Math Department Core Courses

GENERAL PRE-ALGEBRA (377) **Prerequisite: This course is assigned at the recommendation of the Child Study Team and is a Resource Center Level course.**	5 Credits Full Year Grade 9

This Course is designed for ninth grade students who require skill development in preparation for either General Algebra or Algebra 1 Lab. Students review foundational topics essential for successful algebraic thinking. Topics include the Real Number System, simplifying and evaluating variable expressions, linear equations and inequalities in one variable, percent's and proportional reasoning, the coordinate plane, and problem solving.

GENERAL ALGEBRA (376) **Prerequisite: This course is assigned at the recommendation of the Child Study Team and is a Resource Center Level course.**	5 Credits Full Year Grades 9-12

This course is designed for students in resource center math who are approaching readiness for algebraic thinking. The intention of this course is to prepare students for Algebra 1 Lab. Students review the Real Number System, multi-step equations and inequalities, linear functions, systems of equations and inequalities, simplifying exponents and radicals, operations with polynomial expressions, and factoring. Problem solving and reasoning skills will be emphasized in every unit to prepare students for the rigor of CP level math courses.

ALGEBRA 1 LAB CP (316) **Prerequisite: None.**	10 Credits Full Year Grades 9-10

Completion of a summer assignment is required for this course.
This college prep course is designed for students who wish to meet the Algebra 1 requirement for college entrance, however, may require additional support in both mathematics content and test-taking strategies. Topics include: solving linear equations and inequalities, systems of equations and inequalities, fundamental operations with monomial and polynomial expressions, factoring, solving quadratic equations, graphing different types of functions, radical expressions, and practical word problems. The foundation for this study is the structure of the real number system. This course will be taught in a double period which will include a lab component.

ALGEBRA 1 CP (312) **Prerequisite: None.**	5 Credits Full Year Grades 9-12

Completion of a summer assignment is required for this course.
This college preparatory course includes a study of the language of algebra, solving linear equations and inequalities, systems of equations and inequalities, quadratic equations, fundamental operations with monomials, polynomial and radicals, factoring, graphing different types of functions, and practical word problems. The foundation for this study is the structure of the real number system.

ALGEBRA 1 NJSLA LAB (317)	**2.5 Credits**
Prerequisite: Placement by Math Department.	**Semester**
	Grades 9-11

This course is required for those students who did not meet the proficiency level on the Algebra 1 NJSLS (formerly PARCC) test needed to satisfy the state testing graduation requirement for mathematics. The course reviews the Algebra 1 concepts needed for students to be successful on the test. Students will also learn test-taking strategies and complete sample practice problems to prepare them for the test.

ALGEBRA 1 HONORS (313)	**5 Credits**
Prerequisite: None.	**Full Year**
	Grade 9

Completion of a summer assignment is required for this course.
Algebra 1 Honors is a course designed for the well-motivated student who is capable of moving at an above average pace in mathematics. Students in this class often are in transition from a standard math program to an accelerated program. A minimum grade of B or higher in 8th grade math is a good predictor for success in this course. The student's performance in this ninth grade course will be one the factors in determining placement in tenth grade. Topics, concepts, and skills will be presented in greater depth than in Algebra 1 CP. This course is not for students who completed Algebra 1 in the 8th grade.

GENERAL GEOMETRY (378)	**5 Credits**
Prerequisite: This course is assigned at the recommendation of the Child Study Team and is a Resource Center Level course.	**Full Year**
	Grade 10-12

This course is designed for students in resource center math who are approaching readiness for geometric and spatial thinking. This course provides students with a modified Geometry curriculum in which emphasis is placed on developing students' spatial and reasoning skills. Students will learn about geometric notation, definitions, postulates, and theorems. Rather than proving theorems, students will focus on applying geometric concepts related to points, lines, planes, polygons, circles, and three-dimensional shapes. Review of algebraic skills will be infused in lessons throughout the year to ensure students' retention of concepts learned in General Algebra.

GEOMETRY LAB CP (321)	**10 Credits**
Prerequisite: Successful completion of Algebra 1.	**Full Year**
	Grades 9-12

Completion of a summer assignment is required for this course.
This college prep course includes the study of plane and solid figures, critical deductive and inductive reasoning and the axiomatic method of proof. Numeric and algebraic applications are linked to the geometric concepts. This course will be taught in a double period which includes a lab component.

GEOMETRY CP (322)	**5 Credits**
Prerequisite: Successful completion of Algebra 1.	**Full Year**
	Grades 9-12

Completion of a summer assignment is required for this course.
This college prep course includes the study of plane and solid figures, critical deductive and inductive reasoning and the axiomatic method of proof. Numeric and algebraic applications are linked to the geometric concepts.

