



# Mathematics

Mount Madonna School provides the opportunity for students to become Algebra-ready by eighth grade, and for all High School students to complete at least one Advanced Placement Math class by the time they graduate. High School students are required to take four years of college preparatory mathematics. The Middle School program focuses on developing students' confidence around mathematical thinking while allowing students to progress at a pace that reflects their motivation and interest. The goal of our Math program is to allow math to "sing" for every student. Students progress as they are ready and should graduate as lifelong users of Mathematics.

## Math 6 and Math 7

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In sixth and seventh grade, students learn all the skills needed to prepare them for a rigorous Algebra course in the 8<sup>th</sup> grade. Teachers use the direct method of teaching in conjunction with group and exploratory practices using multiple resources. Units include Ratios, Rates and Proportional Reasoning, Percents, Arithmetic including Fraction, Rational Numbers, Expressions and Equations, Geometry, Statistics and Probability, which are offered in concert with science projects so that students can observe math in action.

## STEAM-6 and STEAM-7

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STEAM stands-for Science, Technology, Engineering, Art and Mathematics. This class is targeted at students who understand math better when they see it in the context of another subject. In one block period per week, students use their mathematical brains to study Music Theory, Computer Programming, Choreography and Math, and Engineering.

## Math Lab Intensive for Grades 6 and 7

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This class is targeted at 6<sup>th</sup> and 7<sup>th</sup> graders who have a strong interest and/or strength in mathematics and a desire to work hard exploring the subject at a deeper level. The class progresses through Elementary Algebra, working the most difficult problem sets available for each unit. It is offered at the same time as STEAM and is intended to prepare students to be successful in a combined Algebra I/II course in the 8<sup>th</sup> grade.

## Algebra I

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This course provides students with a strong foundation for further studies of mathematics. Students learn to recognize and apply advanced tools for attacking word problems and increase their ability to use observation and reasoning skills. Small class sizes allow students to master algebraic concepts in this class. Topics covered include Rational Expressions, Manipulating and Factoring Polynomials, Manipulating and Applying Fractions, Functions and Linear Equations, Systems of Linear Equations, Inequalities, Rational and Irrational Numbers including Radical Expressions, and the Quadratic Formula.

## Algebra II (honors option)

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In this class, students build on what they have learned in their Algebra I course and deepen their interaction with the fundamentals of mathematics. Topics include Linear Equations and Functions, Polynomials, Rational and Irrational Numbers,

Quadratic Functions and Graphing, Geometry, and Exponential and Logarithmic Functions. Honors students reach deeper into the material and explore more challenging applications of the material being presented.

## **Algebra I/II** \_\_\_\_\_

In this class, students who demonstrated readiness through their 6<sup>th</sup> and 7<sup>th</sup> grade years, in 8<sup>th</sup> grade progress rapidly through Algebra I in the first semester. In the second semester, students review, perfect and expand their skills through the Algebra II concepts. Entrance to this course requires the 7<sup>th</sup> grade teacher's recommendation as well as successful completion of Math Lab Intensive in 7<sup>th</sup> grade.

## **Geometry (honors option)** \_\_\_\_\_

In Geometry, students maintain and use their algebra skills while applying those skills to Geometric problems and reasoning. Students practice proofs and advanced problem-solving skills. All the basic postulates of Euclidian Geometry are covered; students also study the Pythagorean Theorem, Coordinate Geometry, Surface Area, Perimeter and Volume, and Solid Geometry. Honors students take a more theoretical approach; non-honors students follow more hands-on learning.

## **Pre-Calculus (honors option)** \_\_\_\_\_

This class covers the knowledge and skills necessary to prepare students for a college-level Calculus class. Some major topics include Transformations of Functions, Solving and Graphing Advanced and Inverse Trigonometric Functions, Polar Coordinates and Vectors, Analytical Geometry, early Linear Algebra with Matrices, Solid Geometry treated as Coordinate Geometry, Probability, Sequences and Series, and the concepts of Limits and Rates of Change. Honors students are expected to show a deeper knowledge of all material and take more challenging weekly exams.

## **AP Calculus AB and AP Calculus BC** \_\_\_\_\_

These courses are college-level mathematics courses focused on preparing students to take either the Calculus AB or Calculus BC exams. They each follow curriculum currently recommended and approved by the College Board. Topics include Functions, Limits, Derivatives and their Applications, Techniques of Integration, Applications of Integrals and Infinite Series. AP Calculus AB covers Limits, Derivatives, basic Integrals and their Applications. AP Calculus BC revisits many of the AB topics with more complex applications and interpretations and focuses on advanced Integration Methods, Calculus of Parametric Equations and Infinite Series.

## **AP Statistics and Statistics** \_\_\_\_\_

Curriculum for this course follows AP Statistics curriculum approved by the College Board and is designed to introduce students to the uses of analytical data. This course draws connections between all aspects of the statistical process, including Exploring Data, Sampling and Experimentation, Anticipating Patterns, and Statistical Inference. Additionally, using the vocabulary of statistics this course will teach students how to use and communicate statistical methods, results and interpretations using a year-long project of their own design. The two courses are taught in the same classroom and students electing not to take the "AP" course have different expectations on homework and take different exams, although the same material is presented to all the students.