

Mathematics Course Descriptions

MATHEMATICS COURSES

Honors and Accelerated Level Course Note: Accelerated courses require a greater demand on students through increased academic rigor. Academic rigor is obtained through the application, analysis, evaluation, and creation of complex ideas that are often abstract and multi-faceted. Students are challenged to think and collaborate critically on the content they are learning. Honors level rigor will be achieved by increasing text complexity through text selection, focus on high-level qualitative measures, and complexity of task. Instruction will be structured to give students a deeper understanding of conceptual themes and organization within and across disciplines. Academic rigor is more than simply assigning to students a greater quantity of work.

M/J Accelerated Mathematics, Grade 6, #120502003: In Grade 6 Accelerated Mathematics, instructional time will emphasize five areas: (1) performing all four operations with rational numbers with procedural fluency; (2) exploring and applying concepts of ratios, rates, percent and proportions to solve problems; (3) creating, interpreting and using expressions, equations and inequalities; (4) extending geometric reasoning to plotting points on the coordinate plane, area and volume of geometric figures and (5) extending understanding of statistical thinking to represent and compare categorical and numerical data. **Annual Course.**

M/J Accelerated Mathematics, Grade 7, #120505003: In Grade 7 Accelerated Mathematics, instructional time will emphasize six areas: (1) representing numbers in scientific notation and extending the set of numbers to the system of real numbers, which includes irrational numbers; (2) generating equivalent numeric and algebraic expressions including using the Laws of Exponents; (3) creating and reasoning about linear relationships including modeling an association in bivariate data with a linear equation; (4) solving linear equations, inequalities and systems of linear equations; (5) developing an understanding of the concept of a function and (6) analyzing two-dimensional figures, particularly triangles, using distance, angle and applying the Pythagorean Theorem. **Annual Course.**

Algebra 1 Honors, #120032001: In Algebra 1 Honors, instructional time will emphasize five areas: (1) performing operations with polynomials and radicals, and extending the Laws of Exponents to include rational exponents; (2) extending understanding of functions to linear, quadratic and exponential functions and using them to model and analyze real-world relationships; (3) solving quadratic equations in one variable and systems of linear equations and inequalities in two variables; (4) building functions, identifying their key features and representing them in various ways and (5) representing and interpreting categorical and numerical data with one and two variables. **Annual Course.**

Geometry, #120631001: In Geometry, instructional time will emphasize five areas: (1) proving and applying relationships and theorems involving two-dimensional figures using Euclidean geometry and coordinate geometry; (2) establishing congruence and similarity using criteria from Euclidean geometry and using rigid transformations; (3) extending knowledge of geometric measurement to two-dimensional figures and three-dimensional figures; (4) creating and applying equations of circles in the coordinate plane and (5) developing an understanding of right triangle trigonometry. **Prerequisite:** “A, B, or C” in Algebra 1 Honors. **Annual Course.**

Geometry Honors, #120632001: In Geometry Honors, instructional time will emphasize five areas: (1) proving and applying relationships and theorems involving two-dimensional figures using Euclidean geometry and coordinate geometry; (2) establishing congruence and similarity using criteria from Euclidean geometry and using rigid transformations; (3) extending knowledge of geometric measurement to two-dimensional figures and three-dimensional figures; (4) creating and applying equations of circles in the coordinate plane and (5) developing an understanding of right triangle trigonometry. **Prerequisite:** “A” or “B and teacher recommendation” in Algebra 1 Honors. **Annual Course.**

Algebra 2, #120033001: In Algebra 2, instructional time will emphasize five areas: (1) extending arithmetic operations with algebraic expressions to include radical and rational expressions and polynomial division; (2) graphing and analyzing functions including polynomials, absolute value, radical, rational, exponential and logarithmic; (3) building functions using compositions, inverses and transformations; (4) extending systems of equations and inequalities to include non-linear expressions and (5) developing understanding of the complex number system, including complex numbers as roots of polynomial equations. **Prerequisite:** Successful completion of Geometry. **Annual Course.**

Algebra 2 Honors, #120034001: In Algebra 2 Honors, instructional time will emphasize six areas: (1) developing understanding of the complex number system, including complex numbers as roots of polynomial equations; (2) extending arithmetic operations with algebraic expressions to include polynomial division, radical and rational expressions; (3) graphing and analyzing functions including polynomials, absolute value, radical, rational, exponential and logarithmic; (4) extending systems of equations and inequalities to include non-linear expressions; (5) building functions using compositions, inverses and transformations and (6) developing understanding of probability concepts. **Prerequisite:** A in Geometry and teacher recommendation or “A” or “B and teacher recommendation” in Geometry Honors. **Annual Course.**

