



Alignment Document
State of New Hampshire and Aventa Learning Consumer Math

Consumer Math
2005-2007 Benchmark Blueprint

Strands	Standards	Unit Name	Course Topic Description
Number and Operations	M:N&O:HS:1 Demonstrates conceptual understanding of rational numbers by knowing why a real number is rational if and only if the number's decimal expansion eventually repeats or terminates.	All About Jobs	Multiplication and Division of Whole Numbers and Decimals
	M:N&O:HS:2 Demonstrates understanding of the relative magnitude of real numbers by solving problems that involve ordering or comparing elements of any subset of the real numbers.	Housing	Renting an Apartment
	M:N&O:10:2 Demonstrates understanding of the relative magnitude of real numbers by solving problems involving ordering or comparing rational numbers, common irrational numbers (e.g., square root of 2, pi), rational bases with integer exponents, square roots, absolute values, integers, or numbers represented in scientific notation using number lines or equality and inequality symbols.	Housing	Renting an Apartment
	M:N&O:HS:3 No standard at this level		
	M:N&O:HS:4 Accurately solves problems.	Covered throughout the course	
	M(N&O)-HS-4.a Interprets and computes with rational exponents and their relation to radicals, by hand in simple cases (e.g., 4 to the 3/2 power), and using a calculator when appropriate.	Checking and Savings Accounts Checking and Savings	Exponential Equations Compound Interest

		Accounts	
	M(N&O)-HS-4.b Interprets and computes in scientific notation with and without a calculator.		
	M(N&O)-HS-4.c Solves compound interest problems using $A = P(1 + r/n)$ to the nt power, where n is finite.	Credit Checking and Savings Accounts Checking and Savings Accounts	Using Credit Cards Savings and Graphs Compound Interest
	M:N&O:10:4 Accurately solves problems involving rational numbers within mathematics, across content strands, disciplines or contexts (with emphasis on, but not limited to, proportions, percents, ratios, and rates).	Housing	Scale Drawings
	M:N&O:HS:5 No standard at this level		
	M:N&O:HS:6 Uses a variety of mental computation strategies to solve problems (e.g., using compatible numbers, applying properties of operations, using mental imagery, using patterns) and to determine the reasonableness of answers.	Covered throughout the course	
	M:N&O:HS:7 Makes estimates in a given situation (e.g., tips, discounts, tax, the value of a non-perfect square root or cube root) by identifying when estimation is appropriate, selecting the appropriate method of estimation; determining the level of accuracy needed given the situation; analyzing the effect of the estimation method on the accuracy of results; evaluating the reasonableness of solutions appropriate to GSEs across content strands.		
	M:N&O:HS:8 Applies properties of numbers and field properties (including determining whether a given subset of numbers is closed under a given arithmetic operation) to solve problems or to simplify computations; and compares and	All About Jobs	Review of Order of Operations

	contrasts the properties of numbers and number systems; adds and multiplies numerical matrices with attention to the arithmetic properties of these operations.		
Geometry and Measurement	M:G&M:HS:1 No standard at this level		
	M:G&M:HS:2 Creates formal proofs of propositions (e.g., angles, lines, circles, distance, midpoint and polygons including triangle congruence and similarity).		
	M:G&M:10:2 Makes and defends conjectures, constructs geometric arguments, uses geometric properties, or uses theorems to solve problems involving angles, lines, polygons, circles, or right triangle ratios (sine, cosine, tangent) within mathematics or across disciplines or contexts (e.g., Pythagorean Theorem, Triangle Inequality Theorem).		
	M:G&M:HS:3 No standard at this level		
	M:G&M:HS:4 Applies the concepts of congruency by using matrices to represent reflections, translations, and rotations.		
	M:G&M:10:4 Applies the concepts of congruency by solving problems on or off a coordinate plane involving reflections, translations, or rotations; or solves problems using congruency involving problems within mathematics or across disciplines or contexts.		
	M:G&M:HS:5 Applies concepts of similarity to define the trigonometric functions as ratios of sides of right triangles; uses the ratios of the sides of special right triangles ($30^\circ - 60^\circ - 90^\circ$ and $45^\circ - 45^\circ - 90^\circ$) to determine the sine, cosine and tangent of 30° , 45° , and 60° ; and solves related problems.		
M:G&M:10:5 Applies concepts of similarity by solving problems within mathematics or across disciplines or contexts.	Housing	Scale Drawings	

