RHS Mathematics Department

Department Introduction:

Mathematics
The Randolph High School Mathematics program provides instruction fully aligned with the focus, coherence, and rigor of the New Jersey Student Learning Standards. Students are offered multiple paths to meet their learning needs. In all cases instruction is focused on conceptual understanding, procedural skill and fluency, and application of mathematics.

Course Recommendation Process:

Teacher recommendation, classroom performance, and diagnostic assessments are the primary criteria for determining appropriate course levels. When making recommendations for courses, teachers consider the following criteria:

Recommending a move to a different level: At least three of the listed indicators should be present.

Moving Up:

An average of 97 or better
An apparent ease with assignments
An ability to grasp concepts quickly
A capacity for thinking at a deeper level with greater insight
An interest in the subject matter more appropriate to a higher-level student
Success in a skills-based test (Mathematics Only)

Moving Down from Honors to an A-level class:

Averaging a C- or lower
Struggling or seeming overwhelmed by the work
An inability to grasp concepts without additional, separate, individual explanation
Critical thinking and writing skill levels noticeably lower than those of peers
Lack of motivation to meet the challenges of an accelerated course

Moving Down from A level to a B-level class:

Averaging a D or lower
Struggling or seeming overwhelmed by the work
An inability to grasp concepts without additional, separate, individual explanation
Skill level significantly below the average

Please note that students who have an A in a class may simply be appropriately placed and are able to shine at that level. Having an A average alone does not indicate that a student should move to a more advanced level.

Regarding lack of motivation: If students do not submit work, it is difficult to gauge ability level. Although having difficulties completing homework assignments will naturally impact a student's grade, homework is only a portion of the average. Therefore, it stands to reason if a student is appropriately placed, he/she should be able to maintain a C+ average or higher based on tests, submitted assignments, and participation.

Summer Assignments:

Some courses, especially the AP courses, may require a summer assignment. Any assignment will be available either from the teacher prior to leaving school in June or will be available on the school website. These assignments will be communicated to the students who are enrolled in classes with a summer assignment requirement prior to leaving for summer break.

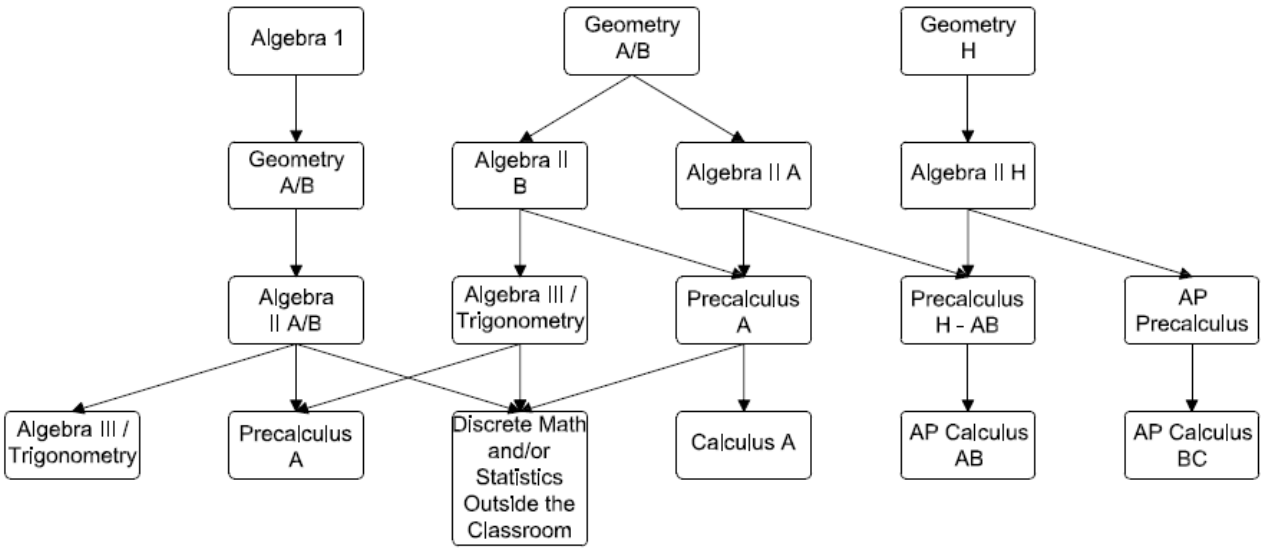
Mathematics

Randolph high school mathematics teachers believe in a student-centered approach. This is evident in our available courses and sequencing and in our classroom practices.

