Wyoming Content Standard 1. Number Operations and Concepts		
Skill 1. Understand the meaning of arithmetic operations and make reasonable estimates.		
Benchmark	**Where in CCSS**	**Content Limits:**
11.1.3 Students explain their choice of estimation and problem solving strategies and justify results of solutions in problem-solving situations involving real numbers.	**N1 is embedded in N2 and N3.**	

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:**
11.1.1 Students represent and apply real numbers in a variety of forms.	**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**. . .)** **8.NS.1** (Know that numbers that are not rational are called irrational. . .) **8.NS.2** (Use rational approximations of irrational numbers to compare . . .) **8.EE.1** (Know and apply the properties of integer exponents) **8.EE.2** (Use square root and cube root symbols …)	• Items that involve exponents may include integer bases. • Items may not include rational exponents. • Items may be set in either real-world or mathematical contexts. • Different types of numbers may be mixed within the same item. • Simplifying/using radical numbers with and without context of real world application. • Logarithms and imaginary numbers will not be assessed. • CR items may have students "Show your work or explain your answer." • Graphics should be used in some of these items, as appropriate.
11.1.2 Students apply the structure and properties of the real number system.	**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**. . .)** **8.NS.1** (Know that numbers that are not rational are called irrational. . .) **8.NS.2** (Use rational approximations of irrational numbers to compare . . .) **8.EE.1** (Know and apply the properties of integer exponents) **8.EE.2** (Use square root and cube root symbols …)	
11.1.4 Students use proportional reasoning to	**7.RP.2** (Recognize and represent proportional	

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<mark>solve problems</mark>.	relationships between quantities.) **7.RP.3** (Use proportional relationships to solve multistep ratio & percent problems) **8.EE.5** (Graph proportional relationships, interpreting the unit rate as the slope of the graph.)	

Wyoming Content Standard 1. Number Operations and Concepts		
Skill 3. Develop the connection between conceptual understanding and computational proficiency.		
Benchmark	**Where in CCSS**	**Content Limits:**
11.1.1 Students represent and apply real numbers in a variety of forms.	**7.NS.1** (Addition & subtraction of rational numbers) **7.NS.2** (Multiplication & division of rational numbers) **8.EE.1** (Know and apply properties of integer exponents) **N.RN.1** (Explain meaning of rational exponents) **N.RN.2** (Expressions involving radicals and rational exponents)	• Items should require students to determine the effects of operations on real numbers including adding, subtracting, multiplying, dividing, and raising to whole number powers. • Understand the effect of exponents, and apply to simplify numerical and algebraic expressions using rules of exponents set in real-world or mathematical contexts. • 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. • Numbers may be represented in word form (e.g., fifty billion) or as denominate numbers (e.g., 4.3 trillion). • Items may include numeric or variable expressions or equations. • Items will assess understanding of the properties and not the vocabulary.
11.1.3 Students explain their choice of estimation and problem solving strategies and justify results of solutions in problem-solving situations involving real numbers.	**7.EE.3** (…assess the reasonableness of answers using mental computation and estimation strategies.) **Core Practice #6**	• Items may be set in either real-world or mathematical contexts. • Items should not assess linear estimation. • Item contexts may require students to make an estimate and not to calculate an exact amount. • Understand, explain and justify the effect of operations on various real numbers. • CR items may have students "Show your work or explain your answer." • Graphics should be used in some of these items, as appropriate.

