of the three primary trigonometric functions, their graphs, and their applications. Students will explore properties of the trigonometric using TI-84 graphing calculators and the online tool Desmos.

Prerequisite: Completion of Algebra II, 12th grade standing

Primary Graduate Expectations: Critical Thinking and Problem Solving; Effective Communication.

524162

Statistics

(Spring only)

0.5 Credit (Math)

Grade 12

This course is designed for those students who have successfully completed Algebra II and want to continue studying mathematics at a slower pace than AP Statistics.

Students will focus on statistical concepts such as displaying quantitative data, basic probability, confidence intervals and hypothesis testing.

Prerequisite: Completion of Algebra II, 12th grade standing

Primary Graduate Expectations: Critical Thinking and Problem Solving; Effective Communication.

52424

Intermediate Algebra (offered both Fall and Spring semesters)

1.0 Credit (Math) and possible 3 Credits for CCV

Grades 11-12

This one semester, fast-paced course provides an in-depth study of algebra skills including algebraic laws, polynomials, exponents, linear equalities and inequalities, factoring, functions, set notation, graphing in the Cartesian Coordinate system, and applications. Course objectives include: solving and graphing linear equations and inequalities; solving equations and inequalities involving absolute values; given information about a line, such as a slope and an intercept, find its equation; use of proper set notation for solution sets; solving systems of linear equations and inequalities of two variables by graphing and using algebraic methods; performing all operations using polynomials and rational expressions; factoring polynomials such as quadratic trinomials, quadratic binomials (special cases of trinomial factoring), higher order trinomials of the quadratic form, and cubic polynomials; applying properties of exponents (including positive, negative, and fractional exponents) and radicals; defining and graphing functions including absolute value, quadratic, and square root; applying algebraic techniques and models in solving problems that occur in various fields of study; and applying mathematical reasoning to analyze social justice problems in a variety of different contexts and consider whether these approaches are just and equitable.

Students must take a math assessment for placement purposes prior to registration.

Prerequisite: Integrated Math I; Integrated Math II; Math placement test

Primary Graduate Expectations: Critical Thinking & Problem Solving

*This course is eligible for concurrent enrollment with Community College of Vermont for students in grades 11 & 12 using a dual enrollment voucher. Students must apply for CCV and a voucher when seeing CCV credits. All BHS students may take this class for BHS credit even if they are not seeking CCV credit. See Ms. Stein for more information.

52420

AP Statistics

1.0 Credit (Math)

Grade 11- 12

This is an elective class for those juniors or seniors who may be concurrently taking an advanced science class or planning to pursue a college degree in a research field.

Topics include constructing and summarizing single and multiple variable data, creating and conducting surveys and experiments, understanding randomness and probability principles, types of distributions (normal, binomial, geometric, student's t, chi-square), and inference (confidence intervals and hypothesis testing). Multiple software packages and presentation tools will be used and each student will be required to have a TI-84 graphing calculator. Students are required to take the Advanced Placement Examination in May.

Prerequisite: Minimum Final Grade of A- in Algebra II or B in Pre-Calculus and teacher recommendation

Primary Graduate Expectations: Critical Thinking & Problem Solving, Effective Communication.