

New Mexico
Curricular Standards
Mathematics - Grade 8
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<i>Benchmark Number</i>	<i>Benchmark</i> • <i>Instructional Targets</i>	<i>Gourmet Resource</i>	<i>Taught</i>	<i>Tested</i>
NUMBER AND OPERATIONS				
Content Standard	Students will understand numerical concepts and mathematical operations.			
Grade 8 Benchmark	Understand numbers, ways of representing numbers, relationships among numbers, and number systems.			
1	<ul style="list-style-type: none"> Sort numbers by their properties (e.g., prime, composite, square, square root). 	Appetizers 1 A & F; 1 (Number Concepts)		
2	<ul style="list-style-type: none"> Demonstrate the magnitude of rational numbers (e.g., trillions to millions). 	Appetizers 1 C; 1 (Number Concepts)		
Grade 8 Benchmark	Understand the meaning of operations and how they relate to one another.			
1	<ul style="list-style-type: none"> Use real number properties (e.g., commutative, associative, distributive) to perform various computational procedures. 	Appetizers 2 A; 2 (Mathematical Relations)		
2	<ul style="list-style-type: none"> Perform arithmetic operations and their inverses (e.g., addition/subtraction, multiplication/division, square roots of perfect squares, cube roots of perfect cubes) on real numbers. 	Appetizers 1 A & B; 2 A & E; 1 (Number Concepts); 2 (Mathematical Relations)		
3	<ul style="list-style-type: none"> Find roots of real numbers using calculators. 			

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Grade 8 Benchmark	Compute fluently and make reasonable estimates.			
1	<ul style="list-style-type: none"> Formulate algebraic expressions that include real numbers to describe and solve real-world problems. 	Appetizers 2 A, B, F, & G; 12 A; 2 (Mathematical Relations); 12 (Mathematical Representation)		
2	<ul style="list-style-type: none"> Use a variety of computational methods to estimate quantities involving real numbers. 	Appetizers 1 D; 10 A; 1 (Number Concepts); 10 (Estimation)		
3	<ul style="list-style-type: none"> Differentiate between rational and irrational numbers. 	Appetizers 1 C; 2 A; 1 (Number Concepts); 2 (Mathematical Relations)		
4	<ul style="list-style-type: none"> Use real number properties to perform various computational procedures and explain how they were used. 	Appetizers 6 A; 7 A; 8 A; 9 A; 11 A; 6 (Addition); 7 (Subtraction); 8 (Multiplication); 9 (Division); 11 (Problem Solving)		
5	<ul style="list-style-type: none"> Perform and explain computations with rational numbers, pi, and first-degree algebraic expressions in one variable in a variety of situations. 	Appetizers 2 F & G; 8 B; 11 A; 12 A; 2 (Mathematical Relations); 8 (Multiplication); 11 (Problem Solving); 12 (Mathematical Representation)		
6	<ul style="list-style-type: none"> Select and use appropriate forms of rational numbers to solve real-world problems including those involving proportional relationships. 	Appetizers 2 D; 3 E & I; 4 F & H; 8 B; 2 (Mathematical Relations); 3 (Geometry); 4 (Measurement); 8 (Multiplication)		
7	<ul style="list-style-type: none"> Approximate, mentally and with calculators, the value of irrational numbers as they arise from problem situations. 	Most Appetizers		
8	<ul style="list-style-type: none"> Express numbers in scientific notation (including negative exponents) in appropriate problem situations using a calculator. 	Appetizers 1 A; 1 (Number Concepts)		
9	<ul style="list-style-type: none"> Estimate answers and use formulas to solve application problems involving surface area and volume. 	Appetizers 4 E, F, & H; 4 (Measurement)		

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	ALGEBRA			
Content Standard	Students will understand algebraic concepts and applications.			
Grade 8 Benchmark	Understand patterns, relations, and functions.			
1	<ul style="list-style-type: none"> • <i>Move between numerical, tabular, and graphical representations of linear relationships.</i> 	Appetizers 2 C & F; 2 (Mathematical Relations)		
2	<ul style="list-style-type: none"> • <i>Use variables to generalize patterns and information presented in tables, charts, and graphs:</i> <ul style="list-style-type: none"> - <i>graph linear functions noting that the vertical change per unit of horizontal change (the slope of the graph) is always the same</i> - <i>plot the values of quantities whose ratios are always the same, fit a line to the plot, and understand that the slope of the line equals the quantities.</i> 	Appetizers 2 C; 12 C; 2 (Mathematical Relations); 12 (Mathematical Representation) Appetizers 12 C; 12 (Mathematical Representation)		
Grade 8 Benchmark	Represent and analyze mathematical situations and structures using algebraic symbols.			
1	<ul style="list-style-type: none"> • <i>Demonstrate the difference between an equation and an expression.</i> 	Appetizers 2 F & G; 12 A; 2 (Mathematical Relations); 12 (Mathematical Representation)		
2	<ul style="list-style-type: none"> • <i>Solve two-step linear equations and inequalities in one variable with rational solutions.</i> 	Appetizers 2 G; 12 A; 2 (Mathematical Relations); 12 (Mathematical Representation)		
3	<ul style="list-style-type: none"> • <i>Evaluate formulas using substitution.</i> 	Appetizers 2 A & B; 3 E & I; 4 F & H; 2 (Mathematical Relations); 3 (Geometry); 4 (Measurement)		

