Asheville School

2025-2026

Math

Course Offerings

ALGEBRA 1

Algebra 1 is a foundational course designed to introduce students to the fundamental concepts and skills of algebra. Throughout the course, students will explore the relationships between variables and learn how to manipulate algebraic expressions. They will develop techniques for solving linear equations and inequalities, including both simple and multi-step problems. Students will also investigate the concept of functions, focusing on linear functions, and will gain experience in graphing and interpreting various data sets. Additionally, the course will cover the basics of polynomials, including operations and factoring. Real-world applications will be emphasized, enabling students to apply their algebraic knowledge to solve practical problems and enhance their critical thinking abilities. Through collaborative activities, problem-solving exercises, and technology-enhanced learning, students will build a solid foundation for future mathematics courses. By the end of Algebra 1, students will have the confidence and skills to approach complex mathematical challenges.

GEOMETRY

Geometry is a dynamic course that explores the properties and relationships of shapes, sizes, and figures in both two and three dimensions. Students will engage with fundamental concepts such as points, lines, angles, triangles, quadrilaterals, circles, and more complex geometric figures. The course emphasizes the development of logical reasoning and problem-solving skills through the study of geometric proofs, theorems, and constructions. Throughout the year, students will learn to apply geometric principles to real-world situations, using measurement and spatial reasoning to analyze and interpret various shapes and structures. They will explore concepts of congruence, similarity, and transformations, as well as the relationships between angles and lines in parallel and intersecting configurations. Additionally, students will use technology and hands-on activities to deepen their understanding of geometric concepts, fostering critical thinking and collaboration. By the end of the course, students will have a solid grasp of geometric principles, preparing them for advanced mathematics and enhancing their ability to visualize and solve problems in everyday life.

HONORS GEOMETRY

This course covers all topics from the on-level Geometry course with greater depth, emphasizing rigorous problem-solving, real-world applications, and a faster pace. Students will engage in advanced explorations of congruence, similarity, transformations, and spatial reasoning while incorporating proof-based logic and technology. This course challenges students to think critically, apply geometric concepts to complex problems, and prepare for and Honors course in Algebra 2.

ALGEBRA 2

Algebra 2 is an advanced mathematics course that builds on the foundations established in Algebra 1, delving deeper into the study of algebraic concepts and their applications. Students will explore complex numbers, polynomial functions, rational expressions, and exponential and logarithmic functions, developing a thorough understanding of their properties and behaviors. The course emphasizes the analysis of functions, including quadratic, polynomial, rational, and radical functions, as well as the exploration of their graphs and transformations. Students will learn to

solve a variety of equations and inequalities, engage in systems of equations, and apply techniques for factoring and simplifying expressions. In addition to pure algebraic skills, the curriculum will incorporate real-world applications, enabling students to apply mathematical concepts to solve problems in diverse contexts. Throughout the course, students will enhance their problem-solving abilities, critical thinking skills, and mathematical reasoning. With a mix of collaborative projects, technology integration, and independent exploration, Algebra 2 prepares students for higher-level mathematics courses and provides a solid foundation for future studies in STEM fields.

HONORS ALGEBRA 2

Honors Algebra 2 will emphasize the analysis of functions, including quadratic, polynomial, rational, and radical functions, as well as the exploration of their graphs and transformations. The course will also explore topics such as complex numbers, exponential and logarithmic applications, trigonometry, and sequences and series, prioritizing the development of a thorough understanding of properties and behaviors. As an honors level course, this class will move at a faster pace with less review, while also involving deeper exploration of each concept. Students will be expected to demonstrate a dynamic comprehension of each unit and to extend their understanding through modeling and various applications. Please see the honors document for the math department for additional details. This course is specifically designed to prepare students to take Calculus in two years.

