

MATHEMATICS

MATHEMATICS CURRICULUM

	9th Grade	10th Grade	11th Grade	12th Grade
<ul style="list-style-type: none"> • Level 1: For students who have completed an Algebra 1 course, but have not completed a high school Intermediate Algebra course. 	<ul style="list-style-type: none"> • Intermediate Algebra • Fast-paced Intermediate Algebra (Teacher Approval) 	<ul style="list-style-type: none"> • Geometry • AP[®] Comp Science Principles 	<ul style="list-style-type: none"> • Algebra 2 • AP[®] Computer Science* • AP[®] Comp Science Principles* 	<ul style="list-style-type: none"> • Math Modeling with Applications • Precalculus • AP[®] Statistics • AP[®] Computer Science *
<ul style="list-style-type: none"> • Level 2: For students who have accelerated a year in math and who have completed a high school Intermediate Algebra course. 	<ul style="list-style-type: none"> • Honors Geometry 	<ul style="list-style-type: none"> • Honors Algebra 2 • AP[®] Statistics • AP[®] Computer Science* • AP* Comp Sci Principles* 	<ul style="list-style-type: none"> • Honors Precalculus • AP[®] Statistics • AP[®] Computer Science • AP[®] Comp Science Principles* 	<ul style="list-style-type: none"> • Honors Precalculus • AP[®] Statistics • AP[®] Calculus AB • AP[®] Calculus BC • AP[®] Computer Science * • AP* Comp Sci Principles*
<ul style="list-style-type: none"> • Level 3: For students who have accelerated two years in math and have completed a high school Intermediate Algebra and Honors Geometry course. 	<ul style="list-style-type: none"> • Honors Algebra 2 	<ul style="list-style-type: none"> • Honors Precalculus • AP[®] Statistics • AP[®] Computer Science* • AP[®] Comp Science Principles 	<ul style="list-style-type: none"> • AP[®] Statistics • AP[®] Calculus AB • AP[®] Calculus BC • AP[®] Computer Science * • AP[®] Comp Science Principles* 	<ul style="list-style-type: none"> • AP[®] Statistics • AP[®] Calculus AB • AP[®] Calculus BC • AP[®] Computer Science * • CLA/Diff Eq. • Multivariable Calculus • AP[®] Comp Sci Principles

*Courses in bold meet typical graduation requirements

*Introduction to Computer Science (not a math credit) can be taken during any year.

*AP[®] Computer Science and AP[®] Computer Science Principles are elective courses and do not qualify as one of the math credits required for graduation.

Characteristics of a Student Well-Suited for Honors Math Courses

1. Has experienced high achievement in past courses without undue stress; has not depended on rote learning or tutoring.
2. Is creative. Can think of things to try, or use original methods, when faced with a problem situation.
3. Readily applies learned principles to new situations. Can solve novel problems. Responds well to guided discovery.
4. Responds positively to challenging situations. Shows persistence in searching for solutions. Finds satisfaction in independently solving a problem rather than accepting another person's solution or help.
5. Likes to analyze, generalize, derive, prove, abstract; to investigate relationships and alternative solutions.
6. Has a strong intuitive sense for the subject matter. Sorts out key relationships quickly.
7. Shows a high degree of interest and motivation. Is intellectually curious and a critical thinker.
8. Works well independently. Seeks help only when necessary. Does not require detailed or repeated teacher directions in order to proceed.
9. Shows above average ability in oral and written expressions.

National and state reports from mathematics and education organizations recommend that all students take four years of mathematics in grades 9-12. Colleges and universities require three or four years of high school level mathematics. Many vocational and technical school programs require a math background. To prepare for post-secondary studies, students benefit from a sequential plan of mathematical coursework that is appropriate for them. With this in mind, the mathematics department offers sequential courses differentiated by student abilities. The District 196 mathematics curriculum addresses concerns that have been identified in mathematics education. The textbook series provides materials that use current technology and real-life applications, incorporates reading, integrates with other subjects, and presents material needed by all students in the future. **Success in any mathematics course requires a solid background from previous coursework, proper study skills, and a commitment to daily work.** To fulfill graduation requirements all students are required to earn nine trimester credits, three of which are earned in grade nine. Students entering Apple Valley High School as 9th graders and who are currently enrolled in a middle school in the district will be enrolled in one of three levels based on the recommendation of the

Mathematics Department: Intermediate Algebra, Honors Geometry or Honors Algebra 2. This recommendation includes input from a grade eight mathematics teacher, mathematics grades and standardized test scores. Students who will be in 10th, 11th, or 12th grade next year will enroll in courses based upon the student's mathematics teacher's recommendation and mathematics achievement. Note: Students enrolled in the following courses are required to have a graphing calculator. The TI83 or 84 series is strongly recommended.