	M:G&M:HS:6 Applies trigonometric formulas (e.g., Law of Sines, Law of Cosines, $A = \frac{1}{2} ab \sin C$) to find angles, lengths and areas of polygons.		
	M:G&M:10:6 Solves problems involving perimeter, circumference, or area of two-dimensional figures (including composite figures) or surface area or volume of three-dimensional figures (including composite figures) within mathematics or across disciplines or contexts.	Housing	Decorating and Remodeling
	M:G&M:HS:7 Applies informal concepts of successive approximation, upper and lower bounds, and limits in measurement situations (e.g., use successive approximation to find the area of a pond); and uses measurement conversion strategies (e.g., unit/dimensional analysis).		
	M:G&M:10:7 Uses units of measure appropriately and consistently when solving problems across content strands; makes conversions within or across systems and makes decisions concerning an appropriate degree of accuracy in problem situations involving measurement in other GSEs.		
	M:G&M:HS:8 No standard at this level		
	M:G&M:10:9 Solves problems on and off the coordinate plane involving distance, midpoint, perpendicular and parallel lines, or slope.	Personal Finances Automobile Expenses	Graphs of Equations Other Car Topics
	M:G&M:HS:10 Demonstrates conceptual understanding of spatial reasoning and visualization by sketching or using dynamic geometric software to generate three-dimensional objects from two-dimensional perspectives, or to generate two-dimensional perspectives from three-dimensional objects, and by solving related problems; perform and justify constructions with a compass and straightedge or dynamic geometric software.		
Functions and Algebra	M:F&A:HS:1 Identifies arithmetic and geometric		

	<p>sequences and finds the nth term; then uses the generalization to find a specific term.</p>		
	<p>M:F&A:10:1 Identifies, extends, and generalizes a variety of patterns (linear and nonlinear) represented by models, tables, sequences, or graphs in problem solving situations.</p>	<p>Deductions, Taxes, and Insurance</p> <p>Deductions, Taxes, and Insurance</p> <p>Deductions, Taxes, and Insurance</p> <p>Recreation and Spending</p> <p>Recreation and Spending</p> <p>Recreation and Spending</p> <p>Recreation and Spending</p> <p>Recreation and Spending</p> <p>Personal Finances</p> <p>Personal Finances</p> <p>Personal Finances</p> <p>Personal Finances</p> <p>Personal Finances</p> <p>Checking and Savings Accounts</p> <p>Checking and Savings Accounts</p>	<p>Federal Tax Table</p> <p>Federal Income Tax</p> <p>Life Insurance</p> <p>Movies and Shows</p> <p>Eating Out</p> <p>Parks and Sports</p> <p>Catalog Shopping</p> <p>Costs of Recreation</p> <p>The Costs of Raising a Family</p> <p>Graphing Using Slope and Y-Intercept</p> <p>Budgeting Expenses</p> <p>Budgets</p> <p>Net Worth and Purchasing Power</p> <p>Plotting a Decay Curve</p> <p>Graphing Exponential Equations</p>

		Checking and Savings Accounts	Exponential Equations
		Checking and Savings Accounts	Exponential Graphs
		Automobile Expenses	Preventative Maintenance and Repairs
		Automobile Expenses	Comparing Costs
		Housing	The Mortgage
	M:F&A:HS:2 Demonstrates conceptual understanding of linear and nonlinear functions and relations.	Personal Finances	Graphs and Linear Equations
		Checking and Savings Accounts	Exponential Equations
		Automobile Expenses	Other Car Topics
	M(F&A)-HS-2.a Analyzes characteristics of classes of functions (polynomial, rational, and exponential) to include domain, range, intercepts, increasing and decreasing intervals and rates of change.	Personal Finances	Writing Linear Equations
		Checking and Savings Accounts	Exponential Equations
	M(F&A)-HS-2.b Understands one-to-one (injective) functions and that a function that is one-to-one has a converse that is also a function; and finds inverses algebraically and graphically.		
	M(F&A)-HS-2.c Graphs polynomial, rational and exponential functions, including vertical and horizontal shifts, stretches, and compressions as well as reflections across vertical and horizontal axes.	Checking and Savings Accounts	Graphing Exponential Equations
		Checking and Savings Accounts	Plotting a Decay Curve
		Checking and Savings Accounts	Exponential Graphs
		Personal Finances	Graphing Using Slope and Y-Intercept

