MATHEMATICS

Mr. William Moss, Chairperson of Math and Science

The many course offerings in the Mathematics Department are designed to provide mathematics training for a student body having a wide range of mathematical backgrounds, abilities and interests. There is a math course for everyone.

Three years of mathematics are required for a high school diploma. However, students are urged to pursue a mathematics course through their high school career in order to ensure success in future plans. In order to receive a Regents diploma, a student must pass at least one of the following exams: Algebra, Geometry, and/or Algebra 2/Trigonometry. In order to receive an Advanced Regents diploma, a student must pass all three exams.

Honors placement is offered in Algebra, Geometry, Algebra 2/Trigonometry, and Pre-Calculus. The policy for Honors placement in the Mathematics Department is below.

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POLICY FOR PLACEMENT IN THE HONORS TRACK IN THE MATH DEPARTMENT

(I) In order for a student to be invited from a Regents level to an Honors level the following year, the student must meet the department criteria:

(1) Average of 90 or above in current Regents level class
(2) Teacher's Recommendation
(3) Department/Administrative Approval

(II) Any student who is currently enrolled in Algebra 2 and Trigonometry H, and meets the requirements to continue his/her study in the Honors program, will be invited to enroll in the following courses: Pre-Calculus H, AP Calculus AB, AP Calculus BC, AP Statistics or Statistics, respectively

The Math Department will inform the Guidance Department as to who should be invited to enroll in the Honors courses.

New York State Mathematics Requirements for a Regents Diploma

3 Credits in Mathematics
1 Regents
(Must score at least a 65 on at least one Mathematics Regents)
(Algebra, Geometry, or Algebra 2/Trigonometry)

New York State Mathematics Requirements for an Advanced Regents Diploma

3 Credits in Mathematics
3 Regents
(Must score at least a 65 on all three Mathematics Regents)
(Algebra, Geometry, and Algebra 2/Trigonometry)

Courses will run only if they meet enrollment and graduation requirements.

444CC ALGEBRA I (R) (Common Core) 1 year – 1 Credit

Prerequisite: Pre-Algebra 8/Math 8

Algebra I (Common Core) is the first course in the high school Common Core Regents mathematics sequence. Algebra I provides students with a deep understanding of the relationships between quantities and reasoning with equation and their graphs, descriptive statistics, linear and exponential functions, polynomial and quadratic expressions, equations and functions, and a synthesis of modeling with equations and functions. Students will be required to take the New York State Algebra I Regents examination in June. A Texas Instrument, TI83 or Ti84 graphing calculator is required the Regents examination and therefore this course as well.

454CC ALGEBRA I (H) (Common Core) 1 year - 1 credit

Prerequisite: Pre-Algebra 8H, Teacher Recommendation

Algebra I is the first course in the high school Regents mathematics sequence. Algebra provides tools and ways of thinking that are necessary for solving problems in a wide variety of disciplines, such as science, business, social sciences, fine arts, and technology. This course will assist students in developing skills and processes to be applied using a variety of techniques to successfully solve problems in a variety of settings. Problem situations may result in all types of linear equations in one variable, quadratic function with integral coefficients and roots as well as absolute value and exponential functions. Coordinate geometry will be integrated into the investigation of these functions allowing students to make connections between their analytical and geometrical representations. Problem situations resulting in systems of equations will also be presented in this course. Students will study, analyze, and interpret data. They will also explore right triangle trigonometry and the probability of events. Students will be required to take the New York State Algebra Regents examination in June at the completion of the course. A Texas Instrument TI83$^+$or TI84$^+$ graphing calculator is required for this course as instruction will be enhanced through the use of this tool.

This course is taught on a higher level of complexity and difficulty than Algebra.

463CC ALGEBRA I WITH LAB 1 year – 1 credit

Prerequisite: Pre-Algebra 8

Algebra I is the first course in the high school Regents mathematics sequence. Algebra provides tools and ways of thinking that are necessary for solving problems in a wide variety of disciplines, such as science, business, social sciences, fine arts, and technology. This course will assist students in developing skills and processes to be applied using a variety of techniques to successfully solve problems in a variety of settings. Problem situations may result in all types of linear equations in one variable, quadratic function with integral coefficients and roots as well as absolute value and exponential functions. Coordinate geometry will be integrated into the investigation of these functions allowing students to make connections between their analytical and geometrical representations. Problem

situations resulting in systems of equations will also be presented in this course. Students will study, analyze, and interpret data. They will also explore right triangle trigonometry and the probability of events. Students will be required to take the New York State Algebra Regents examination in June at the completion of the course. A Texas Instrument TI83$^+$or TI84$^+$ graphing calculator is required for this course as instruction will be enhanced through the use of this tool.