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4	<ul style="list-style-type: none"> Demonstrate understanding of the relationships between ratios, proportions, and percents and solve for a missing term in a proportion. 	Appetizers 2 D; 2 (Mathematical Relations)		
5	<ul style="list-style-type: none"> Graph solution sets of linear equations in two variables on the coordinate plane. 	Appetizers 2 C; 2 (Mathematical Relations)		
6	<ul style="list-style-type: none"> Formulate and solve problems involving simple linear relationships, find percents of a given number, variable situations, and unknown quantities. 	Appetizers 2 F & G; 12 A; 2 (Mathematical Relations); 12 (Mathematical Representation)		
7	<ul style="list-style-type: none"> Use symbols, variables, expressions, inequalities, equations, and simple systems of equations to represent problem situations that involve variables or unknown quantities. 			
Grade 8 Benchmark	Use mathematical models to represent and understand quantitative relationships.			
1	<ul style="list-style-type: none"> Generate different representations to model a specific numerical relationship given one representation of data (e.g., a table, a graph, an equation, a verbal description). 	Appetizers 3 H; 4 F & H; 12 B & C; 13 A & C; 3 (Geometry); 4 (Measurement); 12 (Mathematical Representation); 13 (Reasonableness)		
Grade 8 Benchmark	Analyze changes in various contexts.			
1	<ul style="list-style-type: none"> Use graphs, tables, and algebraic representations to make predictions and solve problems that involve change. 	Appetizers 3 I; 4 H; 11 F; 12 C; 3 (Geometry); 4 (Measurement); 11 (Problem Solving); 12 (Mathematical Representation)		

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2	<ul style="list-style-type: none"> Estimate, find, and justify solutions to problems that involve change using tables, graphs, and algebraic expressions. 	Appetizers 3 I; 4 H; 8 B; 11 F; 12 C; 13 C; 3 (Geometry); 4 (Measurement); 8 (Multiplication); 11 (Problem Solving); 12 (Mathematical Representation); 13 (Reasonableness)		
3	<ul style="list-style-type: none"> Use appropriate problem-solving strategies (e.g., drawing a picture, looking for a pattern, systematic guessing and checking, acting it out, making a table or graph, working a simpler problem, writing an algebraic expression or working backward) to solve problems that involve change. 	Appetizers 3 I; 4 H; 8 B; 11 F; 12 C; 13 A; 3 (Geometry); 4 (Measurement); 8 (Multiplication); 11 (Problem Solving); 12 (Mathematical Representation); 13 (Reasonableness)		
4	<ul style="list-style-type: none"> Solve multi-step problems that involve changes in rate, average speed, distance, and time. 	Appetizers 2 G; 8 B; 12 A; 2 (Mathematical Relations); 8 (Multiplication); 12 (Mathematical Representation)		
5	<ul style="list-style-type: none"> Analyze problems that involve change by identifying relationships, distinguishing relevant from irrelevant information, identifying missing information, sequencing, and observing patterns. 	Appetizers 11 A, B, C, D, & F; 11 (Problem Solving)		
6	<ul style="list-style-type: none"> Generalize a pattern of change using algebra and show the relationship among the equation, graph, and table of values. 	Appetizers 2 B; 3 I; 4 H; 5 D; 11 F; 2 (Mathematical Relations); 3 (Geometry); 4 (Measurement); 5 (Probability/Statistics); 11 (Problem Solving)		
7	<ul style="list-style-type: none"> Recognize the same general pattern of change presented in different representations. 	Appetizers 2 B; 12 B; 2 (Mathematical Relations); 12 (Mathematical Representation)		

