

Family Friendly Math

GUIDE FOR CALCULUS

Log on to the [SC Department of Education website](#), for the complete standards.

Calculus (C) focuses on conceptual understanding and computational competency.

Prerequisite courses: *Geometry with Statistics* > *Algebra 1* > *Algebra 2 with Probability* > *Pre-Calculus*

DATA, PROBABILITY, AND STATISTICAL REASONING

Data, Probability, and Statistical Reasoning (DPSR) is not addressed in Calculus.

MEASUREMENT, GEOMETRIC, AND SPATIAL REASONING

Calculus students will explain the concept of the integral of a function geometrically, numerically, analytically and contextually.

- Explain how the definite integral is used to solve area problems.
- Approximate and interpret the definite integral as a limit of Riemann sums.
- Explain the relationship between the integral and derivative.
- Apply The Fundamental Theorem of Calculus.
- Explain graphically and verbally the properties of the definite integral.

NUMERICAL REASONING

Calculus students extend knowledge of limits.

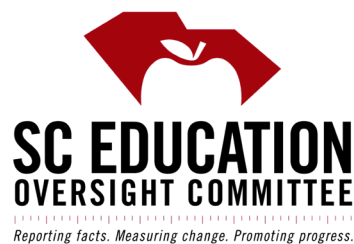
- Estimate and verify limits.
- Calculate limits using direct substitution, simplification, rationalization and the limit laws for constant multiples, sums differences, products and quotients.
- Calculate infinite limits and limits at infinity.

PATTERNS, ALGEBRA, AND FUNCTIONAL REASONING

Calculus students study piecewise, rational, radical, exponential, logarithmic and trigonometric functions.

- Apply the definition of continuity of a function at a point to solve problems.
- Classify and justify the classification of continuity.
- Understand and apply the Intermediate Value Theorem.
- Interpret and explain the value of the derivative of a function as slope and rate of change.
- Explain graphically and analytically the relationship between differentiability and continuity.
- Explain graphically and analytically the relationship between the average and instantaneous rate of change.
- Determine the derivatives of various functions.
- Apply the rules of differentiation to functions (inverse, trigonometric, exponential and logarithmic).
- Explain and apply theorems (Extreme Value Theorem and the Mean Value Theorem).
- Explain the relationships between increasing/decreasing behavior of f and the signs of f' .
- Explain the relationships among the concavity of the graph of f , the increasing/decreasing behavior of f' and the signs of f'' .
- Solve real-world situations involving rates, optimization, linear approximation and rates of change.

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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.