GEOMETRY HONORS (310)	**5 Credits**
Prerequisite: Successful completion of Algebra 1.	**Full Year**
	Grade 9 -12

Completion of a summer assignment is required for this course.
Topics studied in this challenging course include the study of plane and solid figures, critical deductive and inductive reasoning, and the axiomatic method of proof. Students are expected to function at an abstract analytical level and be capable of independent thought. It is assumed students in this course are moving in the accelerated track for their mathematics studies. Students should possess a strong spatial aptitude. A minimum grade of B+ or higher in 8th grade Algebra 1 or Algebra I Honors is a good predictor for success in this course.

GENERAL INTERMEDIATE ALGEBRA (379)	**5 Credits**
Prerequisite: This course is assigned at the recommendation of the Child Study Team and is a Resource Center Level course.	**Full Year**
	Grades 11-12

This course is designed for students in resource center math who require instruction to further develop Algebra and Geometry skills. General Intermediate Algebra expands upon the concepts learned in General Algebra and General Geometry to promote a deeper understanding of more complex algebraic topics. Topics include solving linear equations and inequalities, systems of equations and inequalities, operations with polynomial expressions, simplifying radicals and solving quadratic equations. The course also reviews the concepts needed for students to be successful on college placement exams.

INTERMEDIATE ALGEBRA (329)	**5 Credits**
Prerequisite: Successful completion of Geometry.	**Full Year**
	Grades 11-12

Intermediate Algebra expands upon the concepts learned in Algebra I and Geometry to promote a deeper understanding of more complex algebraic topics. Topics include solving linear and quadratic equations and inequalities, quadratic functions, polynomial functions, rational functions, radical functions, rational exponents, the complex number system, and applications.

ALGEBRA 2 LAB CP (318) **Prerequisite: Successful completion of Geometry.**	**10 Credits** **Full Year** **Grades 11-12**

Completion of a summer assignment is required for this course.
After a brief review of Algebra 1, instruction in this course focuses on the study of nonlinear functions: polynomial, exponential, logarithmic, radical, and rational. The course also extends the study of algebra from real numbers to the complex number system. Emphasis is placed on understanding the behavior and characteristics of functions numerically, analytically, and graphically. Applications are made through word problems and will integrate algebra skills and geometric concepts. This course will be taught in a double period which includes a lab component.

ALGEBRA 2 CP (332) **Prerequisite: Successful completion of Geometry.**	**5 Credits** **Full Year** **Grades 9-12**

Completion of a summer assignment is required for this course.
After a brief review of Algebra 1, instruction in this course focuses on the study of nonlinear functions: polynomial, exponential, logarithmic, radical, and rational. The course also extends the study of algebra from real numbers to the complex number system. Emphasis is placed on understanding the behavior and characteristics of functions numerically, analytically, and graphically. Applications are made through word problems and will integrate algebra skills and geometric concepts.

ALGEBRA 2 HONORS (320) **Prerequisite: Successful completion of Geometry.**	**5 Credits** **Full Year** **Grades 9-12**

Completion of a summer assignment is required for this course.
This course will provide a rigorous and comprehensive background for students of high mathematical ability. A high placement test score and/or teacher recommendation can be a good predictor for success in this course. The curriculum includes the study of linear and nonlinear functions (polynomial, exponential, logarithmic, and rational). The course also extends the study of algebra from real numbers to the complex number system. Students must demonstrate their grasp of essential concepts through their interactions with each other. Challenge problems, projects, calculator labs and group work extend and expand text material and provide the opportunity for students to communicate mathematical understanding.

APPLICATIONS OF MATHEMATICS (374) **Prerequisite: This course is assigned at the recommendation of the** **Child Study Team and is a Resource Center Level course.**	**5 Credits** **Full Year** **Grade 12**

This course is designed for seniors in the resource center math program. Individualized reinforcement of State-mandated topics, real-life uses of problem solving and computational skills are stressed in this course. The course also reviews the concepts needed for students to be successful on college placement exams.

PRECALCULUS CP (342)	5 Credits
Prerequisite: Successful completion of Algebra 2*.*	Full Year
	Grades 10 - 12

Completion of a summer assignment is required for this course.
This course provides necessary mathematics knowledge for students interested in continuing mathematical studies in college. The curriculum extends the study of linear and nonlinear functions. Other topics include trigonometry, sequences and series and conic sections. Real life applications are integrated throughout the year.

COLLEGE ALGEBRA AND TRIGONOMETRY (345)	5 Credits
Prerequisite: Successful completion of Algebra 2 CP or	Full Year
Intermediate Algebra CP.	Grades 11-12

This course is for students not taking Pre-Calculus, but who are interested in obtaining additional knowledge of mathematics. College Algebra and Trigonometry expands on the topics of functions and their graphs introduced in Algebra 2. The course investigates the trigonometric functions and their applications.