This class is paired with an Algebra Skills Lab.

464CC ALGEBRA I SKILLS LAB 1 year – 1/2 credit

Algebra Skills Lab provides students with additional time to understand concepts and build their algebraic skills through labs and hands-on activities.

455CC GEOMETRY (R) Common Core) 1 year – 1 Credit

Prerequisite: Algebra I (Common Core)

Geometry (Common Core) is the second course in the high school Common Core Regents mathematics sequence. Common Core Geometry provides students with a deep understanding of congruence, proofs, and constructions, similarity, proof and trigonometry, extensions to the third dimension, connecting algebra and geometry through coordinates, and circles with and without coordinates. Students will be required to take the New York State Geometry Regents examination in June. A Texas Instrument, TI83 or Ti84 graphing calculator is required the Regents examination and therefore this course as well.

456CC GEOMETRY (H) 1 year – 1 credit

Prerequisite: Algebra I

Geometry is the second course in the high school Common Core Regents mathematics sequence.

Within this course, students will have the opportunity to make conjectures about geometric situations and prove in a variety of ways, both formal and informal, that their conclusion follows logically from their hypothesis. This course is meant to employ an integrated approach to the study of geometric relationships. A major emphasis of this course is to allow students to investigate geometric situations. Properties of triangles, quadrilaterals, and circles should receive particular attention. It is intended that students will use the traditional tools of compass and straightedge as well as dynamic geometry software that models these tools more efficiently and accurately, to assist in these investigations. Geometry is meant to lead students to an understanding that reasoning and proof are fundamental aspects of mathematics and something that sets it apart from the other sciences. A Texas Instrument TI83$^+$or TI84$^+$ graphing graphing calculator is required for this course.

This course is taught on a higher level of complexity and difficulty than Geometry (R).

465CC GEOMETRY WITH A LAB 1 year – 1 credit

Prerequisite: Integrated Algebra (R)

Geometry is the second course in the high school Regents mathematics sequence. Within this course, students will have the opportunity to make conjectures about geometric situations and prove in a variety of ways, both formal and informal, that their conclusion follows logically from their hypothesis. This course is meant to employ an integrated approach to the study of geometric relationships. A major emphasis of this course is to allow students to investigate geometric situations. Properties of triangles, quadrilaterals, and circles should receive particular attention. It is intended that students will use the traditional tools of compass and straightedge as well as dynamic geometry software that models these tools more efficiently and accurately, to assist in these investigations. Geometry is meant to lead students to an understanding that reasoning and proof are fundamental aspects of mathematics and something that sets it apart from the other sciences. A Texas Instrument TI83^{+}or TI84^{+} graphing calculator is required for this course.

This class is paired with a Geometry Skills Lab.

466CC GEOMETRY SKILLS LAB 1 year – 1/2 credit

Geometry Skills Lab provides students with additional time to understand concepts and build their geometric skills through labs and hands-on activities.

457 ALGEBRA 2 and TRIGONOMETRY (R) 1 year – 1 credit

Prerequisites: Integrated Algebra and Geometry

Algebra 2 and Trigonometry is the capstone course of the three units of credit required for a Regents diploma. This course is a continuation and extension of the two courses that preceded it. While developing the algebraic techniques that will be required of those students that continue their study of mathematics, this course is also intended to continue developing alternative solution strategies and algorithms. Within this course, the number system will be extended to include imaginary and complex numbers. The families of functions to be studied will include polynomial, absolute value, radical, trigonometric, exponential, and logarithmic functions. Problem situations involving direct and indirect variation will be solved in this course. Problems resulting in systems of equations will be solved graphically and algebraically. Algebraic techniques will be developed to facilitate rewriting mathematical expressions into multiple equivalent forms. Data analysis will be extended to include measures of dispersion and the analysis of regression that model functions studied throughout this course. Associated correlation coefficients will be determined, using technology tools and interpreted as a measure of strength of the relationship. Arithmetic and geometric sequences will be expressed in multiple forms, and students will evaluate these arithmetic and geometric series. Right triangle trigonometry will be expanded to include the investigation of circular functions. Students will also investigate trigonometric equations and identities in order to solve different problems. A Texas Instrument TI83^{+}or TI84^{+} graphing calculator is required for this course.