Wyoming Content Standard 2. Geometry		
Skill 1. Specify locations and describe spatial relationships using coordinate geometry and other representational systems.		
Benchmark	**Context**	**Content Limits:**
11.2.1 Students use transformations, congruency, symmetry, similarity, perpendicularity, parallelism, and the Pythagorean Theorem to solve problems.	**8.G.1 (**Verify experimentally the properties of rotations, reflections, and translations. . .) **8.G.2** (Understand that a two-dimensional figure is congruent to another . . .) **8.G.3** (…effects of dilations, translations, rotations and reflections on two-dimensional figures using coordinates) **8.G.4** (Understand that a two-dimensional figure is similar to another . . .) **8.G.7** (Apply Pythagorean Theorem … right triangles) **8.G.8** (Apply Pythagorean Theorem … distance in a coordinate system.) **G.CO.3** (Given a rectangle, . . . describe the rotations and reflections that carry it onto itself.) (**G.CO.7** (Use the definition of congruence in terms of rigid motions to show that two triangles are congruent . . .) **G.CO.9** (Prove theorems about lines and angles. . .) **G.SRT.5** (Use congruence and similarity criteria for triangles to solve problems . . .)	• Items should not assess tangency or fractals. • Items may assess the necessary conditions that cause figures to be similar or congruent. • Items will not assess trigonometric functions • Items may assess understanding and application of perpendicularity and parallelism including understanding and using slopes to identify parallel and perpendicular lines; the angle relationships in angles formed by 2 parallel lines and a transversal. • Items may assess right-triangle geometry. Methods of solving may include the Pythagorean Theorem, but cannot rely exclusively on the 30-60-90 or 45-45-90 triangle relationships to solve problems. • Items may include linear equations in various forms, including standard, slope-intercept, and point-slope forms. • Items may be set in either real-world or mathematical contexts. • Rectangular coordinate planes should be used in all items. • CR items may have students "Show your work or explain your answer." • Graphics should be used in most of these items, as appropriate.
11.2.4 Students solve problems involving the	**8.G.8** (Apply Pythagorean Theorem … distance in a	

coordinate plane such as the <mark>distance between two points</mark>, the midpoint, and <mark>slope</mark>.	coordinate system.) **8.EE.6** (… derive equation … y=mx+b …) **G.GPE.5** (Prove the slope criteria for parallel and perpendicular lines and use them to solve . . .) **G.GPE.6** (Find the point on a directed line segment between two given points . . .)	

Wyoming Content Standard 2. Geometry		
Skill 2. Analyze characteristics and properties of two- and three-dimensional geometric shapes.		
Benchmark	**Context**	**Content Limits:**
No Benchmarks for this Skill	Not Assessed at this Grade	----

Wyoming Content Standard 2. Geometry		
Skill 3. Apply transformations and use symmetry to analyze mathematical situations.		
Benchmark	**Context**	**Content Limits:**
11.2.1 Students use transformations, congruency, symmetry, similarity, perpendicularity, parallelism, and the Pythagorean Theorem to solve problems.	**4.G.3** (Recognize a line of symmetry …) **8.G.1** (Verify experimentally the properties of rotations, reflections, and translations. . .) **8.G.2** (Understand that a two-dimensional figure is congruent to another . . .) **8.G.3** (…effects of dilations, translations, rotations and reflections on two-dimensional figures using coordinates) **8.G.4** (Understand that a two-dimensional figure is similar to another . . .) **8.G.7** (Apply Pythagorean Theorem … right triangles) **8.G.8** (Apply Pythagorean Theorem … distance in a coordinate system.) **G.CO.3** (Given a rectangle, . . . describe the rotations and reflections that carry it onto itself.) **G.CO.7** (Use the definition of congruence in terms of rigid motions to show that two triangles are congruent . . .) **G.CO.9** (Prove theorems about lines and angles. . .) **G.SRT.5** (Use congruence and similarity criteria for triangles to solve problems . . .)	• Items may assess properties and relationships pertaining to regular and irregular two dimensional shapes, and the concepts of symmetry, reflections, congruency, similarity, and transformations. • Items may assess understanding and application of symmetry, congruency, and similarity. • Items may assess transformations, including translations, reflections, rotations, and dilations. • Parabolic relations will not be used. • Three-dimensional figures in a coordinate system will not be assessed. • Verification and explanation of geometric properties. • Rectangular coordinate planes should be used. • Items may be set in either real-world or mathematical contexts. • CR items may have students "Show your work or explain your answer." • Graphics should be used in most of these items, as appropriate

