

A Guide to the Colorado Academic Standards



Mathematics

Algebra II
High School



Working Together

To support families and teachers in realizing the goals of the Colorado Academic Standards, this guide provides an overview of the learning expectations for high school mathematics and offers some possible learning experiences students may engage in during this time.

Why Standards?

Created by Coloradans for Colorado students, the Colorado Academic Standards provide a grade-by-grade road map to help ensure students are ultimately successful in college, careers, and life. The standards aim to improve what students learn and how they learn in ten content areas, emphasizing critical-thinking, creativity, problem solving, collaboration, and communication as important life skills in the 21st century.

Mathematics Education for High Schools (9-12)

The mathematics standards throughout middle and high school build on the strong foundation of number developed during elementary school. Students begin to branch into other areas of mathematics such as probability, statistics and algebra. The study of geometry and geometric proof is also formalized during these years. The work of geometric proof is also extended to all parts of mathematics as students construct viable arguments and critique the reasoning of others. In each grade students investigate the world around them through mathematics. They confront problems and persevere in solving them as they strategically apply mathematical tools and techniques.

Where can I learn more?

- Contact your school district regarding local decisions related to standards, curriculum, resources, and instruction.
- Colorado Academic Standards Booklets: <http://www.cde.state.co.us/standardsandinstruction/GradeLevelBooks.asp>
- Mary Pittman, Mathematics Content Specialist at 303-854-4560, Pittman_m@cde.state.co.us



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At the end of High School, students can...



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Mathematics Learning Expectations for Algebra II

Number Sense, Properties, and Operations

Calculate with fractional exponents and imaginary numbers (complex numbers); explain why the solutions to some quadratic equations are imaginary.

Patterns, Functions, and Algebraic Structures

Fluently divide polynomials; fluently write formulas for arithmetic and geometric sequences; create graphs of polynomials by identifying zeros and describe key features of the graph; create equations and inequalities for linear, quadratic, rational and exponential functions; solve rational and radical equations; solve systems of equations and inequalities; find inverse functions; use logarithms and technology to solve exponential equations; describe patterns that repeat in cycles using trigonometry.

Data Analysis, Statistics, and Probability

Recognize the purpose of surveys, experiments and observational studies; compare treatment and control groups from an experiment; estimate the mean and standard deviation of a population from sample data; explain the purpose of a normal curve; calculate margins of errors; compute probabilities of multiple events and determine if one event influences another.

Throughout Algebra II, you may find students...

- Determining the monthly interest rate for a savings account with an annual interest of 4.5%.
- Explaining how a mortgage calculator uses geometric series to determine monthly payments.
- Researching how imaginary numbers are used in the production of movies.
- Modeling the motion of a ferris wheel, pendulum, or ocean tides with a trigonometric function.
- Comparing the strengths of earthquakes using logarithms.
- Examining control and treatment group data from an experiment testing the effectiveness of a new study technique.
- Calculating the probability of getting cancer given a history of smoking.
- Describing the meaning of a $\pm 4\%$ margin of error for a presidential candidate polling at 48%.