

Alignment Document

State of Connecticut And Aventa Learning Calculus

Calculus

2005-2007 Benchmark Blueprint

State Standard Number	State Standard Area / Description	Unit Name	Course Topic Description
1	Patterns and functional relationships can be represented and analyzed using a variety of strategies, tools and technologies.		
1.1	Understand and describe patterns and functional relationships.	Limits and Their Properties	Functions, Graphs of Functions, and Finding Models to Data
		Logarithmic, Exponential, and other Transcendental Functions	The Natural Logarithmic Function
		Logarithmic, Exponential, and other Transcendental Functions	Inverse Functions and Exponential Functions
		Logarithmic, Exponential, and other Transcendental Functions	Inverse Trigonometric Functions
		Logarithmic, Exponential, and other Transcendental Functions	Hyperbolic Functions
1.1.a	Model real-world situations and make generalizations about mathematical relationships using a variety of patterns and functions.	Limits and Their Properties	Linear Models and Rates of Change
		Applications of Differentiation	Extreme and The Mean Value Theorem
		Applications of Differentiation	Optimization, Newton's Method, and Differentials

1.2	Represent and analyze quantitative relationships in a variety of ways.	Integration	Area, Riemann Sums, and Definite Integrals
		Applications of Integration	Volumes, Arc Lengths, and Surfaces
1.2.a	Relate the behavior of functions and relations to specific parameters and determine functions to model real-world situations.	Differentiation	Implicit Differentiation
		Applications of Differentiation	Extreme and The Mean Value Theorem
1.3	Use operations, properties and algebraic symbols to determine equivalence and solve problems.	Limits and Their Properties	Finding Limits Graphically, Numerically, and Analytically
		Integration	Antiderivatives and Indefinite Integration
1.3.a	Use and extend algebraic concepts to include real and complex numbers, vectors and matrices.		
2	Quantitative relationships can be expressed numerically in multiple ways in order to make connections and simplify calculations using a variety of strategies, tools and technologies.		
2.1	Understand that a variety of numerical representations can be used to describe quantitative relationships.	Integration	Area, Riemann Sums, and Definite Integrals
		Applications of Integration	Volumes, Arc Lengths, and Surfaces
2.1.a	Extend the understanding of number to include the set of complex numbers.		
2.2	Use numbers and their properties to compute flexibly and fluently, and to reasonably estimate measures and quantities.	Integration	Area, Riemann Sums, and Definite Integrals
		Applications of Differentiation	Derivative Tests, Limits, and Graphs
		Differential Equations	Separation of Variables and First Order Linear Differential Equations
		Integration	The Fundamental Theorem of Calculus

2.2.a	Investigate mathematical properties and operations related to objects that are not numbers		
3	Shapes and structures can be analyzed, visualized, measured and transformed using a variety of strategies, tools and technologies.		
3.1	Use properties and characteristics of two- and three-dimensional shapes and geometric theorems to describe relationships, communicate ideas and solve problems.	Differential Equations	Slope Fields, Euler's Method and Growth and Decay
3.1.a	Use methods of deductive and inductive reasoning to make, test and validate geometric conjectures.	Differentiation	The Derivative
3.1.b	Explore non-Euclidean geometries.		
3.2	Use spatial reasoning, location and geometric relationships to solve problems.	Applications of Integration	Area of a Region Between Two Curves
		Applications of Integration	Volumes, Arc Lengths, and Surfaces
3.2.a	Use a variety of coordinate systems and transformations to solve geometric problems in 2 and 3 dimensions using appropriate tools and technologies.	Applications of Integration	Work, Moments, and Fluids
3.3	Develop and apply units, systems, formulas and appropriate tools to estimate and measure.	Differentiation	Differentiation
		Integration	Integration by Substitution and Numerical Integration
3.3.a	Approximate measurements that cannot be directly determined with some degree of precision using appropriate tools, techniques and strategies.	Limits and Their Properties	Linear Models and Rates of Change
		Limits and Their Properties	Continuity, One-Sided Limits, and Infinite Limits
4	Data can be analyzed to make informed decisions using a variety of strategies, tools and technologies.		
4.1	Collect, organize and display data using appropriate statistical and graphical methods		

4.1.a	Model real data graphically using appropriate tools, technologies and strategies.		
4.2	Analyze data sets to form hypotheses and make predictions.		
4.2.a	Describe and analyze sets of data using statistical models.		
4.3	Understand and apply basic concepts of probability.		
4.3.a	Solve problems using the methods of discrete mathematics.		
4.3.b	Make statistical inferences through the use of probability.		