Family Friendly
GUIDE FOR EIGHTH GRADE
Math

Steps to Success

This document is designed to:

• Provide examples of the standards, skills, and knowledge your child will learn in mathematics.

The South Carolina College-and Career-Ready Standards for Mathematics:

• Outline the knowledge and skills students must master so that, as high-school graduates, they have the expertise needed to be successful in college or careers.

• Provide a set of grade-level standards, "stair steps," based on the previous grade's standards which serve as the foundation for the next grade.

• Ensure that no matter where a student lives in South Carolina, the expectations for learning are the same.

Human knowledge now doubles about every three years. Therefore, revision of South Carolina's standards occurs periodically to respond to this growth of knowledge and increase of needed skills so our students will be ready for college or jobs. The College-and Career-Ready Standards prepare students for dealing with the growing mass of information by not only emphasizing content knowledge but by also stressing the skills of reasoning, analyzing data, and applying information to examine and solve situations.

South Carolinians developed these academic standards for South Carolina's children. The Mathematics standards are aligned with the Profile of the South Carolina Graduate, which summarizes the knowledge, skills, and habits employers expect. Developed by business leaders, the Profile is approved by the South Carolina Chamber of Commerce and endorsed by the Superintendents' Roundtable as well as South Carolina's colleges and universities. The Profile demands world-class knowledge and skills, and emphasizes critical thinking and problem solving, communication, and interpersonal skills.

DATA, PROBABILITY, AND STATISTICAL REASONING

Eighth graders will compare bivariate (two-variable) data. This is the first time that students will work with two variables simultaneously. They will use scatter plots to organize bivariate data from real-world situations. Students will describe associations among the data points in a scatter plot based on direction, form, and strength. Eighth graders will identify sample spaces and calculate and interpret the probability of compound events, using fractions, decimals, or percentages to report the probability of events.

- Create and analyze graphs (scatter plots) that represent real-world and mathematical situations

- Draw conclusions about data sets from two populations

- Describe how adding or deleting data can affect the mean, median, mode, and distribution of the set

- Compare data displays for two data sets using double line graphs, back-to-back stem-and-leaf plots, and/or double box plots

- Calculate and interpret the probability of compound events (for example, finding the probability of it raining AND being below freezing temperature on the same day)

Geometry with Statistics

- Using the data to graph a scatter plot, describe the relation and use two points to find an approximate line of fit and compare to the line of best fit.

- Distinguish between correlation and causation.

- Describe categories of events as smaller samples of a larger sample space using comparative words such as unions, intersections, or complements.

- Apply the Addition and Multiplication Rules to find the probability of events to interpret the answer and context.

MEASUREMENT, GEOMETRY, AND SPATIAL REASONING

Eighth graders will use technology to explore volume and other formulas to include the Pythagorean Theorem. The focus on right triangles will also include Pythagorean Triples and the relationship among the measures of triangles' interior and exterior angles and sums of angle measures of polygons decomposed into triangles. Eighth graders will study transformations and dilations of polygons graphed on or off the coordinate plane. Students will also study angle relationships of parallel lines. Students will also use proportional reasoning to determine congruence or similarity among polygons, finding the missing side lengths and identifying corresponding angles.

- Solve for volume of cones, cylinders, and spheres in mathematical and real-world situations

- Apply the Pythagorean Theorem ($a^2 + b^2 = c^2$) to find distances and missing side lengths on right triangles

- Understand congruence and similarity using physical models, transparencies, or Geometry software (for example, given two congruent figures, show how to obtain one from the other by a sequence of rotations, translations, and/or reflections)

- Determine angle relationships with parallel lines that are cut by a transversal

- Create a dilation using a given scale factor and describe the effect of a dilation

Geometry with Statistics

- Apply area and volume formulas of two-and three-dimensional figures to solve real-world situations.
- Identify and describe the shape formed when a three-dimensional figure is sliced, vertically, horizontally or diagonally.
- Using geometric vocabulary (rotation, reflection, and translation), students will be able to describe and apply a sequence of transformations of one figure to another figure.
- Determine that two figures are congruent by a series of rigid motions and justify the congruence of triangles using congruence conditions.
- Demonstrate and justify experimentally the properties of dilation of a figure given the scale factor and the center.
- Justify and apply the characteristics angles, triangles and quadrilaterals to solve real-world situations.
- Discover and apply the converse of the Pythagorean Theorem and constant ratios to right triangles in real-life situations.
- Students will apply the relationships among segments and angles in circles to solve real-world situations.