Mathematics for College Algebra, #120071001: In Mathematics for College Algebra, instructional time will emphasize five areas: (1) developing fluency with the Laws of Exponents with numerical and algebraic expressions; (2) extending arithmetic operations with algebraic expressions to include rational and polynomial expressions; (3) solving one-variable exponential, logarithmic, radical and rational equations and interpreting the viability of solutions in real-world contexts; (4) modeling with and applying linear, quadratic, absolute value, exponential, logarithmic and piecewise functions and systems of linear equations and inequalities; (5) extending knowledge of functions to include inverse and composition. **Prerequisite:** “A, B, or C” in Algebra 2 or Algebra 2 Honors. **Annual Course.**

Precalculus Honors, #120234002: In Precalculus Honors, instructional time will emphasize six areas: (1) extending right triangle trigonometry to unit circle trigonometry and trigonometric functions; (2) extending understanding of functions to trigonometric; (3) developing understanding of conic sections; (4) representing and performing operations with complex numbers and vectors in the coordinate plane; (5) extending understanding of relations in the plane using parametric representations, including polar coordinates and (6) analyzing arithmetic and geometric sequences and series. **Prerequisite:** A in Algebra 2 and teacher recommendation or “A” or “B and teacher recommendation” in Algebra 2 Honors. **Annual Course.**

Advanced Placement Pre-Calculus, #120230501: AP Precalculus prepares students for other college-level mathematics and science courses. Through regular practice, students build deep mastery of modeling and functions, and they examine scenarios through multiple representations. The course framework delineates content and skills common to college precalculus courses that are foundational for careers in mathematics, physics, biology, health science, social science, and data science. **Prerequisite:** A in Algebra 2 Honors, teacher recommendation, and 570 PSAT Math Score. **Annual Course.**

Calculus Honors, #120230001: In Calculus Honors, instructional time will emphasize four areas: (1) developing understanding of limits and continuity of functions; (2) finding derivatives and applying them to motions, slopes, related rates and optimizations; (3) applying limits and derivatives to graph and analyze functions and (4) evaluating integrals and applying them to areas, volumes, average values and differential equations. Prerequisite: “A, B, or C” in Precalculus Honors. Annual Course.

Advanced Placement Calculus AB, #120231001: AP Calculus AB is an introductory college-level calculus course. Students cultivate their understanding of differential and integral calculus through engaging with real-world problems represented graphically, numerically, analytically, and verbally and using definitions and theorems to build arguments and justify conclusions as they explore concepts like change, limits, and the analysis of functions. **Prerequisite:** “A” or “B and teacher recommendation” in Pre-Calculus or A or B in Calculus Honors. **Annual Course.**

Advanced Placement Calculus BC, #120232001: AP Calculus BC is an introductory college-level calculus course. Students cultivate their understanding of differential and integral calculus through engaging with real-world problems represented graphically, numerically, analytically, and verbally and using definitions and theorems to build arguments and justify conclusions as they explore concepts like change, limits, and the analysis of functions. **Prerequisite:** “A” or “B and teacher recommendation” in Advanced Placement Calculus AB. **Annual Course.**

AP Calculus AB and AP Calculus BC focus on students’ understanding of calculus concepts and provide experience with methods and applications. Through the use of big ideas of calculus (e.g., modeling change, approximation and limits, and analysis of functions), each course becomes a cohesive whole, rather than a collection of unrelated topics. Both courses require students to use definitions and theorems to build arguments and justify conclusions. The courses feature a multirepresentational approach to calculus, with concepts, results, and problems expressed graphically, numerically, analytically, and verbally. Exploring connections among these representations builds understanding of how calculus applies limits to develop important ideas, definitions, formulas, and theorems. A sustained emphasis on clear communication of methods, reasoning, justifications, and conclusions is essential. Teachers and students should regularly use technology to reinforce relationships among functions, to confirm written work, to implement experimentation, and to assist in interpreting results.

Probability and Statistics, Honors, #121030007: In Probability and Statistics Honors, instructional time will emphasize four areas: (1) creating and interpreting data displays for univariate and bivariate categorical and numerical data; (2) comparing and making observations about populations using statistical data, including confidence intervals and hypothesis testing; (3) extending understanding of probability and probability distributions and (4) developing an understanding of methods for collecting statistical data, including randomized trials. **Prerequisite:** “A, B, or C” in Pre-Calculus Honors and Senior Status. **Annual Course.**

Advanced Placement Statistics, #121032001: AP Statistics is an introductory college-level statistics course that introduces students to the major concepts and tools for collecting, analyzing, and drawing conclusions from data. Students cultivate their understanding of statistics using technology, investigations, problem solving, and writing as they explore concepts like variation and distribution; patterns and uncertainty; and data-based predictions, decisions, and conclusions.

The AP Statistics course introduces students to the major concepts and tools for collecting, analyzing, and drawing conclusions from data. There are four themes evident in the content, skills, and assessment in the AP Statistics course: exploring data, sampling and experimentation, probability and simulation, and statistical inference. Students use technology, investigations, problem solving, and writing as they build conceptual understanding. The AP Statistics course is equivalent to a one-semester, introductory, non-calculus-based college course in statistics. **Prerequisite:** “A, B, or C” in Pre-Calculus Honors or concurrent enrollment in Pre-Calculus Honors and teacher recommendation. **Annual Course.**