



Alignment Document

State of Nevada And Aventa Learning Calculus

Calculus

2005-2007 Benchmark Blueprint

State Standard Number	State Standard Area / Description	Unit Name	Course Topic Description
A	Students will develop their ability to solve problems by engaging in developmentally appropriate opportunities where there is a need to use various approaches to investigate and understand mathematical concepts in order to:		
0	Generalize solutions and apply previous knowledge to new problem solving situations	Limits and Their Properties	Linear Models and Rates of Change
0	Determine an efficient strategy, verify, interpret, and evaluate the results with respect to the original problem	Limits and Their Properties	Functions, Graphs of Functions, and Finding Models to Data
0	Apply problem solving strategies until a solution is found or it is clear that no solution exists	Limits and Their Properties	Finding Limits Graphically, Numerically, and Analytically
0	Interpret and solve a variety of mathematical problems by paraphrasing	Differentiation	The Derivative
0	Identify necessary and extraneous information	Limits and Their Properties	Linear Models and Rates of Change
0	Check the reasonableness of a solution	Limits and Their Properties	Functions, Graphs of Functions, and Finding Models to Data
0	Apply technology as a tool in problem solving situations	Logarithmic, Exponential and other Transcendental Functions	Inverse Functions and Exponential Functions
0	Apply combinations of proven strategies and previous knowledge to solve non-routine problems	Limits and Their Properties	Functions, Graphs of Functions, and Finding Models to Data

B	Students will develop their ability to communicate mathematically by solving problems where there is a need to obtain information from the real world through reading, listening, and observing in order to:		
0	Use a variety of techniques to solve mathematical problems	Differentiation	The Derivative
0	Evaluate written and oral presentations in mathematics.	Applications of Differentiation	Derivative Tests, Limits and Graphs
0	Model and explain mathematical relationships using oral, written, graphic, and algebraic methods	Limits and Their Properties	Finding Limits Graphically, Numerically, and Analytically
0	Communicate and evaluate mathematical thinking based on the use of definitions, properties, rules, and symbols in problem solving	Limits and Their Properties	Finding Limits Graphically, Numerically, and Analytically
0	Use everyday language, both orally and in writing, communicate strategies and solutions to problems using appropriate mathematical language	Limits and Their Properties	Finding Limits Graphically, Numerically, and Analytically
C	Students will develop their ability to reason mathematically by solving problems where there is a need to investigate mathematical ideas and construct their own learning in all content areas in order to:		
0	Recognize and apply deductive and inductive reasoning	Limits and Their Properties	Functions, Graphs of Functions, and Finding Models to Data
0	Review and refine the assumptions and steps used to derive conclusions in mathematical arguments	Differentiation	Differentiation
0	Make and test conjectures about algebraic and geometric properties based on mathematical principles	Limits and Their Properties	Linear Models and Rates of Change
0	Justify the validity of an argument	Applications of Differentiation	Derivative Tests, Limits and Graphs
0	Construct a valid argument	Applications of Differentiation	Derivative Tests, Limits and Graphs
D	Students will develop the ability to make mathematical connections by solving problems where there is a need to view mathematics as an integrated whole in order to:		
0	Use mathematical ideas from one area of mathematics to explain an idea from another area of mathematics	Applications of Differentiation	Optimization, Newton's Method and Differentials



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0	Explain the relationship between concepts and procedures	Differentiation	Implicit Differentiation
0	Use the connections among mathematical topics to develop multiple approaches to problems	Differentiation	Implicit Differentiation
0	Apply mathematical thinking and modeling to solve problems that arise in other disciplines, such as rhythm in music and motion in science	Differentiation	Implicit Differentiation
0	Identify, explain, and apply mathematics in everyday life	Differentiation	Implicit Differentiation
1.0	Students will accurately calculate and use estimation techniques, number relationships, operation rules, and algorithms; they will determine the reasonableness of answers and the accuracy of solutions to solve problems, communicate, reason, and make connections within and beyond the field of mathematics.		
0	Place Value		
0	Nevada has no content for this theme.		
0	Fractions		
0	Nevada has no content for this theme.		
0	Comparing and Ordering		
0	Nevada has no content for this theme.		
0	Counting		
0	Nevada has no content for this theme.		
0	Facts		
0	Nevada has no content for this theme.		
1.12.6	Estimating and Estimation Strategies		
1.12.6.1	Determine an approximate value of radical and exponential expressions using a variety of methods.	Applications of Differentiation	Optimization, Newton's Method and Differentials
1.12.7	Computation		
1.12.7.1	Solve mathematical problems involving exponents and roots.	Logarithmic, Exponential and other Transcendental Functions	Inverse Functions and Exponential Functions
1.12.7.2	Perform addition, subtraction, and scalar multiplication on matrices.		
1.12.8	Solving Problems and Number Theory		
1.12.8.1	Identify and apply real number properties to solve problems.	Limits and Their Properties	Functions, Graphs of Functions, and Finding Models to Data

