Nevada Grade 7 Mathematics Item Specifications

Grade 7 CRT Item Specifications – Number and Operations		
Content Standard 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.		
"Enduring and Important Knowledge" identified in previous grade-levels may be included within the context of some problems.		
Assessed Indicators	**Depth of Knowledge Essence (*)**	**Item Specifications and Assessment Development Notes**
1.7.2 Fractions Translate among fractions, decimals, and percents, including fractional percents.	DOK 1	Repeating decimals are limited to 1/3 and 2/3 only. Percents must be 100% or less.
1.7.3 Comparing and Ordering Compare and order a combination of rational numbers, including fractions, decimals, percents, and integers in mathematical and practical situations	DOK 2	When comparing numbers, or ordering numbers a maximum of five numbers may be used. Items may use such models as a number line to compare a mix of fractions, percents, and decimals.
1.7.5 Facts Identify absolute values of integers	DOK 1	Items may ask student to perform integer computations inside the absolute value symbol.
1.7.6 Estimation Generate a reasonable estimate for a computation using a variety of methods. Select and round to the appropriate significant digit.	DOK 2	Items may be written in context and be multi-step. Answer choices may be single numbers, ranges of numbers, or descriptions. Items may ask students to determine the number of significant digits in a given number. Significant digit items with a given number must always be written with a decimal point.
1.7.7 Computation Calculate with integers and other rational numbers to solve mathematical and practical situations. Use order of operations to evaluate expressions and solve one-step equations (containing rational numbers).	DOK 1	Items may use integers, fractions, decimals, and percents. Expressions and equations used to assess order of operations may not contain exponents.
1.7.8 Number Theory Identify and apply the distributive, commutative, and associative properties of rational numbers to solve problems.	DOK 1	Items may not use variables. Zero property may be used as a distracter.

(*) = 50% of the assessed items must be at or above the Depth of Knowledge Essence

Nevada Grade 7 Mathematics Item Specifications

Grade 7 CRT Item Specifications - Algebra		
Content Standard 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.		
"Enduring and Important Knowledge" identified in previous grade-levels may be included within the context of some problems.		
Assessed Indicators	**Depth of Knowledge Essence (*)**	**Item Specifications and Assessment Development Notes**
2.7.1 Patterns Use and create tables, charts, and graphs to extend a pattern in order to describe a linear rule, including integer values.	DOK 2	Patterns must be repeated 3 times. Items may ask students to describe a linear rule for a pattern using words or symbols, create a table using a linear rule, or graph points to extend a pattern using only integer values. Items should be clear about the relationship between the two columns.
2.7.2 Variables and Unknowns Evaluate formulas and algebraic expressions for given integer values. Solve and graphically represent equations and inequalities in one variable with integer solutions.	DOK 1	Items should avoid using geometric formulas for volume and surface area. Equations may be one step or two steps; inequalities must be one step to solve. Solutions to equations must be integer values. Non-integer solutions are assessed in grade 8. Solutions to inequalities should be represented on number lines with an integer end point. Items may require the recognition of the graph of an equation or inequality. Items should ask students to substitute whole number values for variables in formulas and expressions.
2.7.4 Relations and Functions Generate and graph a set of ordered pairs to represent a linear equation.	DOK 2	Items may ask students to graph a set of ordered pairs to represent a linear equation. Items may ask students to identify a set of ordered pairs that represents solutions to a linear equation or to identify a graph of a set of ordered pairs (minimum of 2) that represents a linear equation.
2.7.5 Linear Equations and Inequalities Identify linear equations and inequalities. Model and solve equations using concrete and visual representations.	DOK 2	Solving and representing linear equations are assessed in 2.7.2. Linear equation models are assessed in 2.7.5. Identify linear inequalities are assessed in 2.7.5 Limited to pre-algebra skill level. Limit inequalities to one variable.

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Nevada Grade 7 Mathematics Item Specifications

Grade 7 CRT Item Specifications - Measurement		
Content Standard 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.		
"Enduring and Important Knowledge" identified in previous grade-levels may be included within the context of some problems.		
Assessed Indicators	**Depth of Knowledge Essence (*)**	**Item Specifications and Assessment Development Notes**
3.7.1 Comparison and Estimation Estimate and compare corresponding units of measure for area and volume/capacity between customary and metric systems	DOK 2	Items may focus on using comparison and estimation to get at the general size of a unit measure (e.g., Which unit is closest in size to a meter? Answer choices: inch, foot, yard, and mile.). Corresponding benchmark units: 1 quart ≈ 1 liter 1 yard ≈ 1 meter 2 pounds ≈ 1 kilogram 2 inches ≈ 5 centimeters Items may ask students to use corresponding benchmark units to estimate measures between systems. Customary units for area include: inch^2, foot^2, yard^2, and mile^2. Metric units for area include: millimeter^2, centimeter^2, meter^2, and kilometer^2. Customary units for volume include: cup, pint, quart, and gallon. Metric units for volume include: milliliter, centiliter, liter, and kiloliter.
3.7.3 Formulas Select, model, and apply formulas to find the volume and surface area of solid figures.	DOK 2	For volume, solid figures may include cubes, rectangular and triangular prisms, cylinders, and triangular and square pyramids. For surface area, solid figures may include cubes and rectangular prisms only. Items may require substitution into a formula or the actual calculation with the formula embedded into the stem. Embed all formulas from the HSPE formula sheet and any surface area or volume formulas.
3.7.4 Money Calculate simple interest in monetary problems.	DOK 1	Items limited to whole number interest rates only.
3.7.5 Ratios and Proportions Write and apply proportions to solve mathematical and practical problems involving measurement and monetary conversions.	DOK 2	Include a diagram when possible. Items may ask students to identify the correct proportion to solve a problem. ***Monetary conversions within the U.S. system only.***
3.7.6 Time Use elapsed time to solve practical problems.	DOK 2	Items may ask students to determine start time, end time, or elapsed time.

