

A Guide to the Colorado Academic Standards



Mathematics

Integrated III
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.

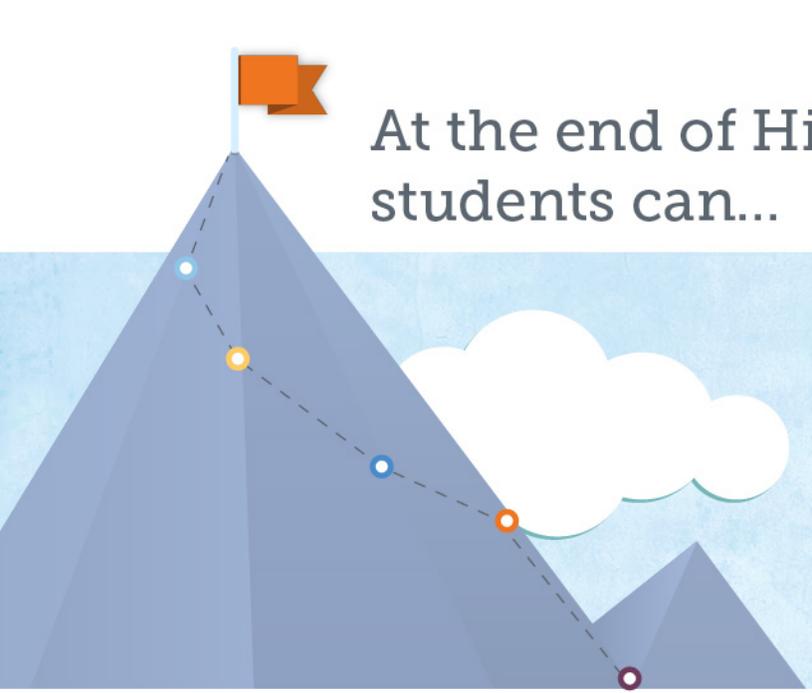
Where can I learn more?

- 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 Integrated III

Patterns, Functions, and Algebraic Structures
Fluently write formulas for arithmetic and geometric sequences; fluently divide polynomials; create graphs of polynomials by identifying zeros and describe key features of the graph; solve rational and radical equations; create equations and inequalities for linear, quadratic, rational and exponential functions; 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; explain the purpose of a normal curve; calculate margins of errors.

Shape, Dimension, and Geometric Relationships
Fluently use coordinates to calculate lengths and angles using equations derived from the Pythagorean Theorem; construct geometric figures using a compass and straight edge; find arc lengths and areas for parts of circles; determine if two lines are parallel or perpendicular by calculating their slopes.

Throughout Integrated III, you may find students...

- Modeling the motion of a Ferris wheel, pendulum, or ocean tides with a trigonometric function.
- Describing the meaning of a $\pm 4\%$ margin of error for a presidential candidate polling at 48%.
- Examining control and treatment group data from an experiment testing the effectiveness of a new study technique.
- Comparing the strengths of earthquakes using logarithms.
- Explaining how a mortgage calculator uses geometric series to determine monthly payments.
- Applying the concept of area to calculate the population density for various parts of Colorado.
- Verifying the best location (that minimizes patient/visitor drive times) for a hospital serving three different communities.
- Designing a city's architectural plans using drafting tools and explaining the geometric principles underlying the plans.
- Using properties of circles to explain why the outside wheels of a car turn faster than the inside wheels of a car when turning a corner.