Mathematics Content Assessed by PAWS
GRADE 7

Wyoming Content Standard 1. Number Operations and Concepts		
Skill 1. Understand the meaning of arithmetic operations and make reasonable estimates.		
Benchmark	**Context**	**Content Limits:**
07.1.4 Students explain their choice of estimation and problem- solving strategies and justify results when performing number operations with fractions and decimals in problem-solving situations appropriate to grade level. Students add and subtract fractions and mixed numbers.	**N1 is embedded in N2 and N3.**	

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Wyoming Content Standard 1. Number Operations and Concepts		
Skill 2. Understand ways to represent numbers, relationships among numbers, and number systems.		
Benchmark	**Where in CCSS**	**Content Limits:**
07.1.1 Students represent and order rational numbers that are greater than or equal to 0 in a variety of equivalent forms in problem-solving situations.	**4.NF.2 (**Compare two fractions with different…) **5. NBT.3** (Read, write and compare decimals…) **6.NS.6** (Understand a rational number as a point on the number line…) **6.NS.7** (Understand ordering and absolute value of rational numbers…)	• Items may compare and order fractions, decimals, numbers expressed as percents, integers, and include ordering numbers on a number line. • The data presented to students may be either precise values, a range of values, or a combination of precise values and estimates of other values. • Number lines may include whole numbers, fractions, mixed numbers, or decimals. • Words, number lines, drawings, numerals, or symbols (<,>, =, ≤, ≥) may be used. • Items may compare smaller or larger numbers, or compare the order of magnitude between numbers. • An item may utilize one format or a variety of formats, such as fractions, decimals, and percents. • Items may include the relationships among fractions, decimals, or numbers expressed as percents, given a real-world context. • The place values of the fractional part of decimal numbers should range from tenths through ten-thousandths. • Items may include quantities expressed as fractions, decimals, percents, integers, and ratios. • Items may contain multiple forms of a given value. • Items will not include repeating decimals. • Some items should include word names as well as numerals. • Items should be set in either a real-world or mathematical context. • CR items may have students “Show your work or explain your answer.” • Graphics should be used in some of these items, as appropriate.

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<table>
<tr><td colspan="3">Wyoming Content Standard 1. Number Operations and Concepts</td></tr>
<tr><td colspan="3">Skill 3. Develop the connection between conceptual understanding and computational proficiency.</td></tr>
<tr><th>Benchmark</th><th>Where in CCSS</th><th>Content Limits:</th></tr>
<tr><td>07.1.2
Students use basic operations with integers in problem-solving situations.</td><td>7.NS.1 – 7.NS.2 (Rational number operations)</td><td rowspan="5">Items will include the effects of the four basic operations on integers, fractions, mixed numbers, and decimals, and the use of properties of real numbers to solve problems (commutative, associative, distributive, identity, equality, and the inverse relationship of rational numbers).
Items can use positive fractions with no more than two-digit numerators and denominators or decimals to hundredths.
Expressions may include parentheses, exponents, multiplication, division, addition, and subtraction.
Items applying the order of operations should be limited to use of whole numbers only.
Items may include problems dealing with percents used to find sales tax, discount, simple interest, and percent increase or decrease with whole numbers, decimals, and fractions.
Items may ask for answers to be rounded to the nearest percent, whole number, dollar, cent, etc., as appropriate.
Items should be set in either a real-world or a mathematical context.
CR items may have students “Show your work or explain your answer.”
Item situations should require estimation to find the solution and should not lend themselves to the calculation of an exact amount.</td></tr>
<tr><td>07.1.3
Students divide decimal numbers by decimal numbers.</td><td>6.NS.3 (Fluently add, subtract, multiply, and divide multi-digit decimals…)</td></tr>
<tr><td>07.1.5
Students multiply and divide fractions and mixed numbers.</td><td>5.NF.6 (Solve real world problems involving multiplication of fractions and mixed numbers. . .)
6.NS.1 (Interpret and compute quotients of fractions, and solve word problems involving division of fractions by fractions. . .)</td></tr>
<tr><td>07.1.7
Students apply the order of operations (whole numbers including grouping symbols and operations, excluding roots and powers) in problem-solving situations.</td><td>5.OA.1 (Use parentheses, …, and evaluate expressions with these symbols.)
6.EE.2 (… Perform arithmetic operations, including those involving whole-number exponents, in the conventional order when there are no parentheses to specify a particular order (Order of Operations).)</td></tr>
<tr><td>07.1.4
Students explain their choice of estimation and problem- solving strategies and justify results when performing number operations with fractions and decimals in problem-</td><td>7.EE.3 (Solve multi-step real-life and mathematical problems posed with positive and negative rational numbers in any form. . . and assess the reasonableness</td></tr>
</table>