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	GEOMETRY			
Content Standard	Students will understand geometric concepts and applications.			
Grade 8 Benchmark	Analyze characteristics and properties of two- and three-dimensional geometric shapes and develop mathematical arguments about geometric relationships.			
1	<ul style="list-style-type: none"> Recognize, classify, and discuss properties of all geometric figures including point, line, and plane. 	Appetizers 3 A; 11 D; 3 (Geometry); 11 (Problem Solving)		
2	<ul style="list-style-type: none"> Identify arc, chord, and semicircle and explain their attributes. 	Appetizers 3 G; 4 D; 3 (Geometry); 4 (Measurement)		
3	<ul style="list-style-type: none"> Use the Pythagorean theorem and its converse to find the missing side of a right triangle and the lengths of the other line segments. 	Appetizers 3 C & D; 3 (Geometry)		
Grade 8 Benchmark	Specify locations and describe spatial relationships using coordinate geometry and other representational systems.			
1	<ul style="list-style-type: none"> Represent, formulate, and solve distance and geometry problems using the language and symbols of algebra and the coordinate plane and space (e.g., ordered triplets). 	Appetizers 3 C, D, & E; 11 D; 3 (Geometry); 11 (Problem Solving)		
Grade 8 Benchmark	Apply transformations and use symmetry to analyze mathematical situations.			
1	<ul style="list-style-type: none"> Describe the symmetry of three-dimensional figures. 	Appetizers 3 B & F; 3 (Geometry)		
2	<ul style="list-style-type: none"> Describe and perform single and multiple transformations that include rotation, reflection, translation, and dilation (i.e., shrink or magnify) to two-dimensional figures. 	Appetizers 3 H; 3 (Geometry)		

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Grade 8 Benchmark	Use visualization, spatial reasoning, and geometric modeling to solve problems.			
1	<ul style="list-style-type: none"> Understand angle relationships formed by parallel lines cut by a transversal. 	Appetizers 3 A; 3 (Geometry)		
2	<ul style="list-style-type: none"> Recognize and apply properties of corresponding parts of similar and congruent triangles and quadrilaterals. 	Appetizers 3 F; 3 (Geometry)		
3	<ul style="list-style-type: none"> Represent and solve problems relating to size, shape, area, and volume using geometric models. 	Appetizers 3 B & E; 4 E & F; 11 D; 3 (Geometry); 4 (Measurement); 11 (Problem Solving)		
4	<ul style="list-style-type: none"> Develop and use formulas for area, perimeter, circumference, and volume. 	Appetizers 4 D & E; 11 D; 4 (Measurement); 11 (Problem Solving)		
5	<ul style="list-style-type: none"> Construct two-dimensional patterns for three-dimensional models (e.g., cylinders, prisms, cones). 	Appetizers 3 A, B, & G; 3 (Geometry)		
MEASUREMENT				
Content Standard	Students will understand measurement systems and applications.			
Grade 8 Benchmark	Understand measurable attributes of objects and the units, systems, and process of measurement.			
1	<ul style="list-style-type: none"> Understand the concept of volume and use the appropriate units in common measuring systems (e.g., cubic centimeter, cubic inch, cubic yard) to compute the volume of rectangular solids. 	Appetizers 4 E & F; 4 (Measurement)		
2	<ul style="list-style-type: none"> Use changes in measurement units (e.g., square inches, cubic feet) to perform conversions from one-, two-, and three-dimensional shapes. 	Appetizers 4 F; 4 (Measurement)		

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Grade 8 Benchmark	Apply appropriate techniques, tools, and formulas to determine measurements.			
1	• <i>Use ratios and proportions to measure hard-to-measure objects.</i>	Appetizers 2 D; 3 E, H, & I; 2 (Mathematical Relations); 3 (Geometry)		
2	• <i>Use estimation to solve problems.</i>	Appetizers 1 D; 10 A; 1 (Number Concepts); 10 (Estimation)		
3	• <i>Use proportional relationships in similar shapes to find missing measurements.</i>	Appetizers 3 E; 3 (Geometry)		
4	• <i>Apply strategies to determine the surface area and volume of prisms, pyramids, and cylinders.</i>	Appetizers 4 E; 4 (Measurement)		
5	• <i>Perform conversions with multiple terms between metric and U.S. standard measurement systems.</i>	Appetizers 4 A, B, & C; 4 (Measurement)		
6	• <i>Estimate volume in cubic units.</i>	Appetizers 4 E; 10 A; 4 (Measurement); 10 (Estimation)		
7	• <i>Solve simple problems involving rates and derived measurements for such properties as velocity and density.</i>			
DATA ANALYSIS AND PROBABILITY				
Content Standard	Students will understand how to formulate questions, analyze data, and determine probabilities.			
Grade 8 Benchmark	Formulate questions that can be addressed with data and collect, organize, and display relevant data to answer them.			
1	• <i>Represent two numerical variables on a plot, describe how the data points are distributed, and identify relationships that exist between the two variables.</i>	Appetizers 2 C; 2 (Mathematical Relations)		
2	• <i>Generate, organize, and interpret real numbers in a variety of situations.</i>	Interactive discussions throughout Appetizers		