11.2.2 Students communicate, using mathematical language, to: - Interpret, represent, or create geometric figures; - Draw or build figures from a mathematical description; - Analyze properties and determine attributes of 2- and <mark>3- dimensional objects</mark>.	**G.CO.1** (Know precise definitions of angle, circle, perpendicular line, parallel line, and line segment . . .) **G.CO.9 – G.CO.11** (Prove theorems about lines and angles, … triangles, … parallelograms …) **G.CO.12** (Make formal geometric constructions with a variety of tools …) **G.CO.13** (Construct an equilateral triangle, a square, and a regular hexagon inscribed in a circle.) **G.C.2** (Identify and describe relationships among inscribed angles, radii, and chords. …) **G.C.3** (Construct the inscribed and circumscribed circles of a triangle, …)	
11.2.3 Students communicate the reasoning used in identifying geometric relationships in problem-solving situations.	**G.CO.1** (See above) **G.CO.9 – G.CO.11** (See above) **G.C.2** (See above) **Core Practices #3 & #6**	

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:**
11.3.1 Students apply estimation and measurement using the appropriate methods and units to solve problems involving length, weight/mass, area, surface area, volume, and angle measure.	**4.MD. 2** (Use the four operations to solve word problems involving distances, intervals of time, liquid volumes, masses of objects…) **7. G.5** (Use facts about supplementary, complementary … in multi-step…) **7.G.6** (Solve real-world and mathematical problems involving area, volume and surface area …) **G.MG.2** (Apply concepts of density based on area and volume …) **G.GMD.3** (Use volume formulas for cylinders, pyramids, cones, and spheres …)	• Items may include numeric and algebraic expressions to assess understanding and application of complementary and supplementary angles, and the sum of interior angles of a triangle. • Items that involve derived measures should not be limited to miles per hour or feet per second, but should include other derived measures. • Items assessing angle measures should be based on real-world applications as appropriate. • Conversions must be within one system of measurement but may include area or volume conversions. • Items may assess how change in a figure's dimensions affects its perimeter (including circumference), area, surface area, or volume; or how changes in the volume, surface area, area, or perimeter of a figure affect the dimensions of the figure. • Items may include similar figures and scale drawings. • All items should be set in a real-world context. • All CR items should specify the unit of the derived measures required. • All CR items should contain multiple steps in the solution process. • CR items may have students "Show your work or explain your answer." • Graphics should be used in some of these items, as appropriate.
11.3.2 Students demonstrate an understanding of both metric and U. S. customary systems. Students are able to convert within each system.	**4.MD.1** (Know relative sizes of measurement units within one system of units …) **5.MD.1** (Convert among different-sized standard measurement units within a given measurement system …) **6.RP.3** (Use ratio reasoning to convert measurement units …) **N.Q.1** (Use units as a way to understand problems and to guide the solution of multi-step problems …)	

11.3.3 Students identify and apply scale, ratios, and proportions in solving measurement problems.	7.G.1 (Solve problems involving scale drawings …)	
11.3.4 Students solve problems of angle measure including those involving polygons or parallel lines cut by a transversal.	G.CO.9 – G.CO.11 (Prove theorems about lines and angles, … triangles, … parallelograms …)	

Wyoming Content Standard 3. Measurement		
Skill 2. Apply appropriate techniques, tools, and formulas to determine perimeter, area or volume.		
Benchmark	**Where in CCSS**	**Content Limits:**
11.3.1 Students apply estimation and measurement using the appropriate methods and units to solve problems involving length, weight/mass, area, surface area, volume, and angle measure.	**4.MD. 2** (Use the four operations to solve word problems involving distances, intervals of time, liquid volumes, masses of objects…) **6.G.4** (Represent 3-dimensional figures using nets … and use nets to find surface area …) **7.G.6** (Solve real-world and mathematical problems involving area, volume and surface area of two- and three-dimensional objects …) **8.G.9** (Know formulas for the volumes of cones, cylinders, and spheres …) **G.GMD.3** (Use volume formulas for cylinders, pyramids, cones, and spheres to solve problems)	• Items should include either symmetric or regular figures or a combination of these figures. • Items assessing cones or cylinders should include only right circular cones or right circular cylinders. • Items assessing characteristics of pyramids should include only right, square pyramids. • Items may require finding intermediate variables. • Items may include lateral area. • Items may involve comparisons between objects or the different measurements of the same object. • Items may be set in either real-world or mathematical contexts.(i.e. calculation of lateral surface area) • 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." • Graphics should be used in most of these items, as appropriate

Wyoming Content Standard 4. Algebra

Skill 1. Understand patterns, relations, and functions.