solving situations appropriate to grade level. Students add and subtract fractions and mixed numbers	of answers using mental computation and estimation strategies. . .) **Core Practice #6**	

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Wyoming Content Standard 2. Geometry		
Skill 1. Specify locations and describe spatial relationships using coordinate geometry and other representational systems.		
Benchmark	**Where in CCSS**	**Content Limits:**
07.2.1 Students classify and describe one- and two-dimensional geometric objects, including: • lines, rays, segments, and angles; • parallel and perpendicular relationships; and • regular polygon types.	**4.G.1** (Draw points, lines, line segments,rays, … perpendicular and parallel lines…) **4.G.2** (Classify two-dimensional figures based on the presence or absence of parallel or perpendicular lines…) **6.G.3. (**Draw polygons in the coordinate plane. . .) **6.G.4** (Represent three-dimensional figures using nets…)	• Items will assess identifying points, parallel and perpendicular lines, planes, rays, diagonals, and types of angles. • Objects or points on the coordinate grid should be placed on the points of intersection of the grid lines. • Items may assess understanding and application of perpendicularity and parallelism. • Items should utilize only a single figure, with no comparisons to other figures or transformations. • Items assessing three-dimensional figures will use various types of drawings and perspectives (e.g., flat patterns/nets, isometric drawings). • Items should assess only geometric concepts of two-dimensional figures. • Items may use coordinate planes. • Items should be set in either a real-world or mathematical context. • CR items may have students “Show your work or explain your answer.” • Graphics should be used in most of these items, as appropriate
07.2.3 Students communicate the reasoning used in identifying geometric relationships in problem-solving situations appropriate to grade level.	**5.G.3 (**Understand that attributes belonging to a category of two-dimensional…) **5.G.4** (Classify two-dimensional figures in a hierarchy…) **Core Practice #6**	

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Wyoming Content Standard 2. Geometry		
Skill 2. Analyze characteristics and properties of two- and three-dimensional geometric shapes.		
Benchmark	**Where in CCSS**	**Content Limits:**
07.2.1 Students classify and describe one- and two-dimensional geometric objects, including: • lines, rays, segments, and angles; • parallel and perpendicular relationships; and • regular polygon types.	**4.G.1** (Draw points, lines, line segments, rays,…perpendicular and parallel lines…) **4.G.2** (Classify two-dimensional figures based on the presence or absence of parallel or perpendicular lines…) **5.G.4** (Classify two-dimensional figures in a hierarchy. . .) **6.G.3.** (Draw polygons in the coordinate plane. . .) **6.G.4** (Represent three-dimensional figures using nets…)	• Items will assess identifying basic properties and attributes of triangles, quadrilaterals, parallelograms, trapezoids, regular polygons, such as pentagons and hexagons. • Items assessing three-dimensional figures will use right prisms, right circular cylinders, square pyramids, cones, or spheres. • Items assessing three-dimensional figures will use various types of drawings and perspectives (e.g., flat patterns/nets, isometric drawings). • Items may use coordinate planes. • Items should be set in either a real-world or mathematical context. • CR items may have students “Show your work or explain your answer.” • Graphics should be used in most of these items, as appropriate.