As a school and district, we take pride in our mathematics sequencing. Beginning in middle school, students can customize their mathematics experience based on need and interest. In high school this means students can take core classes from algebra through advanced placement calculus and elective classes in statistics and discrete mathematics. Additionally, with courses at multiple levels and opportunities to take courses concurrently, students can challenge themselves appropriately and progress through A-, Honors-, and AP-level classes.

Our mathematics teachers make every effort to reach students where they are. This is accomplished using various digital tools and formative assessment strategies to capture student work and gauge their understanding of concepts. Additionally, our classrooms are outfitted with ample markerboard space to enhance student collaboration and support mathematical discourse.

Sequencing:



Note: Statistics or AP Statistics electives may be taken by any student after successfully completing Algebra II.

The state of New Jersey requires three years of high school mathematics. In general, students should expect to follow a sequence of Algebra I, Geometry, and Algebra II, followed by either Algebra III/Trig or Precalculus. Most often, students will stay in the same level through the progression of math courses. There are guidelines posted in the introduction regarding reasons that may precipitate a change.

Note: Students who wish to take a 4th year of math but do not wish to pursue a math/science related field should consider Statistics A, Algebra III/Trig, or a combination of Discrete Math and Statistics Outside the Classroom. Those who wish to continue to Calculus or who need to complete an Algebra-based mathematics requirement (college algebra, pre-calculus, etc.) should pursue the more traditional course offerings.

Course Title (Code)	**Grade Level**	**Length**
Algebra I (MAT115)	9	Full Year
Geometry H (MAT200)	9, 10	Full Year
Geometry A (MAT210)	9, 10	Full Year
Geometry B (MAT220)	9, 10	Full Year
Algebra II H (MAT300)	9, 10, 11	Full Year
Algebra II A (MAT310)	10, 11	Full Year
Algebra II B (MAT320)	11	Full Year
AP Precalculus (MAT480)	10, 11	Full Year
Precalculus Honors AB (MAT420)	10, 11, 12	Full Year
Precalculus A (MAT410)	10, 11, 12	Full Year
Algebra III & Trigonometry (MAT330)	11, 12	Full Year
Discrete Math (MAT875)	12	Semester
Statistics Outside the Classroom (MAT885)	12	Semester
Statistics A (MAT840)	11, 12	Full Year
AP Calculus BC (MAT510)	11, 12	Full Year
AP Calculus AB (MAT500)	11, 12	Full Year
Calculus A (MAT440)	11, 12	Full Year
AP Statistics (MAT540)	10, 11, 12	Full Year
Academic Review Math (MAT610)	9	Full Year
SAT Prep Math (MAT865)	10, 11, 12	Semester

+ indicates required course

Courses:

All Randolph High School math courses prepare students for college. In general, students at a higher level are expected to be more independent, more self-disciplined, and more self-motivated. They will explore content matter to a greater depth. The development of positive math attitudes, communication and critical thinking skills, career awareness, and the use of modern technology will be incorporated in the curriculum by infusion into lesson presentations on a regular basis.

Algebra I, Geometry, Algebra II, and Precalculus are offered at several levels, (e.g. Honors, A, and B). (See Course descriptions for specific levels offered). Advanced Placement courses are offered in Calculus, Computer Science, and Statistics. Students are placed in appropriate levels based upon teacher recommendations, classroom performance, and performance on standardized tests.

Randolph's mathematics curricula are aligned to the New Jersey Student Learning Standards for Mathematics.

Course Title: Algebra I (MAT115)	
Level/Grade: 9	**Length:** Full Year
NCAA Approved Core Course	**Pre-requisites:** None

Course Description:

This mathematics course provides the student an opportunity to advance their elementary algebraic skills and apply these skills to problem solving. Topics of study include real number operations, linear equations and inequalities, polynomials, special products and factoring, rational expressions and equations, functions and relations, data analysis, linear systems, the real number system, and quadratic equations.

Students may be required to complete a summer assignment.