Benchmark	Where in CCSS	Content Limits:
11.4.1 Students use algebraic concepts, symbols, and skills to represent and solve real-world problems.	**A.SSE.3** (Choose and produce an equivalent form of an expression …) **A.APR.1** (Understand that polynomials form a system analogous to the integers, …) **A.CED.1** (Create equations and inequalities in one variable and use …) **A.CED.2** (Create equations in two or more variables to …) **A.CED.3** (Represent constraints by equations …) **A.CED.4** (Rearrange formulas to highlight a quantity of interest …) **A.REI.3** (Solve linear equations and inequalities in one variable, …) **A.REI.6** (Solve systems of linear equations exactly and approximately, …) **A.REI.12** (Graph the solutions to a linear inequality in two variables …)	• Items should include no more than three variables. • One or two parameters may be changed, resulting in the change of another parameter. • Parameters such as dimension, capacity, cost, and relationships between variables may be used. • Simplifying and evaluating non-linear expressions (combining like-terms, etc.), and applying symbolic reasoning. • Writing, solving equations or inequalities, and interpreting patterns are limited to linear equations. • Systems of inequalities will not be assessed. • Solve and graph linear inequalities in one or two variables, and represent their solutions in multiple ways. • Items may be set in either real-world or mathematical contexts. • CR items may have students "Show your work or explain your answer." • Graphics should be used in some of these items, as appropriate.
11.4.2 Students write, model, and evaluate expressions, functions, equations, and inequalities.	**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	

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	inequalities to solve …) **8.F.4** (Construct a function to model a linear relationship between two quantities. …) **Core Practice #4**	

Wyoming Content Standard 4. Algebra		
Skill 2. Use mathematical models to represent and understand quantitative relationships.		
Benchmark	**Where in CCSS**	**Content Limits:**
11.4.3 Students graph linear equations and interpret the results in solving algebraic problems.	**8.F.4** (Construct a function to model a linear relationship between two quantities. . .) **F.LE.5** (Distinguish between situations that can be modeled with linear functions and …) **A.SSE.1** (Interpret expressions that represent a quantity in terms of its context. …) **F.IF.6** (Calculate and interpret the average rate of change of a function …) **F.IF.7** (Graph functions expressed symbolically and …) **A.REI.10** (Understand that the graph of an equation in two variables is …)	• In items that require the solving of equations or inequalities, the equation or inequality should be linear. • Graphing and analyzing/interpreting graphs is limited to linear equations. • Interpreting the meaning of parameters in linear equations according to real world applications, and apply or justify the effect in parameter changes in real-world situations, or characteristics of a linear graph. • Matrices, sequences, series, and recursive relations will not be assessed. • Items can be assessed in all four quadrants. • Objects or points on the coordinate grid should be placed on the points of intersection of the grid lines. • Items may involve finding the intersection of two lines. • Items may assess the slope of lines (including the slope of vertical and horizontal lines) and determine the x- and y-intercepts of a line. • Systems of equations in MC items may be limited to setting up a real world application into a system of linear equations, and to providing solutions in CR items.
11.4.4 Students solve, graph, or interpret systems of linear equations.	**8.F.2** (Compare properties of two functions each represented in a different way (algebraically, graphically…) **8.F.4** (Construct a function to model a linear relationship between two quantities. . .) **8.EE.7** (Solve linear equations in one variable…) **8.EE.8** (Analyze and solve pairs of simultaneous linear equations…) **A.REI.5** (Prove that, given a system of two equations in two variables, replacing one	• Items should use methods that are graphical and/or algebraic. • CR items may have students "Show your work or explain your answer." • Graphics should be used in some of these items, as appropriate.

| | equation by the sum …)
A.REI.6 (Solve systems of linear equations exactly and approximately, …) | |

Wyoming Content Standard 5. Data Analysis and Probability

Skill 1. Collect, organize, and display relevant data to answer questions and use appropriate statistical methods to analyze the data.

