MATHEMATICS DEPARTMENT

Math 6 **Year** **6**

This course helps build a strong foundation in all areas of math to prepare students for success in General Math and Pre-Algebra. Content areas include operations with fractions and decimals, integers, ratios, rates, percentages, surface area, volume, as well as algebraic expressions, equations, and inequalities. Sixth grade students who complete this course will be on track to complete the standard college preparatory program.

General Math **Year** **6-7**

This course prepares students for Pre-Algebra. Basic mathematical concepts and skills are reviewed and reinforced including the study of: integers; rational numbers such as fractions; decimals; expressions and basic linear equations; ratios and percentages; angles and geometric figures; circumference and perimeter; surface area and volume; and probability. General Math does not count as a high-school college preparatory course, even if taken in high school.

Pre-Algebra **Year** **6-8**

In this course, students will study multi-step equations, linear equations, functions, radicals, integer exponents, scientific notation, unit conversions, congruent and similar figures, angle relationships, data analysis, volumes of solids, and applications of the Pythagorean Theorem. This class is required for students who plan to take Algebra 1. Pre-Algebra does not count as a high-school college preparatory course, even if taken in high school.

Algebra 1 * **Year** **7-10**

This introductory high school level course focuses on algebraic thinking and multiple representations, including verbal, numeric, symbolic, and graphical representations. This course covers topics including: exponents and roots; simplifying radicals; simplifying expressions; absolute value and equations; solving and graphing linear equations and inequalities; solving systems of equations; simplifying polynomial expressions; factoring polynomials; graphing and solving quadratic equations by factoring, completing the square, and quadratic formula. A scientific calculator is required.

Prerequisite: Completion of Pre-Algebra with a B- or higher.

Note: Students enrolled in this course during 6th–8th grade must earn a final grade of B or higher to enroll in Geometry. High school students who do not pass the second-semester final exam with a grade of 70% or higher and/or do not earn a second-semester grade of 80% or higher should take a summer Algebra 1 remedial course.

Geometry * **Year** **8-10**

This course will use fun, practical problems, creative projects, and a review of the skills and concepts developed in Algebra 1 to train students in geometry topics. Such topics include the use of inductive and deductive reasoning to understand plane, coordinate, and solid geometry, including relationships between points, lines, angles, and planes. Students will also discover the relationships within and between triangles, quadrilaterals, polygons, circles, and solids; including the topics of congruence, similarity, area, perimeter, volume, and surface area. Students will be trained in the language of geometry in order to write proofs for theorems, write proofs for proving congruence and similarity, understand postulates, and become masters at problem-solving.

Prerequisite: Completion of Algebra 1 with a B or higher (for students up to grade 8) or C- or higher (for students in grade 9 and above)

Geometry Honors * **Year** **8-10**

This course includes all the material in the regular Geometry course, in addition to more advanced geometry material.

Prerequisites: Completion of Algebra 1 with an A- or higher.

*** Course meets UC eligibility**

All course offerings are subject to minimum enrollment levels.

MATHEMATICS DEPARTMENT (CONT'D)

Algebra 2 * Year 9-11

This course is designed to solidify the foundational algebraic concepts originally introduced in Algebra 1, while expanding the student's understanding of more advanced topics that will prove necessary in higher-level math courses. Topics covered include: linear equations; quadratics; polynomials; function transformation; complex numbers; logarithmic; trigonometric; rational, and radical functions.
Prerequisites: Completion of Algebra 1 with a B or higher and Geometry with a C- or higher.

Algebra 2 Honors * Year 9-11

Algebra 2 Honors is a second-year, enriched algebra course. It runs at a faster pace and includes more challenging problems than regular Algebra 2. Topics covered are the same as Algebra 2, but also include probability and statistics.
Prerequisites: Completion of Algebra 1 and Geometry with an A- or higher or Geometry Honors with a B+ or higher.

Financial Mathematics Year 10-12

This course is designed to give students experience with practical applications of the math skills they have learned in school. The emphasis is on application to their lives now and to their future financial decisions. The first semester covers personal finances including calculating income, account and credit card interest, loan payments, auto and housing costs, and investments. The second semester covers business finances including production, purchasing, marketing, accounting, and financial management.

Pre-Calculus * Year 10-12

Pre-Calculus covers algebra review; plane trigonometry; plane analytic geometry; complex numbers; polynomial functions; elementary probability; vectors; and matrices.
Prerequisites: Completion of Algebra 2 or Algebra 2 Honors with a C- or higher.