- Algebra 2
- Honors Algebra 2
- Technical Mathematics
- Precalculus
- Honors Precalculus
- Advanced Placement® Statistics
- Advanced Placement® Calculus AB
- Advanced Placement® Calculus BC
- College Linear Algebra and Differential Equations

Intermediate Algebra F-3505, W-3506, S-3507

Grades: 9-10

Prerequisite: Algebra 1

Intermediate Algebra is a study beyond the linear topics found in Algebra 1. Topics include systems of equations, quadratic equations, polynomials, data and statistics, probability and simulation, transformations, and connections to geometry. Students must have a scientific calculator. We recommend the TI-30XIIS. (Graphing calculators are NOT needed.) *This is a year-long course. Students should register for all three courses.

Note: A student who fails Intermediate Algebra fall trimester will remain in the class winter trimester, however, an elective class (or study hall) may be dropped and the student may be placed in a supplemental math class. The supplemental math class will be an elective credit; it will not count as a required math credit. This scenario will repeat itself spring trimester for those who fail the winter Intermediate Algebra course. Students in the supplemental class T2 who earn a "C-" grade or higher in the mainstream math class, can opt out of the supplemental class in the spring.

Fast-Paced Intermediate Algebra F-3508, W-3509, S-3510

Grades: 9-10

Prerequisite: Algebra 1 **AND** Middle School Teacher Recommendation

Fast-paced Intermediate Algebra is a study beyond linear topics in Algebra. It is more in depth than Intermediate Algebra and moves at an accelerated pace. This course also incorporates concepts from the STEM-Innovator program. These concepts and strategies include teamwork, customer discovery, problem-solving and developing multiple prototypes. **You must have a teacher recommendation to enroll in this course.** Topics include systems of equations, quadratic equations, polynomials, data and statistics, probability and simulation, transformations and connections to geometry. Continuation in this course is contingent upon earning a passing grade the previous trimester. A TI-84 graphing calculator is recommended. Note: This is a year-long course. Students should register for all three courses.

Geometry F-3521, W-3522, S-3523

Grades: 10-11-12

Prerequisite: Intermediate Algebra

Geometry integrates standard approaches, coordinates, transformations, and real-world applications making use throughout of the algebra students know. Other topics include: measurement, formulas, similarity, logic, and trigonometry. Students must have a scientific calculator. We recommend the TI-30XIIS. (Graphing calculators are not required for this course.) *This is a year-long course. Students should register for all three courses.

Honors Geometry F-3525, W-3526, S-3527

Grades: 9-10

Prerequisite: Intermediate Algebra

Geometry integrates standard approaches, coordinates, transformations, and real-world applications making use throughout of the algebra students know. Other topics include: measurement, formulas, similarity, logic, and trigonometry. This course moves faster than the Geometry course. Students must have a scientific calculator. We recommend the TI-30XIIS. (Graphing calculators are not required for this course.) *This is a year-long course. Students should register for all three courses. NOTE: Students need to earn a C- or higher to remain in Honors level math. ***Please review the “Characteristics of a student well-suited for Honors Math Courses” at the beginning of the mathematics section.**

Algebra 2 F-3529, W-3530, S-3531

Grades: 11-12

Prerequisite: Intermediate Algebra and Geometry

This second year of algebra will emphasize reading, problem solving, and real-world applications. Topics include: linear, exponential, quadratic, logarithmic and trigonometric functions and matrices. Technology will be integrated throughout the course. A graphing calculator is required for the course. The TI83 or 84 series is recommended. *This is a year-long course. Students should register for all three courses.

Honors Algebra 2 F-3539, W-3540, S-3541

Grades: 9-10-11

Prerequisite: Intermediate Algebra and Geometry with strong performances, or Honors Geometry

This second year of algebra will emphasize reading, problem solving, and real-world applications. Topics include: linear, exponential, quadratic, logarithmic and trigonometric functions and matrices. Technology will be integrated throughout the course. This course moves faster than the Algebra 2 course. A graphing calculator is required for the course. The TI83 or 84 series is recommended. *This is a year-long course. Students should register for all three courses.