458 ALGEBRA 2 and TRIGONOMETRY (H) 1 year – 1 credit

Prerequisites: Integrated Algebra H and Geometry H

Algebra 2 and Trigonometry is the capstone course of the three units of credit required for a Regents diploma. This course is a continuation and extension of the two courses that preceded it. While developing the algebraic techniques that will be required of those students that continue their study of mathematics, this course is also intended to continue developing alternative solution strategies and algorithms. Within this course, the number system will be extended to include imaginary and complex numbers. The families of functions to be studied will include polynomial, absolute value, radical, trigonometric, exponential, and logarithmic functions. Problem situations involving direct and indirect variation will be solved. Problems resulting in systems of equations will be solved graphically and algebraically. Algebraic techniques will be developed to facilitate rewriting mathematical expressions into multiple equivalent forms. Data analysis will be extended to include measures of dispersion and the analysis of regression that model functions studied throughout this course. Associated correlation coefficients will be determined, using technology tools and interpreted as a measure of strength of the relationship. Arithmetic and geometric sequences will be expressed in multiple forms, and students will evaluate these arithmetic and geometric series. Right triangle trigonometry will be expanded to include the investigation of circular functions. Students will also investigate trigonometric equations and identities in order to solve different problems. A Texas Instrument TI83$^+$or TI84$^+$ graphing calculator is required for this course.

This course is taught on a higher level of complexity and difficulty than Algebra 2/Trigonometry (R).

467 ALGEBRA 2/TRIGONOMETRY WITH A LAB 1 year – 1 credit

Prerequisites: Integrated Algebra and Geometry

Algebra 2 and Trigonometry is the capstone course of the three units of credit required for a Regents diploma. This course is a continuation and extension of the two courses that preceded it. While developing the algebraic techniques that will be required of those students that continue their study of mathematics, this course is also intended to continue developing alternative solution strategies and algorithms. Within this course, the number system will be extended to include imaginary and complex numbers. The families of functions to be studied will include polynomial, absolute value, radical, trigonometric, exponential, and logarithmic functions. Problem situations involving direct and indirect variation will be solved. Problems resulting in systems of equations will be solved graphically and algebraically. Algebraic techniques will be developed to facilitate rewriting mathematical expressions into multiple equivalent forms. Data analysis will be extended to include measures of dispersion and the analysis of regression that model functions studied throughout this course. Associated correlation coefficients will be determined, using technology tools and interpreted as a measure of strength of the relationship. Arithmetic and geometric sequences will be expressed in multiple forms, and students will evaluate these arithmetic and geometric series. Right triangle trigonometry will be expanded to include the investigation of circular functions. Students will also investigate trigonometric equations and identities in order to solve different problems. A Texas Instrument TI83$^+$or TI84$^+$ graphing calculator is required for this course.
This class is paired with an Algebra 2/Trigonometry Skills Lab.

468 ALGEBRA 2/TRIGONOMETRY SKILLS LAB 1 year – 1/2 credit

Algebra 2/Trigonometry Skills Lab provides students with additional time to understand concepts and build their advanced algebraic and trigonometric skills through labs and hands-on activities.

417 PRE-CALCULUS (Formerly Math 12R) 1 year - 1 credit
Prerequisite: Integrated Algebra, Geometry, and Algebra 2 and Trigonometry

This mathematics program is designed specifically to accommodate the student who has successfully completed the three year Regents Math sequence, and who wishes to pursue a study of mathematics. It will provide good background for college level math. The following topics are included: analytical geometry of the conic sections, polar coordinates and complex numbers, elements of probability and statistics, introduction to differential calculus, and mathematical induction and logic.

418 PRE-CALCULUS H (Formerly Math 12H) 1 year - 1 credit
Prerequisite: Integrated Algebra H, Geometry H, and Algebra 2 and Trigonometry H

Students participating in this accelerated and enriched program are selected and invited after completion of the Honors Regents Mathematics sequence. Major topics in this course include: analytic geometry with emphasis on the conic sections, relations and functions, parametric equations, limits and continuity, exponential and logarithmic functions, complex numbers and vectors, derivatives and anti derivatives.