PRECALCULUS

Precalculus is an advanced mathematics course designed to bridge the gap between algebra and calculus. Throughout the course, students will deepen their understanding of mathematical concepts and develop the necessary skills to prepare for higher-level mathematics. The curriculum explores the foundational principles of functions, including polynomial, rational, exponential, logarithmic, and trigonometric functions. Students will learn how to analyze and graph these functions, investigate their properties, and apply them to solve real-world problems. In addition to studying functions, the course covers topics such as systems of equations and sequences and series. Students will also explore the principles of mathematical modeling, using functions to represent and solve problems in various fields, such as physics, economics, and engineering. Key concepts of trigonometry, including the unit circle, trigonometric identities, and solving trigonometric equations, will be emphasized to ensure students are prepared for the study of calculus.

HONORS PRECALCULUS

Honors Precalculus follows the same syllabus used by the Precalculus course. The pace and rigor of the honors course is a notable difference. Students must also regularly apply concepts to solve problems. Honors Precalculus is a prerequisite to Advanced Calculus. Additional details regarding honors level math courses can be found at this link.

STATISTICS

This course provides a comprehensive introduction to the fundamental concepts and methods in statistics. Students will explore key topics such as data collection and analysis, basic probability, descriptive statistics, inferential statistics, hypothesis testing, and regression analysis. Through a combination of theoretical principles and practical applications, students will learn to interpret data, draw conclusions, and make informed decisions based on statistical evidence.

Emphasis is placed on real-world examples and the use of statistical applets to analyze data. By the end of the course, students will have a strong grasp of fundamental statistical concepts and the ability to apply them responsibly in everyday contexts.

HONORS STATISTICS

In Honors Statistics, students will build a solid foundation in the essential concepts of statistics, focusing on data collection, organization, and analysis. The course covers important topics such as summarizing data, probability theory, sampling methods, and an introduction to hypothesis testing and confidence intervals. While the course is not as in-depth or challenging as Advanced Statistics, it offers more depth and complexity than the regular course, encouraging students to apply statistical methods to real-world problems. Students will develop skills in interpreting data, identifying trends, and using graphical and numerical techniques. With a balance of theory and hands-on activities, students will develop the skills needed to analyze data, make informed decisions, and understand the role of statistics in the world around them. By the end of the course, students will have the skills to critically evaluate statistical results and apply statistical techniques to various fields, including business, healthcare, social sciences, and more.

ADVANCED STATISTICS

In Advanced Statistics, students enhance their skills in collecting, organizing, analyzing, and interpreting data. The course covers both the theory and practical applications of statistical analysis, including survey and experiment design, and the use of graphical and numerical methods to summarize data and identify patterns for both univariate and bivariate data sets. Students will explore probability, simulations, sampling distributions, confidence intervals, and significance tests to make data-driven inferences about populations. In addition to mastering core statistical techniques, students will develop critical thinking skills to evaluate the use (and misuse) of statistics in media, research, and policy. Through hands-on projects and real-world case studies, they will gain a deeper understanding of data analysis and become more discerning consumers of statistical information. By the end of the course, students will be equipped to apply advanced statistical methods, solve complex problems, and interpret data responsibly.

HONORS CALCULUS

This course provides a foundational introduction to calculus with a strong emphasis on real-world applications. Students will explore key concepts such as limits, derivatives, and integrals, learning how to use calculus to model and solve problems in fields like physics, engineering, economics, and biology. Through hands-on examples and problem-solving, students will develop a practical understanding of rates of change, optimization, and area calculations. Designed for those with a solid background in algebra and precalculus, this course equips students with the mathematical tools needed for real-life problem-solving and future studies in applied sciences.

ADVANCED CALCULUS

Advanced Calculus is a college-level calculus course designed for students who have a strong foundation in algebra, geometry, and precalculus and are eager to explore the abstract, theoretical side of calculus. Emphasizing the core

concepts and principles of pure mathematics, students will delve deeply into the study of limits, derivatives, integrals, and infinite series, with a focus on rigor and proof-based understanding. Topics will include the formal definitions and theorems surrounding differentiation and integration, the exploration of sequences and series, the fundamental theorem of calculus, and the convergence of functions and series.