NUMERICAL REASONING

Eighth graders will convert any form of rational numbers to other forms, which—for the first time—includes translating repeating decimals to their fraction form. This strand also has students identify the subsets of real numbers and contrast rational and irrational numbers, which will include working with perfect squares and cubes and their roots. They will write equations and inequalities to compare real numbers given in real-world settings. Students will apply the Laws of Exponents learned in seventh grade to include algebraic expressions.

- Recognize rational numbers (numbers that can be written as fractions) and irrational numbers (numbers that as a decimal are infinite, such as pi, 3.14159...)
- Classify and order the subsets of real numbers in the number system including natural, whole, integer, rational, and irrational numbers
- Compare and order real numbers using is equal to (=), is not equal to (≠), is less than (<), is greater than (>), is greater than or equal to (≥), and/or is less than or equal to (≤)

Geometry with Statistics

- Show that all points on the number line are part of the real number system.
- Rewrite numerical expressions including radicals to simply, using addition, subtraction, multiplication and division to recognize geometric patterns.

PATTERNS, ALGEBRA, AND FUNCTIONAL REASONING

Eighth graders will concentrate on functions, learning the slope-intercept form of a linear function. Students connect proportionality and linear functions together so that the constant rate of change (slope) and y-intercept can be identified and interpreted. Students will analyze multiple representations of functions to determine if they represent a linear or nonlinear function or represent a non-function. For the first time, students compare two equations to determine if they represent functions with one solution, no solution, or infinite solutions. Also, for the first time, they solve one-variable multi-step equations and inequalities with the same variable on both sides.

- Explain and identify slope in equations, tables, or graphs

- Determine what makes a function

- Describe key features of functions, including domain, range, intervals of increasing or decreasing, constant, discrete, continuous, and intercepts.

- Use multiple representations including mappings, tables, graphs, verbal description, and equations (only when linear) of two functions to compare the functions and draw conclusions.

- Write and solve multi-step equations and inequalities with variables on both sides for real-world and mathematical problems (for example, when wanting to know how long it will take two cars to reach the same location when starting at different points)

- Explore positive and negative exponents attached to variables, square roots, and cube roots (for example, evaluating $c^3(c^5)$ or $\sqrt{36}$ or $\sqrt[3]{27}$)


Geometry with Statistics

- Discover, analyze and apply the derivations of the formulas for circumference, area of a circle, volume and surface area of a prism, cylinder, pyramid, cone, sphere, length of an arc and area of a sector in a circle, to model and solve real-world situations.
- Analyze and determine the slopes of lines to determine if they are parallel, perpendicular or neither.
- Use coordinates to determine distance and midpoint of segments to find areas of triangles and quadrilaterals and to prove simple geometric theorems algebraically.
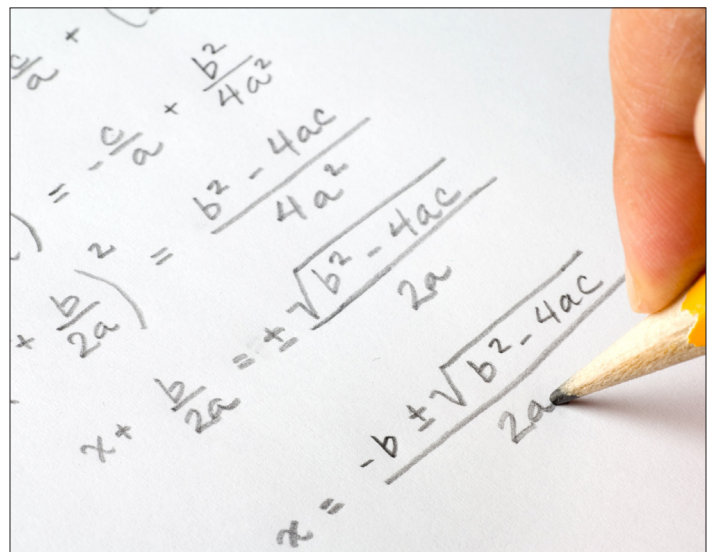
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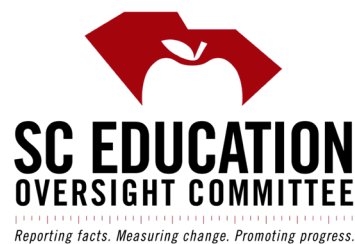
The South Carolina Education Oversight Committee (EOC) is an independent, nonpartisan group of 18 educators, business people, and elected officials appointed by the legislature and governor. The EOC enacts the South Carolina Education Accountability Act of 1998, which sets standards for improving the state's K-12 educational system. The EOC reviews the state's education improvement process, assesses how schools are doing, and evaluates the standards schools must meet to build the education system needed to compete in this century.