	<p>M(F&A)-HS-2.d Applies knowledge of functions to interpret and understand situations, design mathematical models, and solve problems in mathematics as well as in the natural and social sciences.</p>	<p>Checking and Savings Accounts</p> <p>Checking and Savings Accounts</p> <p>Checking and Savings Accounts</p> <p>Automobile Expenses</p>	<p>Savings Accounts</p> <p>The Check Register</p> <p>Checking Accounts</p> <p>Used Cars</p>
	<p>M:F&A:10:2 Demonstrates conceptual understanding of linear and nonlinear functions and relations (including characteristics of classes of functions) through an analysis of constant, variable, or average rates of change, intercepts, domain, range, maximum and minimum values, increasing and decreasing intervals and rates of change (e.g., the height is increasing at a decreasing rate); describes how change in the value of one variable relates to change in the value of a second variable; or works between and among different representations of functions and relations (e.g., graphs, tables, equations, function notation).</p>	<p>Automobile Expenses</p> <p>Automobile Expenses</p> <p>Transportation</p> <p>Wages</p> <p>Personal Finances</p>	<p>Other Car Topics</p> <p>Operating Expenses</p> <p>Distance</p> <p>Review of Equations</p> <p>Writing Linear Equations</p>
	<p>M:F&A:HS:3Demonstrates conceptual understanding of algebraic expressions.</p>	<p>Covered throughout the course</p>	
	<p>M(F&A)-HS-3.a Manipulates, evaluates, and simplifies algebraic and numerical expressions.</p>	<p>Covered throughout the course, but in detail in:</p> <p>Wages</p> <p>Wages</p>	<p>Evaluating Expressions and Formulas</p> <p>Review of Equations</p>
	<p>M(F&A)-HS-3.b Adds, subtracts, multiplies and divides polynomials and rational expressions.</p>		
	<p>M(F&A)-HS-3.c Factors quadratic and higher degree polynomials.</p>		

	M(F&A)-HS-3.d Understands properties of logarithms and converts between logarithmic and exponential forms.		
	M(F&A)-HS-3.e Manipulates, evaluates, and simplifies expressions involving rational exponents and radicals and converts between expressions with rational exponents and expressions with radicals.	Wages Checking and Savings	Evaluating Expressions and Formulas Compound Interest
	M(F&A)-HS-3.f Understands the effect of simplifying rational expressions on the domain of the related functions (e.g., $x^2/x = x$ for x is not equal to 0).	Wages	Evaluating Expressions and Formulas
	M:F&A:10:3 Demonstrates conceptual understanding of algebraic expressions by solving problems involving algebraic expressions, by simplifying expressions (e.g., simplifying polynomial or rational expressions, or expressions involving integer exponents, square roots, or absolute values), by evaluating expressions, or by translating problem situations into algebraic expressions.	Covered throughout the course, but in detail in: Wages	Evaluating Expressions and Formulas
	M:F&A:HS:4 Demonstrates conceptual understanding of equality.	Covered throughout the course	
	M(F&A)-HS-4.a Factors, completes the square, uses the quadratic formula, and graphs quadratic functions to solve quadratic equations.		
	M(F&A)-HS-4.b Solves equations involving polynomial, rational, and radical expressions. Graphs and interprets the solutions.	Wages Wages Wages Wages Wages	Solving Equations: Multiplication and Division Solving Equations: Addition and Subtraction Commission Solving Two-Step Equations Salary and Commission

	Personal Finances Personal Finances Personal Finances Checking and Savings Accounts Checking and Savings Accounts Checking and Savings Accounts	The Costs of Raising a Family Graphing Using Slope and Y-Intercept Graphing an Equation Using Points Graphing Exponential Equations Plotting a Decay Curve Exponential Equations
M(F&A)-HS-4.c Understands extraneous solutions.		
M(F&A)-HS-4.d Finds approximate solutions to equations by graphing each side as a function using technology. Understands that any equation in x can be interpreted as the equation $f(x) = g(x)$ and interpret the solutions of the equation as the x -value(s) of the intersection point(s) of the graphs of $y = f(x)$ and $y = g(x)$.	Personal Finances Personal Finances Checking and Savings Accounts Checking and Savings Accounts Checking and Savings Accounts	Graphing Using Slope and Y-Intercept Graphing an Equation Using Points Plotting a Decay Curve Graphing Exponential Equations Exponential Graphs
M(F&A)-HS-4.e Solves 2×2 and 3×3 systems of linear equations and graphically interprets the solutions.	Automobile Expenses	Automobile Expenses
M(F&A)-HS-4.f Solves systems of linear and quadratic inequalities.	Automobile Expenses	Automobile Expenses
M(F&A)-HS-4.g Solves systems of equations involving nonlinear expressions and graphically interprets the solutions.		