COLLEGE MATH SEMINAR (348)	5 Credits
Prerequisite: Successful completion of Algebra 2 CP or Intermediate	Full Year
Algebra.	Grade 12

This is a survey course intended for seniors who wish to obtain additional mathematics knowledge. The course provides an introduction of discrete math topics encountered in Liberal Arts college curriculum, such as probability, informal statistics, graph theory, election theory, logic, fair division, and cryptology.

PRECALCULUS HONORS (331)	5 Credits
Prerequisite: Successful completion of Algebra 2*.*	Full Year
	Grades 10-12

Completion of a summer assignment is required for this course.
This is a rigorous course which includes instruction in trigonometry, analytic geometry, matrices, theory of equations, linear and nonlinear functions, sequences, series, and an introduction to limits. Students must demonstrate their grasp of essential concepts through their interaction with each other. Challenge problems, calculator labs, video presentations, and group work extend and expand text material and provide opportunities for students to communicate mathematical understanding. A minimum grade of B or higher in Algebra 2 Honors is a good predictor for success in this course. This course is a suggested prerequisite for the AB level of Advanced Placement Calculus.

CALCULUS CP (347) Prerequisite: Successful completion of Pre-Calculus.	5 Credits Full Year Grades 11 - 12

Completion of a summer assignment is required for this course.
This course is designed for students who have completed the traditional four-year college prep sequence in mathematics before their senior year in high school. The course incorporates topics from Pre-Calculus and enables the student to hone his/her algebra skills and techniques and to extend his/her knowledge of analytic geometry. The course also focuses on helping students to develop an understanding of the derivative and its applications and introduces students to some of the techniques and applications of integration. Students will work with real-life applications and data to model the use of calculus to solve problems in areas such as business, economics, management, and/or the social and life sciences.

AP CALCULUS AB (351) Prerequisite: Successful completion of Pre-Calculus.	5 Credits Full Year Grades 10-12

Completion of a summer assignment is required for this course.
This course is recommended to students with a strong four-year background in college prep mathematics. The curriculum includes theory of limits, continuity, mean value theorem, properties and applications of differentiation and integration. This Advanced Placement course is taught at a college level. Students must possess a strong interest in mathematics and be willing to devote extra time to this course. A minimum grade of B or higher in Pre-Calculus Honors or a B+ or higher in Precalculus CP and teacher recommendation can be a good predictor for success in this course.
It is expected that all students take the AP Calculus AB exam in May.

INTRODUCTION TO CALCULUS BC HONORS (340) Prerequisite: Successful completion of Algebra 2 Honors.	5 Credits Full Year Grades 10-11

Completion of a summer assignment is required for this course.
This course incorporates an abstract, formal approach to mathematics and is intellectually rigorous. The topics covered include function theory, analytic geometry, trigonometry, discrete mathematics and an introduction to limit theory with application to derivatives. Students must demonstrate their grasp of essential concepts through their interactions with each other. Challenge problems, calculator labs and group work extend and expand text material and provide opportunities for students to communicate mathematical understanding. This course is recommended for those planning careers in fields related to mathematics or science and who enjoy and have a strong interest in the study of mathematics. A minimum grade of B+ or higher in Algebra 2 Honors is a good predictor for success in this course.

AP CALCULUS BC (350)	**5 Credits**
Prerequisite: Successful completion of Introduction to Calculus BC Honors.	**Full Year** **Grades 10-12**

Completion of a summer assignment is required for this course.
This course covers the same material as the AP Calculus AB, as well as units on differential equations, integration techniques, polar area, vectors, parametric equations, and infinite series. A minimum grade of B or higher in Introduction to Calculus BC Honors is a good predictor for success in this course. It is expected that all students take the AP Calculus BC exam in May.

MULTIVARIABLE CALCULUS (349)	**5 Credits**
Prerequisite: Successful completion of AP Calculus BC.	**Full Year** **Grades 11-12**

Multivariable calculus is the study of differential, integral, and vector calculus for functions of more than one variable. Multivariable Calculus is used in the physical sciences, economics, engineering, and computer graphics. Upon completion of this full year course, students will be able to extend differentiation and integration to vector-valued functions, apply vector tools to study curvature, study the motion of a particle along a path, extend the concepts and techniques of differential calculus to functions of several variables, compute partial derivatives, evaluate double and triple integrals, explore vector fields, explore integration over curves, paths, and surfaces, and solve applied problems. Multivariable Calculus is a rigorous course that builds on the skills and concepts students learned in AP Calculus BC. It is equivalent to a third semester of college level calculus. Therefore, this course will receive AP weighting when grades are calculated.