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<table>
<tr><td colspan="3">Wyoming Content Standard 2. Geometry</td></tr>
<tr><td colspan="3">Skill 3. Apply transformations and use symmetry to analyze mathematical situations.</td></tr>
<tr><th>Benchmark</th><th>Where in CCSS</th><th>Content Limits:</th></tr>
<tr><td>07.2.2
Students make conjectures about geometric figures based on knowledge of congruence and similarity.</td><td>4.G.3 (Recognize a line of symmetry…)
8.G.2 (Understand that a two-dimensional figure is congruent to another if. . .)</td><td rowspan="2">Items may assess properties and relationships pertaining to regular two-dimensional shapes, and the concepts of symmetry, similarity, congruency, and reflection.
Items may assess understanding and application of symmetry, congruency, and similarity.
Items will not assess three-dimensional figures.
Items should assess only geometric concepts of two-dimensional figures.
Items may present a coordinate plane to locate and/or describe objects.
Items may be set in either a real-world or mathematical context.
CR items may have students “Show your work or explain your answer.”
Graphics should be used in most of these items, as appropriate.</td></tr>
<tr><td>07.2.3
Students communicate the reasoning used in identifying geometric relationships in problem-solving situations appropriate to grade level.</td><td>4.G.3 (Recognize a line of symmetry…)
8.G.2 (Understand that a two-dimensional figure is congruent to another if. .)
Core Practice #6</td></tr>
</table>

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Wyoming Content Standard 3. Measurement		
Skill 1. Understand measurable attributes of objects and the units, systems, and processes of measurement.		
Benchmark	**Where in CCSS**	**Content Limits:**
07.3.1 Students apply estimation and measurement of length to content problems and convert within the U.S. customary (in, ft, yd, mi) and within the metric system (mm, cm, m, km).	**2.MD.**1 (Measure the length of an object. . .) **2.MD.3 (**Estimate lengths using units of inches, … centimeters…) **4.MD.1 (**Know relative size of measurement units within one system….) **5.MD.1** (Convert among different-sized standard measurement units within a given system…) **7.G.1** (Solve problems involving scale drawings . .).	• Items may require students to demonstrate knowledge of proportional relationships in scale drawings or solve real-world problems, including distance, using a scale drawing. • Measurements may be in either metric or customary units. • Items should involve interpreting and applying various scales, including those based on number lines, graphs, models, and maps. • Scales, increments, and measures should be restricted to number lines and common ruler measures up to eighths. • Items may assess finding linear measure, weight, capacity or time. • All conversions of units must be within the same system of measurement (metric or customary). • Items should be set in a real-world context. • CR items may have students “Show your work or explain your answer.” • Graphics should be used in most of these items, as appropriate
07.3.2 Students apply estimation and measurement of weight to content problems expressing the results in metric units (g, kg).	**3.MD.2 (**Measure and estimate liquid volumes and masses…units of grams … liters) **4.MD.1 (**Know relative size of measurement units within one system….) **5.MD.1** (Convert among different-sized standard measurement units within a given system…)	
07.3.3 Students apply estimation and measurement of capacity to content problems expressing the results in metric units (liters).	**3.MD.2** (Measure and estimate liquid volumes and masses…units of grams … liters) **4.MD.1** (Know relative size of measurement units within one system….)	