	M(F&A)-HS-4.h Translates problem situations into inequalities; and solves linear and non-linear inequalities (symbolically and graphically).	Housing Housing	Renting an Apartment Buying a House
	M:F&A:10:4 Demonstrates conceptual understanding of equality by solving problems involving algebraic reasoning about equality; by translating problem situations into equations; by solving linear equations (symbolically and graphically) and expressing the solution set symbolically or graphically, or provides the meaning of the graphical interpretations of solution(s) in problem-solving situations; or by solving problems involving systems of linear equations in a context (using equations or graphs) or using models or representations.	Covered throughout the course	
Data, Statistics, and Probability	M:DSP:HS:1 Interprets a given representation(s) (e.g., regression function including linear, quadratic, and exponential) to analyze the data to make inferences and to formulate, justify, and critique conclusions.	Personal Finances Checking and Savings Accounts	Graphs and Linear Equations Exponential Equations
	M:DSP:10:1 Interprets a given representation(s) (e.g., box-and-whisker plots, scatter plots, bar graphs, line graphs, circle graphs, histograms, frequency charts) to make observations, to answer questions, to analyze the data to formulate or justify conclusions, critique conclusions, make predictions, or to solve problems within mathematics or across disciplines or contexts (e.g., media, workplace, social and environmental situations).	Deductions, Taxes, and Insurance Checking and Savings Accounts Checking and Savings Accounts Checking and Savings Accounts Checking and Savings Accounts Checking and Savings Accounts	Tables and Graphs The Check Register Checking Accounts Exponential Graphs Savings Accounts Exponential Equations

		Automobile Expenses	Used Cars
	M:DSP:HS:2 Analyzes patterns, trends, or distributions in data in a variety of contexts by determining or using measures of dispersion (standard deviation, variance, and percentiles).		
	M:DSP:10:2 Analyzes patterns, trends, or distributions in data in a variety of contexts by determining, using, or analyzing measures of central tendency (mean, median, or mode), dispersion (range or variation), outliers, quartile values, estimated line of best fit, regression line, or correlation (strong positive, strong negative, or no correlation) to solve problems; and solve problems involving conceptual understanding of the sample from which the statistics were developed.	Deductions, Taxes, and Insurance	Mean, Median, and Mode
	M:DSP:HS:3 Organizes and displays one- and two-variable data using a variety of representations (e.g., box-and-whisker plots, scatter plots, bar graphs, line graphs, circle graphs, histograms, frequency charts, linear, quadratic, and exponential regression functions) to analyze the data to formulate or justify conclusions, make predictions, or to solve problems with or without using technology.	Deductions, Taxes, and Insurance Checking and Savings Accounts Checking and Savings Accounts	Tables and Graphs Exponential Graphs Exponential Equations
	M:DSP:10:3 Identifies or describes representations or elements of representations that best display a given set of data or situation, consistent with the representations required in M:DSP:10:1.	Deductions, Taxes, and Insurance	Tables and Graphs
	M:DSP:HS:4 Uses counting techniques to solve problems in context involving combination or permutations using a variety of strategies (e.g., nCr , nPr , or $n!$); and finds unions, intersections, and complements of sets.		
	M:DSP:10:4 Uses counting techniques to solve		

	problems in context involving combinations or permutations using a variety of strategies (e.g., organized lists, tables, tree diagrams, models, Fundamental Counting Principle, or others).		
	M:DSP:HS:5 For a probability event in which the sample space may or may not contain equally likely outcomes, predicts the theoretical probability of an event and tests the prediction through experiments and simulations; compares and contrasts theoretical and experimental probabilities; finds the odds of an event and understands the relationship between probability and odds.		
	M:DSP:10:5 Solves problems involving experimental or theoretical probability.		
	M:DSP:HS:6 In response to a teacher or student generated question or hypothesis decides the most effective method (e.g., survey, observation, research, experimentation) and sampling techniques (e.g., random sample, stratified random sample) to collect the data necessary to answer the question; collects, organizes, and appropriately displays the data; analyzes the data to draw conclusions about the questions or hypotheses being tested while considering the limitations of the data that could effect interpretations; and when appropriate makes predications, asks new questions, or makes connections to real-world situations.	Checking and Savings Accounts Checking and Savings Accounts Checking and Savings Accounts Automobile Expenses	Savings Accounts The Check Register Checking Accounts Used Cars
Problem Solving, Reasoning, and Proof	M:PRP:HS:1 Students will use problem-solving strategies to investigate and understand increasingly complex mathematical content and be able to:		
	M(PRP)-HS-1.a Expand the repertoire of problem-solving strategies and use those strategies in more sophisticated ways.	Recreation and Spending Recreation and Spending	Movies and Shows Parks and Sports

