

MINNESOTA ACADEMIC STANDARDS GRADE 7

MATH			
STRAND	SUB-STRAND	STANDARD	BENCHMARKS
I. MATHEMATICAL REASONING		Apply skills of mathematical representation, communication and reasoning throughout the remaining four content strands.	<ol style="list-style-type: none"> 1. Assess the reasonableness of a solution by comparing the solution to appropriate graphical or numerical estimates or by recognizing the feasibility of a solution in a given context. 2. Appropriately use examples and counterexamples to make and test conjectures, justify solutions and explain results. 3. Translate a problem described verbally or by tables, diagrams, or graphs, into suitable mathematical language, solve the problem mathematically and interpret the result in the original context. 4. Support mathematical results by explaining why the steps in a solution are valid and why a particular solution method is appropriate. 5. Determine whether or not relevant information is missing from a problem. 6. Use accurately common logical words and phrases such as “and,” “or,” “if ... then ...,” “unique,” “only if.”
II. NUMBER SENSE, COMPUTATION AND OPERATIONS	A. Number Sense	Use positive and negative rational numbers, represented in a variety of ways, to quantify information and to solve real-world and mathematical problems.	<ol style="list-style-type: none"> 1. Represent rational numbers as fractions, mixed numbers, decimals or percents and convert among various forms as appropriate. 2. Use scientific notation with positive powers of 10, with appropriate treatment of significant digits, to solve real-world and mathematical problems. 3. Locate and compare positive and negative rational numbers on a number line.
II. NUMBER SENSE, COMPUTATION, AND OPERATIONS	B. Computation and Operation	Compute fluently and make reasonable estimates with rational numbers in real-world and mathematical problems. Understand the meanings of the basic operations, including the use of integer exponents and square roots, and how the operations relate to one another. Appropriately use calculators and other technologies to solve	<ol style="list-style-type: none"> 1. Add, subtract, multiply and divide fractions and mixed numbers. 2. Use the inverse relationship between extracting square roots and squaring positive integers to solve real-world and mathematical problems. 3. Calculate the percentage of increase and decrease of a quantity in real-world and mathematical problems. 4. Convert among fractions, decimals and percents and use these representations for estimations and computations in real-world and mathematical problems. 5. Understand and compute positive integer powers of nonnegative integers and express examples as repeated multiplication such as $3^4 = 3 \times 3 \times 3 \times 3 = 81$. 6. Apply the correct order of operations and grouping symbols when using

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		problems.	calculators and other technologies. 7. Know, use and translate calculator notational conventions to mathematical notation. 8. Understand that use of a calculator requires appropriate mathematical reasoning and does not replace the need for mental computation.
III. PATTERNS, FUNCTIONS AND ALGEBRA	A. Patterns and Functions	Demonstrate an understanding of rate of change graphically and numerically.	1. Demonstrate, numerically and graphically, an understanding that rate is a measure of change of one quantity per unit change of another quantity in real-world and mathematical problems. 2. Plot points on the graph of a linear function and identify the slope or rate of change.
III. PATTERNS, FUNCTIONS AND ALGEBRA	B. Algebra (Algebraic Thinking)	Apply arithmetic operations in the correct order to generate equivalent algebraic expressions and to solve simple formulas in real-world and mathematical problems.	1. Apply the correct order of operations including addition, subtraction, multiplication, division and grouping symbols to generate equivalent algebraic expressions. 2. Use the facts that the sum of a number and its opposite is zero and the product of a number and its reciprocal is one to generate equivalent algebraic expressions. 3. Solve simple formulas with up to three variables, when the values of two of the variables are given.
IV. DATA ANALYSIS, STATISTICS AND PROBABILITY	A. Data and Statistics	Represent data and use various measures associated with data to draw conclusions and identify trends.	1. Construct and analyze simple scatter plots. 2. Understand the meaning of, and be able to compute minimum, maximum, range, median, mean and mode of a data set.
IV. DATA ANALYSIS, STATISTICS AND PROBABILITY	B. Probability	Calculate and express probabilities numerically and apply probability concepts to solve real-world and mathematical problems.	1. Express probabilities as percentages, fractions, proportions and decimals. 2. Use a variety of experiments to explore the relationship between experimental and theoretical probabilities.
V. SPATIAL SENSE, GEOMETRY AND MEASUREMENT	A. Spatial Sense	Recognize the relationship between different representations of two- and three-dimensional shapes. Understand the effect of various transformations.	1. Recognize a view of a three-dimensional shape, given a view from a different orientation. 2. Use visual representations of transformations such as reflections, rotations, translations and change of scale in one and two dimensions to solve real-world and mathematical problems.

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V. SPATIAL SENSE, GEOMETRY AND MEASUREMENT	B. Geometry	Use basic geometric principles and proportional reasoning to solve real-world and mathematical problems.	<ol style="list-style-type: none"> 1. Calculate the radius, diameter, circumference and area of a circle given any one of these. 2. Calculate the area and perimeter of a sector of a circle given its angle and radius. 3. Use ratios and proportions to interpret map scales and scale drawings. 4. Classify quadrilaterals as squares, rectangles, rhombi, parallelograms, kites, trapezoids or none of these.
V. SPATIAL SENSE, GEOMETRY AND MEASUREMENT	C. Measurement	Make calculations of time, length, area and volume within standard measuring systems using good judgment in choice of units.	<ol style="list-style-type: none"> 1. Choose appropriate units to calculate, measure, and record length, weight, area and volume in both U.S. customary and metric systems.