Pre-Calculus Honors * ^ Year 10-12

Pre-Calculus Honors is designed to train students in the topics of a high school, pre-calculus course and to introduce calculus concepts. The course covers: plane trigonometry; plane analytic geometry; complex numbers; polynomial functions; elementary probability; vectors; and matrices. This course is intended for students who plan to go on to AP Calculus BC.
Prerequisites: Completion of Algebra 2 with an A- or higher or Algebra 2 Honors with a B+ or higher.

Calculus * Year 11-12

Calculus (non-AP*)* will include an extensive review of topics from algebra, trigonometry and analytic geometry that are needed for success in calculus. The course covers the topics normally taught in the first two quarters of a four-quarter college calculus sequence. This course is intended for students who have completed Pre-Calculus but do not intend to take the AP test. It prepares the student to take calculus in college.
Prerequisites: Completion of Pre-Calculus with a B or higher, or Pre-Calculus Honors with a C+ or higher.

AP Calculus AB * ^ Year 11-12

This course follows the College Board recommended curriculum. Topics include the theory of limits; derivatives and integrals of algebraic, logarithmic, exponential, trigonometric, and inverse trigonometric functions; and areas, volumes, and applications of calculus to physical problems.
Prerequisites: Completion of Pre-Calculus with an A- or higher, or Pre-Calculus Honors with a B+ or higher, a passing grade on a Calculus Readiness Test, and AP Committee approval.

*** Course meets UC eligibility**
^ Earns an extra grade point

All course offerings are subject to minimum enrollment levels.

MATHEMATICS DEPARTMENT (CONT'D)

AP Calculus BC * ^ **Year** **11-12**

This course follows the College Board recommended curriculum. The content includes all topics covered in the AP Calculus AB course, plus others such as parametric, polar, and vector functions, and series.

Prerequisites: Completion of Pre-Calculus with an A- or higher, or Pre-Calculus Honors with a B+ or higher, a passing grade on a Calculus Readiness Test, and AP Committee approval.

Statistics * **Year** **11-12**

This course is designed to introduce students to the fundamental principles of statistics and provide a solid foundation for college study in statistics. A knowledge of statistics is essential for many college majors, including business, math, medicine, psychology, and social science. This course is ideally suited for students who have completed Calculus and wish to keep their math skills current, and for students who have completed Pre-Calculus and want to investigate other aspects of applying math. Topics include categorical data, quantitative data, methods of collecting and analyzing data, correlation, regression, probability theory, confidence intervals, and hypothesis testing.

Prerequisites: Completion of Pre-Calculus or Pre-Calculus Honors with a C- or higher.

AP Statistics * ^ **Year** **11-12**

This course follows the College Board recommended curriculum. The course will cover the material in an initial college course in statistics. As such, it will include all of the topics in the Statistics course, at a faster pace, with increased emphasis on writing. Students will do projects requiring statistical reasoning. These may be either surveys or experiments.

Prerequisites: Completion of Pre-Calculus with an A- or higher, or Pre-Calculus Honors with a B+ or higher, and AP Committee approval.

MATHEMATICS ELECTIVES

Art of Problem Solving 1 **Semester** **7-8**

This course is a math elective and cannot replace the required math class. This course equips students with the problem-solving skills to solve abstract math problems (i.e., number theory and proofs) and real-world problems (i.e., architecture, statistics, financial math). The problem-solving skills will be drawn from four branches of mathematics: algebra, geometry, number theory, and combinatorics. This course will consist of interactive group sessions where students develop and apply analytical skills to competition-style events from MathCounts and AMC such as team round, countdown round. Students may have the opportunity to compete in local, regional, state, and national competitions in the spring semester.

Prerequisite: Completion of Pre-Algebra

Art of Problem Solving 2 **Semester** **7-8**

This course is a math elective and cannot replace the required math class. Art of Problem Solving 2 is the subsequent course for Art of Problem Solving 1 course. This course equips students with the problem-solving skills to solve abstract math problems (i.e., number theory and proofs) and real-world problems (i.e., architecture, statistics, financial math). The problem-solving skills will be drawn from four branches of mathematics: algebra, geometry, number theory, and combinatorics. This course will consist of interactive group sessions where students develop and apply analytical skills to competition-style events from MathCounts and AMC.

Prerequisite: Completion of Art of Problem Solving 1

*** Course meets UC eligibility**
^ Earns an extra grade point

All course offerings are subject to minimum enrollment levels.