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3	<ul style="list-style-type: none"> Organize, analyze, and display appropriate quantitative and qualitative data to address specific questions including: <ul style="list-style-type: none"> frequency distributions plots histograms bar, line, and pie graphs diagram and pictorial displays charts and tables 	Appetizers 5 D; 12 B & C; 5 (Probability/Statistics); 12 (Mathematical Representation)		
4	<ul style="list-style-type: none"> Select the appropriate measure of central tendency to describe a set of data for a particular problem situation. 	Appetizers 5 C; 5 (Probability/Statistics)		
5	<ul style="list-style-type: none"> Simulate an event selecting and using different models. 			
6	<ul style="list-style-type: none"> Develop an appropriate strategy using a variety of data from surveys, samplings, estimations, and inferences to address a specific problem. 	Appetizers 5 A & B; 12 B & C; 13 C; 5 (Probability/Statistics); 12 (Mathematical Representation); 13 (Reasonableness)		
Grade 8 Benchmark	Select and use appropriate statistical methods to analyze data.			
1	<ul style="list-style-type: none"> Use changes in scales, intervals, or categories to help support a particular interpretation of data. 	Appetizers 11 E; 11 (Problem Solving)		
2	<ul style="list-style-type: none"> Generate, organize, and interpret real number and other data in a variety of situations. 	Appetizers 2 C; 5 D; 12 B & C; 2 (Mathematical Relations); 5 (Probability/Statistics); 12 (Mathematical Representation)		
3	<ul style="list-style-type: none"> Analyze data to make decisions and to develop convincing arguments from data displayed in a variety of formats that include: <ul style="list-style-type: none"> plots distributions graphs scatter plots diagrams pictorial displays charts and tables Venn diagrams 	Appetizers 5 D; 12 B & C; 5 (Probability/Statistics); 12 (Mathematical Representation)		

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4	• Interpret and analyze data from graphical representations and draw simple conclusions (e.g., line of best fit).	Appetizers 11 E; 11 (Problem Solving)		
5	• Evaluate and defend the reasonableness of conclusions drawn from data analysis.	Appetizers 13 A & C; 13 (Reasonableness)		
6	• Use appropriate central tendency and spread as a means for effective decision-making in analyzing data and outliers.	Appetizers 5 C; 5 (Probability/Statistics)		
7	• Identify simple graphic misrepresentations and distortions of sets of data (e.g., unequal interval sizes, omission of parts of axis range, scaling).			
8	• Use appropriate technology to display data as lists, tables, matrices, graphs, and plots and to analyze the relationships of variables in the data displayed.			
Grade 8 Benchmark	Develop and evaluate inferences and predictions that are based on data.			
1	• Describe how changes in scale, intervals, or categories influence arguments for a particular interpretation of the data.			
2	• Describe how reader bias, measurement errors, and display distortion can affect the interpretation of data, predictions, and inferences based on data.	Appetizers 5 A & B; 11 E; 12 B; 5 (Probability/Statistics); 11 (Problem Solving); 12 (Mathematical Representation)		
3	• Conduct simple experiments and/or simulations, record results in charts, tables, or graphs, and use the results to draw conclusions and make predictions.	Appetizers 5 A & B; 11 E; 12 B; 5 (Probability/Statistics); 11 (Problem Solving); 12 (Mathematical Representation)		
4	• Compare expected results with experimental results and information used in predictions and inferences.	Appetizers 11 E; 11 (Problem Solving)		

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Grade 8 Benchmark	Understand and apply basic concepts of probability.			
1	<ul style="list-style-type: none"> Calculate the odds of a desired outcome in a simple experiment. 	Appetizers 5 A & B; 11 E; 5 (Probability/Statistics); 11 (Problem Solving)		
2	<ul style="list-style-type: none"> Design and use an appropriate simulation to estimate the probability of a real-world event (e.g., disk toss, cube toss). 	Appetizers 5 A & B; 11 E; 5 (Probability/Statistics); 11 (Problem Solving)		
3	<ul style="list-style-type: none"> Explain the relationship between probability and odds and calculate the odds of a desired outcome in a simple experiment. 	Appetizers 5 A & B; 5 (Probability/Statistics)		
4	<ul style="list-style-type: none"> Use theoretical or experimental probability to make predictions about real-world events. 	Appetizers 11 E & F; 11 (Problem Solving)		
5	<ul style="list-style-type: none"> Use probability to generate convincing arguments, draw conclusions, and make decisions in a variety of situations. 	Appetizers 11 E & F; 11 (Problem Solving)		
6	<ul style="list-style-type: none"> Understand that the probability of two unrelated events occurring is the sum of the two individual possibilities and that the probability of one event following another, in independent trials, is the product of the two probabilities. 			