	5.MD.1 (Convert among different-sized standard measurement units within a given system…)	

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<table>
<tr><td colspan="3">Wyoming Content Standard 3. Measurement</td></tr>
<tr><td colspan="3">Skill 2. Apply appropriate techniques, tools, and formulas to determine perimeter, area or volume.</td></tr>
<tr><th>Benchmark</th><th>Where in CCSS</th><th>Content Limits:</th></tr>
<tr><td>07.3.4
Students determine the circumference of a circle using models.</td><td>7.G.4 (Know the formulas for the area and circumference of a circle and . . .)
7.G.1 (Solve problems involving scale drawings of geometric figures . . .)</td><td rowspan="2">• Items may assess finding perimeter and circumference, and the area of triangles and trapezoids.
• The number of two-dimensional figures assessed in an item cannot exceed two.
• Items requiring three-dimensional graphics must be realistic and must include verbal descriptions.
• Items may assess how a change in a figure’s dimensions affects its perimeter (including circumference) or area, or how changes in the area or perimeter of a figure affect the dimensions of the figure.
• The changes in dimensions of a figure that are increased should use scale factors that are whole numbers.
• The changes in dimensions of a figure that are decreased should use scale factors that are common-unit fractions with denominators of 2, 3, 4, 5, or 10.
• Items may present two- or three-dimensional figures.
• Graphics should be used in most of these items, as appropriate.
• Items requiring three-dimensional graphics must be realistic and must include verbal descriptions.
• CR items may have students “Show your work or explain your answer.”
• Items should be set in either a real-world or mathematical context</td></tr>
<tr><td>07.3.5
Students calculate the areas of triangles and trapezoids.</td><td>6.G.1 (Find area of right triangles, other triangles, special quadrilaterals…)
7.G.1 (See above)</td></tr>
</table>

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Wyoming Content Standard 4. Algebra		
Skill 1. Understand patterns, relations, and functions.		
Benchmark	**Where in CCSS**	**Content Limits:**
07.4.2 Students solve one-step linear equations.	**6.EE.7** (Solve real-world and mathematical problems by writing ans solving…form *x+p=q* and *px=q*…) **7.EE.3 – 7.EE.4** (Solve multi-step real-life and mathematical problems . . . Solve word problems leading to equations of the form px + q = r and p(x + q) = r, where p, q, and r are specific rational numbers . . .)	• Items may use algebraic expressions or formulas/equations to assess generalizations of patterns. • Items may use pictures and graphics to present one-step linear equations. • Items should not use more than two variables or include more than one operation unless formula is given. • Items will use words, tables, symbols, variables, and graphs expressing equations or patterns. • Items may include graphic representations of a pattern, sequence, relationship, or function. • Items may be set in either a real-world (including money) or mathematical context. • CR items may have students "Show your work or explain your answer." • Graphics should be used in some of these items, as appropriate.
07.4.3 Students evaluate algebraic expressions and formulas, using order of operations, given positive integer values for variables.	**6.EE.1 – 6.EE.3** (…evaluate numerical expressions involving whole-number exponents…expressions in which letters stand for numbers…apply properties of operations to generate equivalent expressions) **6.EE.9.** (Use variables to represent two quantities . . . using graphs and tables, and relate these to the equation.)	

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<table>
<tr><td colspan="3">Wyoming Content Standard 4. Algebra</td></tr>
<tr><td colspan="3">Skill 2. Use mathematical models to represent and understand quantitative relationships.</td></tr>
<tr><th>Benchmark</th><th>Where in CCSS</th><th>Content Limits:</th></tr>
<tr><td>07.4.1
Students translate word phrases, which involve addition and subtraction, into mathematical expressions.</td><td>6.EE.2 (Write…expressions in which letters stand for numbers…)
6.EE.6 Use variables to represent numbers and write expressions…
7.EE.4 (Use variables to represent quantities in a real-world or mathematical problem, and construct simple equations and inequalities to solve problems . . .)</td><td rowspan="2">• Values in expressions should be whole numbers.
• Problem situations involving multiplication should represent the operation as 5 • n or 5n, not 5 x n.
• Problem situations involving division should represent the operation using the symbol “÷” or “/” (e.g., 5 ÷ n or 5/n).
• As more variables are used in test items, the numbers they represent should be smaller and/or simpler.
• Items may be from all four quadrants.
• Items involving graphing are limited to plotting points with integral coordinates.
• Items involving graphs will involve linear relationships only.
• Items should rely primarily on translating among written descriptions, expressions, and graphic representations.
• Items may be assessed in either a real-world or mathematical context.
• CR items may have students “Show your work or explain your answer.”
• Graphics should be used in most of these items, as appropriate</td></tr>
<tr><td>07.4.4
Students understand and use basic concepts of the coordinate system, including plotting points in all four quadrants.</td><td>6.NS.6 (…find and position pairs of integers and other rational numbers on a coordinate plane.)
6.NS.8 (Solve real-world…by graphing points in all four quadrants of the coordinate plane.)</td></tr>
</table>