		Recreation and Spending	Eating Out
		Recreation and Spending	Costs of Recreation
		Transportation	Taking a Road Trip
	M(PRP)-HS-1.b Use technology whenever appropriate to solve real-world problems (e.g., personal finance, wages, banking and credit, home improvement problems, measurement, taxes, business situations, purchasing, and transportation).	Checking and Savings Accounts	Savings Accounts
		Checking and Savings Accounts	The Check Register
		Checking and Savings Accounts	Checking Accounts
		Automobile Expenses	Used Cars
	M(PRP)-HS-1.c Formulate and redefine problem situations as needed to arrive at appropriate conclusions.	Recreation and Spending	Costs of Recreation
		Recreation and Spending	Eating Out
		Recreation and Spending	Parks and Sports
		Recreation and Spending	Movies and Shows
		Transportation	Taking a Road Trip
	M:PRP:HS:2 Students will use mathematical reasoning and proof and be able to:		
	M(PRP)-HS-2.a Expand the repertoire of proof techniques and use those techniques in more sophisticated ways.		
	M(PRP)-HS-2.b Use informal and formal reasoning and proof to explain and justify conclusions.	Recreation and Spending	Parks and Sports
		Recreation and Spending	Costs of Recreation
	M(PRP)-HS-2.c Formalize mathematical arguments through the use of deductive reasoning.		
	M(PRP)-HS-2.d Use the principle of mathematical		

	induction.		
	M(PRP)-HS-2.e Use reasoning and proof throughout classroom discussions independent of the mathematical topic being studied.	Discussion Board	Life Insurance
		Discussion Board	Sales Tax
	M(PRP)-HS-2.f Recognize how reasoning and proof influence the structure of mathematics.		
Communication, Connections, and Representations	M:CCR:HS:1 Students will communicate their understanding of mathematics and be able to:		
	M(CCR)-HS-1.a Explain and justify their thinking and develop increasingly sophisticated questions for given problem-situations.	Covered in discussion boards throughout the course	
	M(CCR)-HS-1.b Critique and follow the logic of arguments presented within mathematics and across disciplines.	Covered in discussion boards throughout the course	
	M:CCR:HS:2 Students will create and use representations to communicate mathematical ideas and to solve problems and be able to:		
	M(CCR)-HS-2.a Choose appropriate representations and mathematical language (e.g., spreadsheets, geometric models, algebraic symbols, tables, graphs, matrices) to present ideas clearly and logically for a given situation.	Deductions, Taxes, and Insurance	Tables and Graphs
		Checking and Savings Accounts	The Check Register
		Checking and Savings Accounts	Checking Accounts
		Checking and Savings Accounts	Exponential Graphs
		Checking and Savings Accounts	Savings Accounts
		Checking and Savings Accounts	Exponential Equations
		Automobile Expenses	Used Cars

	<p>M(CCR)-HS-2.b See a common structure in mathematical phenomena that come from very different contexts (e.g., the sum of the first n odd natural numbers, the areas of square gardens, and the distance traveled by a vehicle that starts at rest and accelerates at a constant rate can be represented by functions of the form $f(x) = ax^2$).</p>	<p>Checking and Savings Accounts</p> <p>Checking and Savings Accounts</p> <p>Checking and Savings Accounts</p> <p>Automobile Expenses</p>	<p>Checking Accounts</p> <p>Savings Accounts</p> <p>The Check Register</p> <p>Used Cars</p>
	<p>M(CCR)-HS-2.c Find representations that model essential features of a mathematical situation (e.g., cost of postage can be modeled by a step-function).</p>	<p>Checking and Savings Accounts</p> <p>Checking and Savings Accounts</p> <p>Checking and Savings Accounts</p> <p>Automobile Expenses</p>	<p>Checking Accounts</p> <p>Savings Accounts</p> <p>The Check Register</p> <p>Used Cars</p>
	<p>M(CCR)-HS-2.d Use representations as a primary means for expressing and understanding more abstract mathematical concepts.</p>	<p>Checking and Savings Accounts</p> <p>Checking and Savings Accounts</p>	<p>Exponential Equations</p> <p>Compound Interest</p>
	<p>M:CCR:HS:3 Students will recognize, explore, and develop mathematical connections and be able to:</p>		
	<p>M(CCR)-HS-3.a Explain in oral or written form how mathematics connects to other disciplines, to daily life, careers, and society (e.g., geometry in art and literature, data analysis in social studies, and exponential growth in finance).</p>	<p>Covered throughout the course</p>	
	<p>M(CCR)-HS-3.b Explain multiple approaches that lead to equivalent results when solving problems.</p>	<p>Deductions, Taxes and Insurance</p>	<p>Tables and Graphs</p>