Course Title: Geometry H (MAT200), A (MAT210), B (MAT220)	
Level/Grade: 9, 10	**Length:** Full Year
NCAA Approved Core Course	**Pre-requisites:** Algebra I Teacher recommendation required for honors

Course Description:

This mathematics course provides the student an opportunity for a study of an axiomatic system and deductive reasoning as applied to Euclidean geometry. Topics to be studied include: lines, angles, triangles, congruence of triangles, parallel lines, transformations, geometric constructions, analytic geometry, polygons, proportions, similarity, circles, surface area, and volume. For the Honors level class math skills should be excellent, students should be ready for independent self-motivated work, emphasis is placed on application and problem solving, abstract and visualization skills are important, and memorization is insufficient to be successful.

Students may be required to complete a summer assignment.

Course Title: Algebra II H (MAT300), A (MAT310), B (MAT320)	
Level/Grade: 9, 10, 11	**Length:** Full Year
NCAA Approved Core Course	**Pre-requisites:** Geometry

Course Description:

This mathematics course provides the student an opportunity to study mathematical structural theory, gain intermediate algebraic skills, and apply these skills to problem solving. Topics include: polynomials and factoring, rational numbers and expressions, relations and functions, data analysis, irrational numbers and quadratic equations, quadratic relations and systems, exponential and logarithmic functions, and complex numbers.

Students may be required to complete a summer assignment.

Students may take Geometry and Algebra II concurrently, with supervisor permission.

Course Title: AP Precalculus (MAT480)	
Level/Grade: 10, 11	**Length:** Full Year
NCAA Approved Core Course	**Pre-requisites:** Algebra II & Teacher recommendation

Course Description:

This honors level course will prepare students for our AP Calculus BC course. Like our Precalculus Honors AB and Precalculus A courses, topics studied include polynomial functions, matrices and vectors, trigonometry, sequences and series, polar coordinates, complex numbers, exponential and logarithmic functions, analytic geometry, economics, limits and derivatives, and probability and statistics but with additional units of study focused on limits and basic differentiation techniques.

Students may be required to complete a summer assignment.

Course Title: Precalculus Honors AB (MAT420)	
Level/Grade: 10, 11, 12	**Length:** Full Year
NCAA Approved Core Course	**Pre-requisites:** Algebra II & Teacher recommendation

Course Description:

Precalculus Honors AB will prepare students for our AP Calculus AB course. Like our Precalculus A course, topics studied include polynomial functions, matrices and vectors, trigonometry, sequences and series, polar coordinates, complex numbers, exponential and logarithmic functions, analytic geometry, economics, limits and derivatives, and probability and statistics but with greater depth and rigor.

Students may be required to complete a summer assignment.

Course Title: Precalculus A (MAT410)	
Level/Grade: 10, 11, 12	**Length:** Full Year
NCAA Approved Core Course	**Pre-requisites:** Algebra II

Course Description:

Precalculus will prepare students for the study of Calculus at the high school or college level. Topics to be studied include polynomial functions, matrices and vectors, trigonometry, sequences and series, polar coordinates, complex numbers, exponential and logarithmic functions, analytic geometry, economics, limits and derivatives, and probability and statistics.

Students may be required to complete a summer assignment.

Course Title: Algebra III & Trigonometry (MAT330)	
Level/Grade: 11, 12	**Length:** Full Year
NCAA Approved Core Course	**Pre-requisites:** Algebra II and teacher recommendation

Course Description:

This course is for students wanting to continue developing skills from Algebra II and prepare them for the study of Precalculus or College Algebra. Topics to be studied will include a more in-depth look at many of the topics of Algebra II and preview topics seen in Precalculus which can include functions and their graphs, right triangle trigonometry, the trigonometric functions of any angle, graphs of trigonometric functions, laws of sine and cosine. There are no ICS sections offered.

Students may be required to complete a summer assignment.

Course Title: Discrete Math (MAT875)	
Level/Grade: 12	**Length:** Semester
NCAA Approved Core Course	**Pre-requisites:** Algebra II

Course Description:

Discrete mathematics affords many students the opportunity to experience success and enjoyment in mathematics classes. Those who have encountered numerous difficulties with computation and the complexities of mathematics in the past can be reached with appealing problems from discrete mathematics that have few formal skills as requisites. This will be the math that doesn't, on first glance, feel like math. Ever wonder if there are different methods for how people are elected? How can you divide up a bag of different types of candy fairly taking preferences and needs into consideration? How do postmen and garbage collectors use math to make their job more efficient? If you would like to explore how math plays a factor in each of these decisions, then consider Discrete Math.