TOPICS IN HIGHER MATHEMATICS (ADVANCED)

This post Calculus course functions as an introduction to mathematical proof, linear algebra, and ordinary differential equations with a project-based emphasis on mathematical modeling. By the end of the course, students should be able to present mathematical ideas clearly and rigorously (in writing, graphically, and through presentations). They should leave this course with a foundational and intuitive understanding of a variety of mathematical topics and be able to use the modeling process to help analyze real-life problems (or fictionalized versions like a zombie outbreak). Students learn how to use appropriate tools and techniques to help solve problems, including computational tools like spreadsheets and MATLAB. They will additionally develop skills to learn new mathematical topics independently from textbooks and other resources. In a nutshell, this course is designed to help students learn how to think like a mathematician. At the end of the year, students complete independent research projects which they display and present to the greater school community.

INTRODUCTION TO COMPUTER SCIENCE

It is no secret that computers make the world go round these days. Every major development in the last 60 years has been driven by computer science. A lot has changed since Ada Lovelace wrote the first computer program in the 19th century, but the goal of computer science remains the same. Computers are machines that are meant to amplify and extend our abilities to solve problems and improve our lives. Computer science teaches us both the theories and the mechanics of how to solve complex problems using computers. In this class, we will map out the field of computer science, discover what computers both can and cannot do, understand how computers work from the ground up, learn fundamental programming concepts by doing, practice effective design, analysis, and debugging techniques, and employ these concepts and techniques to solve problems.

ADVANCED COMPUTER SCIENCE

This is a college-level course that introduces the Java programming language. The course is built around developing computer programs, or parts of programs, that correctly solve a given problem. The course emphasizes design elements that ensure programs are understandable, adaptable, and, when appropriate, reusable. At the same time, the development of computer applications is utilized as a context for introducing other important computer science concepts, including the development, analysis, and application of algorithms and fundamental data structures. To aid them in these explorations, students will delve into industry standards with regard to tools, design techniques, reading and writing documentation, and debugging strategies. In addition, students will be challenged to consider what constitutes ethical use of technology, including the development of algorithms.

Math Department Course Levels: Honors and Advanced

Placement in honors or advanced math courses is based on a comprehensive review of a student's performance over the past two years, including grades, teacher input, placement tests, and standardized test scores when available. An A in a standard math course does not automatically qualify a student for an honors-level course. The following points outline the key differences between honors/advanced courses and on-level math courses:

1. **PACE AND RIGOR:**
   Honors courses move faster and delve deeper into content. Students must quickly grasp concepts and seek help promptly when needed. High absenteeism can hinder success.
2. **LESS REPETITION:**
   With fewer examples and worksheets provided, students are expected to master concepts independently and apply them to various problems.
3. **APPLICATION OVER MEMORIZATION:**
   Students must apply concepts, including abstract problem-solving and word problems, in different contexts.
4. **CONTINUOUS CONNECTION:**
   New topics build on previous lessons and past courses, requiring retained mastery without frequent reviews.
5. **INCREASED CONTENT:**
   Honors courses typically cover two additional units compared to standard courses due to the accelerated pace.
6. **FOCUSED ON PROCESS:**
   Emphasis is placed on showing work and following proper steps, not just finding the right answer.
7. **NO GRADE BOOSTS:**
   No extra credit opportunities or test corrections will be offered. Students must accept that not all will earn an A.
8. **ACADEMIC MATURITY:**
   Students must demonstrate resilience, self-advocacy, and a commitment to learning, even when faced with challenges.

Given the demanding nature of honors/advanced courses, students must have a genuine passion for math, a strong work ethic, and the ability to engage with abstract concepts. Additionally, students should consider whether they can manage the workload and balance it with their overall schedule. Placement decisions aim to match students with courses that align with their skills and will support their long-term success in the math curriculum.