2.0	Students will use various algebraic methods to analyze, illustrate, extend, and create numerous representations (words, numbers, tables, and graphs) of patterns, functions, and algebraic relations as modeled in practical situations to solve problems, communicate, reason, and make connections within and beyond the field of mathematics.		
2.12.1	Patterns		
2.12.1.1	Use algebraic expressions to identify and describe the n th term of a sequence.		
2.12.2	Variables and Unknowns		
2.12.2.1	Isolate any variable in given equations, inequalities, proportions, and formulas to use in mathematical and practical situations.	Logarithmic, Exponential and other Transcendental Functions	Inverse Functions and Exponential Functions
2.12.3	Number Sentences, Expressions, and Polynomials		
2.12.3.1	Add, subtract, multiply, and factor 1st and 2nd degree polynomials connecting the arithmetic and algebraic processes.		
2.12.3.2	Simplify algebraic expressions, including exponents and radicals.		
2.12.4	Relations and Functions		
2.12.4.1	Determine the domain and range of functions, including linear, quadratic, and absolute value, algebraically and graphically.	Limits and Their Properties	Functions, Graphs of Functions, and Finding Models to Data
2.12.4.2	Solve absolute value equations and inequalities both algebraically and graphically.		
2.12.5	Linear Equations and Inequalities		
2.12.5.1	Solve systems of two linear equations algebraically and graphically and verify solutions (with and without technology).		
2.12.6	Algebraic Representations and Applications		
2.12.6.1	Solve mathematical and practical problems involving linear and quadratic equations with a variety of methods, including discrete methods (with and without technology).	Limits and Their Properties	Functions, Graphs of Functions, and Finding Models to Data
3.0	Students will use appropriate tools and techniques of measurement to determine, estimate, record, and verify direct and indirect measurements to solve problems, communicate, reason, and make connections within and beyond the field of mathematics.		



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3.12.1	Comparison, Estimation, and Conversion		
3.12.1.1	Estimate and convert between customary and metric systems.		
3.12.2	Precision in Measurements		
3.12.2.1	Justify, communicate, and differentiate between precision, error, and tolerance in practical problems.	Applications of Differentiation	Optimization, Newton's Method and Differentials
3.12.3	Formulas		
3.12.3.1	Select and use appropriate measurement tools, techniques, and formulas to solve problems in mathematical and practical situations.	Integration	Area, Riemann Sums and Definite Integrals
3.12.4	Money		
3.12.4.1	Interpret and apply consumer data presented in charts, tables, and graphs to make informed financial decisions related to practical applications.	Logarithmic, Exponential and other Transcendental Functions	Inverse Functions and Exponential Functions
3.12.5	Ratios and Proportions		
3.12.5.1	Determine the measure of unknown dimensions, angles, areas, and volumes using relationships and formulas to solve problems.		
0	Time		
0	Nevada has no content for this theme.		
4.0	Students will identify, represent, verify, and apply spatial relationships and geometric properties to solve problems, communicate, and make connections within and beyond the field of mathematics.		
4.12.1	Two - Dimensional Shapes		
4.12.1.1	Identify and use the parts of a circle to solve mathematical and practical problems.		
4.12.1.2	Identify and apply properties of interior and exterior angles of polygons to solve mathematical and practical problems.		
4.12.2	Congruence, Similarity, and Transformations		
4.12.2.1	Apply properties of similarity through right triangle trigonometry to find missing angles and sides.		
0	Coordinate Geometry and Lines of Symmetry		
0	Nevada has no content for this theme.		
0	Three - Dimensional Figures		
0	Nevada has no content for this theme.		
4.12.5	Algebraic Connections		



4.12.5.1	Determine the slope of lines using coordinate geometry and algebraic techniques.	Limits and Their Properties	Linear Models and Rates of Change
4.12.5.2	Identify parallel, perpendicular, and intersecting lines by slope.	Limits and Their Properties	Linear Models and Rates of Change
4.12.5.3	Graph linear equations and find possible solutions to those equations using coordinate geometry.	Limits and Their Properties	Linear Models and Rates of Change
4.12.5.4	Find possible solution sets of systems of equations whose slopes indicate parallel, perpendicular, or intersecting lines.	Limits and Their Properties	Linear Models and Rates of Change
4.12.6	Lines, Angles, and Their Properties		
4.12.6.1	Solve problems using complementary and supplementary angles, congruent angles, vertical angles, angles formed when parallel lines are cut by a transversal and angles in polygons.		
4.12.7	Triangles		
4.12.7.1	Apply the Pythagorean Theorem and its converse in mathematical and practical situations.		
4.12.8	Constructions		
4.12.8.1	Solve problems by drawing and/or constructing geometric figures to demonstrate geometric relationships.		
4.12.9	Logic		
4.12.9.1	Formulate, evaluate, and justify arguments using inductive and deductive reasoning in mathematical and practical situations.	Limits and Their Properties	Functions, Graphs of Functions, and Finding Models to Data
5.0	Students will collect, organize, display, interpret, and analyze data to determine statistical relationships and probability projections to solve problems, communicate, reason, and make connections within and beyond the field of mathematics.		
5.12.1	Data Collection and Organization		
5.12.1.1	Organize statistical data through the use of tables, graphs, and matrices (with and without technology).		
5.12.2	Central Tendency and Data Distribution		
5.12.2.1	Select and apply appropriate statistical measures in mathematical and practical situations.		
5.12.3	Interpretation of Data		
5.12.3.1	Distinguish between a sample and a census.		



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5.12.3.2	Identify sources of bias and their effect on data representations and statistical conclusions.		
5.12.3.3	Use the shape of a normal distribution to compare and analyze data from a sample.		
5.12.4	Permutations and Combinations		
5.12.4.1	Apply permutations and combinations to mathematical and practical situations, including the Fundamental Counting Principle.		
5.12.5	Experimental and Theoretical Probability		
5.12.5.1	Determine the probability of an event with and without replacement using sample spaces.		
5.12.5.2	Design, conduct, analyze, and effectively communicate the results of multi-stage probability experiments.		
5.12.6	Statistical Inferences		
5.12.6.1	Design, construct, analyze, and select an appropriate type of graphical representations to communicate the results of a statistical experiment.		
5.12.6.2	Formulate and justify inferences based on a valid data sample.		