421 AP CALCULUS BC 1 year - 1 credit
Prerequisite: Pre-Calculus H

This is the highest level of a College Board Advanced Placement course in mathematics that Lawrence High School offers consisting of a full academic year of work in Calculus and related topics. The syllabus is determined by the College Board. This course will develop a student's understanding of the concepts of Calculus and provide exposure with its methods and application. It provides a deeper understanding of fundamental concepts and methods of single-variable calculus. In addition to the topics covered in Calculus AB, this course includes additional topics: infinite series, logistic growth, vector functions, and L'Hospital Rule, Students must take the AP Calculus exam in May (BC level). The AP exam will have both a BC score and an AB subscore. Upon successful performance on the AP Calculus BC level examination, the student can expect to receive 1 year of college credit and/or placement when they enter college.

422 AP CALCULUS AB 1 year - 1 credit
Prerequisite: Pre-Calculus or Pre-Calculus H

This is a college level calculus course based on the curriculum guidelines given by the College Board Advanced Placement Center. This course covers the following topics: analytic geometry, differentiation of algebraic and trigonometric functions, application of

derivatives, integration of algebraic and trigonometric functions, and application of integration. Students must take the AP Calculus exam in May (AB level)). Upon successful performance on the AP Calculus AB level examination given in May of each year, students can expect to receive either 1/2 year college credit and/or placement when they enter college.

448 AP STATISTICS 1 year - 1 credit

Prerequisite: Open to Juniors and Seniors who have completed Algebra 2/Trigonometry.

The purpose of the AP course in statistics is to introduce students to the major concepts and tools for collecting, analyzing, and drawing conclusions from data. Students are exposed to four broad conceptual themes: a) Exploring data: describing patterns and departures from patterns, b) Sampling and experimentation: planning and conducting a study, c) Anticipating patterns: exploring random phenomena using probability and simulation, and d) Statistical inference: estimating population parameters and testing hypotheses. Students who successfully complete the course and examination may receive credit, advanced placement, or both for a one-semester introductory college statistics course.

430 STATISTICS (NON-AP) 1 year - 1 credit

Prerequisite: Open to Juniors (who finished Integrated Algebra, Geometry, and Algebra 2/Trigonometry) and Seniors.

This course is designed to provide students with a working knowledge of statistics and their applications to the real world. Statistics will be introduced as a mathematical tool for using measurements on random samples to make inferences concerning populations. Examples from varied disciplines will be studied to illustrate statistical principles. Some of the topics investigated will include: simple probability, averages and variation, binomial and normal probability distributions, sampling distributions, confidence intervals, the t-distribution, chi-square distribution, and the formulation and testing of statistical hypotheses. Emphasis will be placed on understanding rather than rote memorization of formulas. Toward this end, the Ti83 calculator with its enhanced statistical capabilities will be extensively infused into the topic development.

440 COLLEGE ALGEBRA 1 year - 1 credit

Prerequisite: Geometry R, with a passing course grade.

This course will emphasize the algebra skills needed for a college algebra course. It will cover rational and irrational numbers, solving equation, complex numbers, 3x3 systems of equations, synthetic division, laws of exponents, factoring by grouping, rational functions, quadratic formula, rational expressions and equations with applications, natural logarithms and functions including inverse, exponential, and logarithmic. Some trigonometry and statistics will also be addressed throughout the course.

424 THE SAT'S AND MORE 1/2 year - 1/2 credit

Prerequisite: Geometry R; Open to Juniors, Seniors, and Sophomores w/teacher recommendation.

This course is designed to prepare students for the SAT's, the ACT's and the College Board Achievement Tests. It will improve a student's ability in problem-solving skills and in

logical thinking. The students will practice skills in number operations, geometry, trigonometry, probability, statistics, and logic problems. It will also strengthen the student's skills needed to analyze mathematical problems and reinforce their knowledge of study skills.

450 CONSUMER MATH 1 year - 1 credit

Open to seniors only.

This course will review basic math, buying problems, wages, borrowing, money savings and investments, and probability. Logic and algebraic expressions will also be taught in this class. Microsoft Money and Excel will be used for real life applications of these math skills.