



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



Mathematics

Geometry
High School



COLORADO
Department of Education

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Mathematics Learning Expectations for Geometry

Shape, Dimension, and Geometric Relationships

Fluently determine if two triangles are congruent or similar; fluently use coordinates to calculate lengths and angles; prove geometric theorems about congruency, similarity, and circles; construct geometric figures using a compass and straight edge; 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; find arc lengths and areas for parts of circles; calculate lengths and areas of figures on a coordinate plane using equations derived from the Pythagorean Theorem; determine if two lines are parallel or perpendicular by calculating their slopes; describe rotations, reflections, translations and dilations algebraically on a coordinate grid.

Throughout Geometry, you may find students...

- Applying the concept of area to calculate the population density for various parts of Colorado.
- Determining the dimensions of a soup can that minimizes packaging materials.
- Using constructions tools and software programs to explore properties of shapes and proving theorems based on these explorations.
- Writing geometric proofs to prove ideas about angles, lines, and figures.
- Calculating heights of buildings, flagpoles, and trees using ratios (trigonometry).
- 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.
- Verifying the best location (that minimizes patient/visitor drive times) for a hospital serving three different communities.
- Estimating the volume of a tree trunk by relating it to the volume of a cylinder.
- Exploring how the Hopewell people of the Ohio Valley (2000 years ago) created earthworks using right triangles.
- Designing a city's architectural plans using drafting tools and explaining the geometric principles underlying their plans.