

# A Guide to the Colorado Academic Standards



## Mathematics

Integrated 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](mailto: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 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 graph functions and interpret key features of each function; fluently add, subtract, and multiply polynomials; use tables, graphs and equations to solve systems of linear and quadratic functions; represent the relationship between two quantities using quadratic functions; rearrange quadratic equations by factoring and completing the square; compare and contrast linear, quadratic, and exponential functions.

### Data Analysis, Statistics, and Probability

Compute probabilities of multiple events and determine if one event influences another.

### Shape, Dimension, and Geometric Relationships

Fluently determine if two triangles are congruent or similar; prove geometric theorems about congruency, similarity, and circles; prove the Pythagorean Theorem by using the concept of similarity; develop the trigonometric ratios (sine, cosine, tangent) and use them to solve a variety of right triangle problems.

## Throughout Integrated II, you may find students...

- Creating quadratic equations that describe the motion of the earth or the trajectory of a kicked football.
- Calculating where a snowboarder will land (on a mountain) after completing a jump using a linear equation to model the height of the mountain and a quadratic equation to model the path of the jump.
- Determining the dimensions of a soup can that minimizes packaging materials.
- Calculating heights of buildings, flagpoles, and trees using ratios (trigonometry).
- Exploring how the Hopewell people of the Ohio Valley (2000 years ago) created earthworks using right triangles.
- Researching how imaginary numbers are used in the production of movies.
- Calculating the probability of getting cancer given a history of smoking.
- Estimating the volume of a tree trunk by relating it to the volume of a cylinder.