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Nevada Grade 7 Mathematics Item Specifications

Grade 7 CRT Item Specifications - Geometry		
Content Standard 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.		
"Enduring and Important Knowledge" identified in previous grade-levels may be included within the context of some problems.		
Assessed Indicators	**Depth of Knowledge Essence (*)**	**Item Specifications and Assessment Development Notes**
4.7.1 Two-Dimensional Shapes Identify, classify, compare, and draw regular and irregular polygons. Find and verify the sum of the measures of interior angles of triangles and quadrilaterals.	DOK 1	Polygons limited to 3- to 10-sided figures. Items may ask students to identify a set of angle measures that can represent the interior angle measures of a triangle or a quadrilateral. Items may ask students to identify triangles and quadrilaterals visually (figures may contain angle and side tic marks where applicable) and by description.
4.7.3 Coordinate Geometry Demonstrate translation, reflection, and rotation using coordinate geometry and models. Describe the location of the original figure and its transformation on a coordinate plane.	DOK 2	Limited to one transformation. Items may ask students to identify the transformation performed on a figure, given both the figure and the image. Transformations may include translation, rotation, and reflection. Dilation may be used as a distracter. Items may ask students to determine an ordered pair that describes the location of a point on the image of a transformed figure on a coordinate plane.
4.7.5 Algebraic Connections Determine slope of a line, midpoint of a segment, and the horizontal and vertical distance between two points using coordinate geometry.	DOK 1	Coordinates of points are limited to integers. Midpoint may be tested in either one quadrant or two quadrants. No formulas needed, yet must contain a visual representation.
4.7.6 Lines, Angles, and their Properties Describe the geometric relationships of parallel lines, perpendicular lines, triangles, quadrilaterals and bisectors	DOK 1	Use geometric relationships to solve practical or mathematical situations. Note that there are currently two definitions of a **trapezoid** accepted by the math community.
4.7.7 Triangles Model the Pythagorean Theorem and solve for the hypotenuse.	DOK 1	Items must ask students to solve for the hypotenuse only. Items are limited to Pythagorean triples. Item may ask students to identify appropriate use of the Pythagorean Theorem.

(*) = 50% of the assessed items must be at or above the Depth of Knowledge Essence

Nevada Grade 7 Mathematics Item Specifications

Grade 7 CRT Item Specifications – Data Analysis		
Content Standard 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.		
"Enduring and Important Knowledge" identified in previous grade-levels may be included within the context of some problems.		
Assessed Indicators	**Depth of Knowledge Essence (*)**	**Item Specifications and Assessment Development Notes**
5.7.1 Data Collection and Organization Formulate questions that guide the collection of data. Organize, display, and read data using the appropriate graphical representations (with and without technology).	DOK 2	Data displays are limited to circle graphs, scatter plots, histograms, stem and leaf plots, pictographs, line plots, frequency tables, bar graphs, tables and number lines. **No** box and whisker plots or line graphs. Axis breaks may be used. Histograms may use continuous scale on the horizontal axis. Items may ask students a simple question about a data display. Items may ask questions about central tendency but distracters must reflect errors in reading the display. Items may ask students to compare data in a data display or to perform calculations to answer questions about a data display. Items may ask students to select the correct data display given a set of data. **Constructed response** items may ask students to construct a data display that represents a given set of data.
5.7.2 Central Tendency Interpret graphical representations of data to describe patterns, trends, and data distribution.	DOK 2	Items may ask students to find measures of central tendency and range.
5.7.4 Permutations and Combinations Find the number of permutations possible for an event in mathematical and practical situations.	DOK 2	Items may ask students to permute a maximum of 4 objects. No permutations of subsets. Keep situations simple. Avoid the term "combination" in items involving permutations.
5.7.5 Experimental and Theoretical Probability Find the theoretical probability of an event using different counting methods including sample spaces and compare that probability with experimental results. Represent the probability of an event as a number between 0 and 1.	DOK 2	Sample spaces may be displayed as a tree diagram, organized list, or chart. Items may have up to 16 outcomes. Probability may be expressed as a fraction, simplified fraction, decimal, or percent. Items may ask students to create a tree diagram or organized list showing all possible outcomes of an activity.
5.7.6 Statistical Inferences Interpolate and extrapolate from data to make predictions for a given set of data.	DOK 2	

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