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Math Modeling and Applications F-3601, W-3602, S-3603

Grades: 12

Prerequisite: Algebra 2

Math Modeling and Applications will begin by building estimation and problem-solving skills. The course will cover topics of number theory, algebra, geometry, consumer mathematics, financial management, measurement, probability, statistics, and trigonometry. This is a year-long course for students who want to continue with mathematics, but **are not ready for the rigor** of AP[®] Statistics, CAPS, or Precalculus. A graphing calculator is required for this course. The TI83 or 84 series is recommended. **This course has not been approved by the NCAA Clearinghouse.**

Precalculus F-3587, W-3588, S-3589

Grades: 11-12

Prerequisite: Algebra 2

Precalculus topics include a review of the elementary functions, advanced properties of functions, polar coordinates, complex numbers, and introductions to the derivative and integral. Recursion, combinatorics, and vectors are also included. A graphing calculator is required for the course. The TI83 or 84 series is recommended. * This is a year-long course for students who intend on pursuing a post-secondary course of study with a math/science focus. Students should register for all three courses.

Honors Precalculus F-3583, W-3584, S-3585

Grades: 11-12

Prerequisite: Honors Algebra 2

Course topics include a review of the elementary functions, advanced properties of functions, polar coordinates, complex numbers, and introductions to the derivative and integral. Vectors are also included. This course moves faster

than the Precalculus course. A graphing calculator is required for the course. The TI83 or 84 series is recommended.

*This is a year-long course. Students should register for all three courses.

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Extended Algebra with Trigonometry F-3514 , W-3515 , S-3516 ,

Grades 11-12

Prerequisite: Must have instructor approval to enroll in this course.

Advanced Placement® Calculus AB F-3591, W-3592, S-3593

Grade: 12

Prerequisite: Honors Precalculus or Precalculus

In this course, students will study rates of change, along with limits of functions. Formal differentiation and its application to real-world problems will be included. Students will study integration to find the area under a curve and its applications. The calculus of trigonometric, exponential, and logarithmic functions will also be studied. This course is equivalent to one semester of college calculus. Many majors in post-secondary education require some mathematics and the AB exam credit would satisfy the requirement. A graphing calculator is required for this course. The TI83 or 84 series is recommended. *This is a year-long course. Students should register for all three courses and are expected to take the Advanced Placement® exam at the end of the year.

***Please review the “Characteristics of a student well-suited for Honors Math Courses” at the beginning of the mathematics section.**

Advanced Placement® Calculus BC F-3608, W-3609, S-3610

Grade: 12

Prerequisite: Honors Precalculus

Students pursuing careers in engineering or the physical sciences would benefit from the BC level course. Topics include those in Calculus AB in addition to parametric, polar and vector functions, polynomial approximations, and series. This course is equivalent to two semesters of college calculus. A graphing calculator is required for the course. The TI83 or 84 series is recommended. *This is a year-long course. Students should register for all three courses and are expected to take the Advanced Placement® exam at the end of the year.

***Please review the “Characteristics of a student well-suited for Honors Math Courses” at the beginning of the mathematics section.**

Advanced Placement® Statistics F-3611, W-3612, S-3613

Grades: 10-11-12

Prerequisite: Completed Honors Algebra 2, dual enrollment with Honors Algebra 2, Completed Algebra 2 with teacher approval

This course is an introduction to the practice of statistics. This Advanced Placement® class covers data collection, analysis and displaying procedures, simulations, probability, distributions as well as surveys and census taking methods. A graphing calculator is required for the course. The TI83 or 84 series is recommended. *This is a year-long course. Students should register for all three courses and are expected to take the Advanced Placement® exam at the end of the year.

***Please review the “Characteristics of a student well-suited for Honors Math Courses” at the beginning of the mathematics section.**

College Linear Algebra and Differential Equations (CLA/Diff Eq) F-3657, W-3658, S-3659

Grades: 9-10-11-12

Prerequisite: AP® Calculus BC or equivalent

This course is an introduction to college linear algebra and to differential equations and is intended for students who have successfully completed Calculus BC or an equivalent course. Linear Algebra topics include systems of linear equations, matrices, determinants, vector spaces, linear transformations and eigenvalues, eigenvectors, etc. Selected applications and use of technology will be included. Coverage in the area of differential equations includes basic

definitions, ideas, and terminology of ordinary differential equations, as well as problem-solving techniques. Specific topics covered include solutions and applications of first-order differential equations, solutions of linear differential equations of higher order, second-order differential equations, and systems of linear differential equations. A graphing calculator is required for the course. The TI83 or 84 series is recommended. *This is a year-long course. Students should register for all three courses.