Course Title: Statistics Outside the Classroom (MAT885)	
Level/Grade: 12	**Length:** Semester
	Pre-requisites: Algebra II

Course Description:

This course introduces students to statistical methods and reasoning as applied to practical problems. Topics include: collecting and analyzing data, descriptive statistics, sampling, surveys, graphs, and use of technology to understand statistics. Ever wonder how a new pharmaceutical drug gets tested? Curious about the reliability and design of the polls used during a political year? What questions should you consider when you read an article involving statistics – in written or graphical form? If you are curious about these questions, consider taking this class.

Course Title: Statistics A (MAT840)	
Level/Grade: 11, 12	**Length:** Full Year
NCAA Approved Core Course	**Pre-requisites:** Algebra II A

Course Description:

This Statistics course will prepare students for the study of statistics at the college level. Topics include: descriptive statistics, correlation, regression, probability, binomial and normal distributions, sampling, confidence intervals, analysis and presentation of data, an introduction to experimental design, variability and uncertainty in data, techniques of statistical inference and decision making. Students are expected to use technology to analyze and present data. Course work will also include a project in each semester that includes the collection and analysis of real data. Students are encouraged to incorporate their knowledge and interest in other disciplines into their project work.

Course Title: AP Calculus AB (MAT500) BC (MAT510)	
Level/Grade: 11, 12	**Length:** Full Year
NCAA Approved Core Course	**Pre-requisites:** Precalculus Honors AB or Precalculus

Course Description:

These are advanced placement courses in calculus and the curriculum is determined by the College Board. They cover topics including concepts and skills of limits, derivatives, definite integrals, and the Fundamental Theorem of Calculus. Students will learn how to approach calculus concepts and problems represented graphically, numerically, analytically, and verbally. Emphasis will be on an understanding of processes. Offered at both the AB and the BC levels, students who successfully complete the AB test may be given credit for one semester of college calculus while those who successfully complete the BC test may be given credit for two semesters of college calculus. Students are encouraged to take the Advanced Placement Examination. To meet the course objectives, students are encouraged to complete a summer review packet due the first day of school.

Students may be required to complete a summer assignment.

Course Title: Calculus A (MAT440)	
Level/Grade: 11, 12	**Length:** Full Year
NCAA Approved Core Course	**Pre-requisites:** Precalculus

Course Description:

As an introductory calculus course for students who have demonstrated an understanding of mathematics, this course contains the concepts of differential and integral calculus. This course is designed to familiarize the students with these topics and their application, so they will be at an advantage when encountering them at the college level.

Students may be required to complete a summer assignment.

Course Title: AP Statistics (MAT540)	
Level/Grade: 10, 11, 12	**Length:** Full Year
NCAA Approved Core Course	**Pre-requisites:** Algebra II & Teacher recommendation

Course Description:

As an advanced placement course in statistics, this is a college level course designed for students who have demonstrated achievement in Algebra II and interest in statistics. The development of descriptive and inferential statistics follows the recommendations of the College Entrance Examination Board and includes the four major themes: exploratory analysis, planning a study, probability, and statistical inference. Students are encouraged to take the Advanced Placement Examination.

Students may be required to complete a summer assignment.

Course Title: Academic Review Math (MAT610)	
Level/Grade: 9	**Length:** Full Year
NCAA Approved Core Course	**Pre-requisites:** District Identification

Course Description:

This course is designed to identify and remediate the basic mathematical needs of students at the high school level. Emphasis is placed on understanding concepts of Algebra I, Geometry, and Algebra II as well as the application of skills to problem solving scenarios. An individualized approach is used to prepare students for the New Jersey Student Learning Assessment for Algebra I.

This course does not fulfill the mathematics requirement for graduation.

Students who are progressing toward identified goals may be identified and removed from the course after the first semester.

Course Title: SAT Prep Math (MAT865)	
Level/Grade: 10, 11, 12*	**Length:** Semester
	Pre-requisites: None

Course Description:

The SAT Prep course is designed to help students prepare for the rigors of taking the SAT test offered by the College Board. Our primary goal is to identify and implement test taking strategies using prerequisite knowledge to increase student performance.

*SAT prep may be appropriate for some seniors. Speak to your school counselor.