Benchmark	Where in CCSS	Content Limits:
11.5.1 Students apply knowledge of mean, median, mode, and range to interpret and evaluate information and data.	**6.SP.2** (Understand that a set of data collected … can be described by its center, spread, …) **6.SP.3** (Recognize that a measure of center of a numerical data set summarizes …) **6.SP.5** (Give quantitative measures of center … and variability …) **S.ID.2** (Use statistics appropriate to the shape of the data distribution to compare center (median, mean) and spread …) **S.ID.3** (Interpret differences in shape, center, and spread in the context of the data sets …)	• The measures of standard deviation and variance will not be assessed. • Items should use the terms mean, median, mode, and range, but should not provide or require a definition of the terms. • Items should contain no more than 15 unorganized data points and no more than 30 organized data points which may be in graphical form. • Displays of data within the stem should be complete and correct. • Items may assess the interpretation of data in the following forms: circle graphs, single- and multiple-line graphs and bar graphs, scatter plots, tables, Venn diagrams, stem-and leaf plots, line plots, or histograms. • Items may assess the interpretation or predictions based on multiple displays of data. • MC items may require identification of appropriate data displays. • Items that require the determination and comparison of all measures of central tendency and/or range should contain no more than 15 two- or three-digit data points. • Items may be set in real-world or mathematical contexts. • Items should assess understanding of the measures of central tendency including changes that occur with new data including outliers.
11.5.2 Students draw reasonable inferences from statistical data and/or correlation/best fit line to predict outcomes.	**7.SP.2** (Use data from a random sample to draw inferences about a population…) **7.SP.4** (Use measures of center and …to draw informal comparative inferences about two populations.) **S.ID.6** (Represent data on two quantitative variables on a scatter plot, and describe how the variables are related…) **S.ID.8** (Compute (using technology) and interpret the correlation	• Items should assess the calculation of the measures of central tendency and the most meaningful measure to use for a given situation. • Data for items using measure of central tendency may be in the form of charts, tables or graphs. • Use of scatter plots in MC items requiring extrapolation may be limited within a short range of the last data point when a line of best fit is not provided; students may be asked to draw a line of best fit in CR items. • CR items may require generalizing, predicting, and/or drawing conclusions. • CR items may have students "Show your work or explain your answer."

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	coefficient of a linear fit.)	• Graphics should be used in some of these items, as appropriate.
11.5.4 Students determine, collect, organize, and analyze relevant data needed to make conclusions.	**3.MD.3** (Draw a scaled picture graph and a scaled bar graph to represent …) **8.SP.1** (Construct and interpret scatter plots for . . .) **S.ID.1** (Represent data with plots on the real number line (dot plots, histograms, and box plots).)	

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:**
11.5.3 Students communicate about the likelihood of events using concepts from probability. • sample space • evaluate simple probabilities • evaluate experimental vs. theoretical	**7.SP.5 – 7.SP.8** (Understand … predict…develop probability models…find probability of compound…) **S.CP.1** (Describe events as subsets of a sample space …) **S.CP.2** (Understand that two events A and B are independent if …) **S.CP.3** (Understand the conditional probability of A given B as …) **S.CP.4** (Construct and interpret two-way frequency tables of data when …) **S.CP.5** (Recognize and explain the concepts of conditional probability and independence in …) **S.IC.2** (Decide if a specified model is consistent with results from a given data-generating process, …)	• Compound events are limited to independent occurrences. • Items may require computation of the probability of a simple compound event (i.e. sample space) • Items may assess combinations and permutations; however, items should not require the use of the formulas. • Items may assess theoretical or experimental probabilities. • Items may be set in real-world or mathematical contexts. • CR items may require generalizing, predicting, and/or drawing conclusions. • CR items may have students "Show your work or explain your answer." • Graphics should be used in some of these items, as appropriate.