***Please review the “Characteristics of a student well-suited for Honors Math Courses” at the beginning of the mathematics section.**

Multivariable Calculus F-3651, W-3652, S-3653

Grade: 12

Prerequisites: Successful completion of AP[®] Calculus BC and AP[®] exam or instructor recommendation

This course is designed for the gifted math student. It covers the same material as a college-level Multivariable Calculus class, including the same rigor, expectations, and special technological skills found in many 2nd and 3rd year college courses. Topics covered include a brief review of infinite series and parametric and polar coordinates, vector geometry and 3-dimensional graphing techniques, vector-valued functions, differentiation of several variables, multiple integration, line and surface integrals, and fundamental theorems of vector analysis. Students will also learn to use the mathematical software package Maple to aid in their understanding of the material and to complete assignments and projects. We will use graphing calculators extensively. The TI-83 or TI-84 series is strongly recommended. The TI-89 may be used in this class. Students pursuing careers in engineering and the physical sciences would benefit from selecting this course. This is a year-long course. This course is shared with EVHS students and will be taught at either AVHS or EVHS as determined by enrollment. **If the course is offered at EVHS, students are responsible for their own transportation to and from that school.**

Computer Science Programs

***NOTE – These courses are math electives and do not qualify as one of the math credits required for graduation from Independent School District 196.**

Introduction to Computer Programming 3524

Grades: 9-10-11-12

Prerequisite: None

The Introduction to Computer Programming course will expose students to basic programming skills. Students will learn code design and how to use Java language for programming the computer. They will also become familiar with displaying information on the screen, using variables, and designing loops. **Note: This course is a math elective and does not qualify as one of the math credits required for graduation. Note: This course is not a NCAA core class.**

Advanced Placement[®] Computer Science F-3654, W-3655, S-3656

Grades: 10-11-12

Prerequisite: Honors Geometry or Geometry

AP[®] Computer Science is similar to an introductory computer programming course that you would find at many colleges. The course is taught with an emphasis on program design and the Java programming language. The primary topics include: basics of computer architecture; binary representations; use of variables; line-oriented input/output; assignment statements; conditional statements; looping constructs; arrays; methods and parameter use; using the Java Standard Library; object-oriented construct (instantiation inheritance, interfaces); simple searching, simple

sorting; basics of recursion. Students will spend the majority of their time designing, coding and testing their own applications. Several student projects will be assigned throughout the school year. This course prepares the student for the Advanced Placement® exam for possible college credit. This is a year-long course – students should register for all three trimesters of the course. Success in this course requires the ability to think abstractly and in an organized fashion, and have a strong personal work ethic. **Note: This course is an elective and does not qualify as one of the math credits required for graduation. Note: This course is not a NCAA core academic class.**

Advanced Placement® Computer Science Principles F-3663, W-3664, S-3665

Grades: 10-11-12

Prerequisite: Intermediate Algebra

AP® Computer Science Principles introduces students to the foundational concepts of computer science and challenges them to explore how computing and technology can impact the world. With a unique focus on creative problem-solving and real-world applications, AP® Computer Science Principles prepares students for college and career. **Note: This course is an elective and does not qualify as one of the math credits required for graduation.**

Note: This course is not a NCAA core academic class.

Mobile Apps Development F-3660, W-3661, S-3662

Grades: 10-12

Prerequisite: None

The Mobile Applications Development Computer Science course is a class in which students will learn another programming language, explore Graphical User Interfaces (GUI), and create applications for general use. This course is designed to provide students with a real-life experience in the full evolution of Application Development: conception, definition, creation, testing, deployment, and support. Students will learn the Objective C programming language and the Xcode Integrated Development Environment tool set. There will be a focus on the Graphical User Interface for the iPad, iPhone and Mac platforms. This course will require students to find a working professional (the User) who needs an Application developed. Students will design an App which meets the requirements of the User and get agreement that the design meets the requirements of the User. Finally, the student will implement, test and deliver the App to the User. The first trimester will focus on learning the new language and development tool set. The second and third trimesters will focus on specifications, design, development, testing and delivery of the Application by a team of students. *This is a year-long course. Students should register for all three courses. **Note: Mobile App Development does not count as a math credit towards graduation, is not a NCAA core academic class, and is not accepted as a math credit by colleges and universities.**