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<table>
<tr><td colspan="3">Wyoming Content Standard 5. Data Analysis and Probability</td></tr>
<tr><td colspan="3">Skill 1. Collect, organize, and display relevant data to answer questions and use appropriate statistical methods to analyze the data.</td></tr>
<tr><th>Benchmark</th><th>Where in CCSS</th><th>Content Limits:</th></tr>
<tr><td>07.5.1
Students systematically collect, organize, describe, and analyze data using histograms.</td><td>3.MD.3 (Draw a scaled picture graph and a scaled bar graph to represent …)
6.SP.1—6.SP.5 (Recognize, use, and summarize statistical data …)
8.SP.1 (Construct and interpret scatter plots for . . .)</td><td rowspan="2">Items may include pictographs, charts, stem-and-leaf plots, scatter plots, data tables, circle graphs, bar graphs, and single-line graphs, Venn diagrams, and histograms. (Note: Histograms differ from bar graphs in that the bar of the histogram represents a range of categories rather than just one category as in the bar graph.).
Items will assess finding the range, mean, median, or mode of a set of data presented in a chart, table, graph, or plot (e.g., scatter plot, stem-and-leaf plot, or line plot).
The data displayed (i.e. bar, circle and line graphs or charts) should represent 8 or fewer categories.
Items that assess understanding of these concepts may ask students to draw conclusions from an analysis of range and/or central tendency measures.
No more than 10 pieces of data should be used for calculations of the mean.
No more than 10 items should be used in data sets.
Data contained in these items need not be ordered.
Items will assess:
interpreting and comparing information from single-bar graphs, single-line graphs, stem-and-leaf plots, or Venn diagrams;
recognizing appropriate displays for different kinds of data;
using and recognizing appropriate scale increments;
choosing reasonable titles, labels, scales, and intervals for data on pictographs and bar, line, or circle graphs;
generating questions, collecting responses, and displaying data on graphs;
interpreting and completing circle graphs using fractions or percents; and
analyzing and explaining in writing the implications of graphed data.
CR items may have students “Show your work or explain your answer.”
Graphics should be used in most of these items, as appropriate.
Items should be set in a real-world context.</td></tr>
<tr><td>07.5.2
Students calculate mean, median, mode, and range for data sets and use in real world setting.</td><td>6.SP.1—6.SP.5 (Recognize, use, and summarize statistical data …)
7.SP.4 (Use measures of center and measures of variability for numerical data . . .)</td></tr>
</table>

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Wyoming Content Standard 5. Data Analysis and Probability		
Skill 2. Develop and evaluate inferences and predictions that are based on data.		
Benchmark	**Where in CCSS**	**Content Limits:**
07.5.3 Students predict, compare, and report as ratios probable outcomes of experiments or simulations (i.e., impossible, equally likely, certain).	**7.SP.5 – 7.SP.8** (Understand that the probability . . . Approximate the probability of a chance . . . Develop a probability model . . . Find probabilities of compound events . . .)	• Items may include probabilities for independent and dependent events. • Mathematical expectations of probabilities will be assessed using simple empirical data or theoretical probabilities. • Most items developed for this context should assess simple events. • Probabilities should be based on whole numbers or fractions. • Probabilities may be expressed as fractions • Items should be set in a real-world context. • Students may be presented with word problems and/or tables. • CR items may have students "Show your work or explain your answer." • Graphics should be used in most of these items, as appropriate.