| **Comparison of Grade 8 PSSA Eligible Content to Keystone Algebra 1** |
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| **PSSA Eligible Content** | **Keystone Algebra 1 Eligible Content** | **Comments** |
| **M08.A-N.1.1.1** Determine whether a number is rational or irrational. For rational numbers, show that the decimal expansion terminates or repeats (limit repeating decimals to thousandths).Page 9, 10Page 44 | NO MATCH |   |
| **M08.A-N.1.1.2** Convert a terminating or repeating decimal into a rational number (limit repeating decimals to thousandths).Page 11 | NO MATCH |   |
| **M08.A-N.1.1.3** Estimate the value of irrational numbers without a calculator (limit whole number radicand to less than 144). *Example: √5 is between 2 and 3 but closer to 2.* | **A1.1.1.4.1** Use estimation to solve problems.Page 8 | Although this matches, the Keystone Eligible Content is a broad statement and the 8th grade is more specific. |
| NO MATCH | **A1.1.1.1.2** Simplify square roots (e.g., √24 = 2√6 ).Page 5 |  |
| **M08.A-N.1.1.4** Use rational approximations of irrational numbers to compare and order irrational numbers.Page 12,13 | **A1.1.1.1.1** Compare and/or order any real numbers.Note: Rational and irrational may be mixed.Page 5, 12 |   |
| **M08.A-N.1.1.5** Locate/identify rational and irrational numbers at their approximate locations on a number line.Page 12 | **A1.1.1.1.1** Compare and/or order any real numbers.Note: Rational and irrational may be mixed.Page 5 |  PSSA references a number line only |
| NO MATCH | **A1.1.1.2.1** Find the Greatest Common Factor (GCF) and/or the Least Common Multiple (LCM) for sets of monomials.Page 6 |   |
| **M08.B-E.1.1.1** Apply one or more properties of integer exponents to generate equivalent numerical expressions without a calculator (with final answers expressed in exponential form with positive exponents). **Properties will be provided.** *Example: 312 × 3 ⎯15 = 3 ⎯3 = 1/(33)*Page 7, 15 | **A1.1.1.3.1** Simplify/evaluate expressions involving properties/laws of exponents, roots, and/ or absolute values to solve problems.Note: Exponents should be integers from -10 to 10.Page 7, 12 | Keystone includes absolute value (PSSA does not). Properties are NOT provided on the Keystone formula sheet. On the Keystones, exponents are limited to integers of -10 to 10. |
| **M08.B-E.1.1.2** Use square root and cube root symbols to represent solutions to equations of the form x2 = p and x3 = p, where p is a positive rational number. Evaluate square roots of perfect squares (up to and including 122) and cube roots of perfect cubes (up to and including 53) without a calculator. *Example: If x2 = 25 then x = ±√25*Page 8 | **A1.1.1.3.1** Simplify/evaluate expressions involving properties/laws of exponents, roots, and/ or absolute values to solve problems.Note: Exponents should be integers from -10 to 10.Page 7, 12 | PSSA makes special mention of perfect squares and perfect cubes. |
| **M08.B-E.1.1.3** Estimate very large or very small quantities by using numbers expressed in the form of a single digit times an integer power of 10, and express how many times larger or smaller one number is than another.*Example: Estimate the population of the United States as 3 × 108 and the population of the world as 7 × 109, and determine that the world population is more than 20 times larger than the United States population.*Page 8 | NO MATCH |  |
| **M08.B-E.1.1.4** Perform operations with numbers expressed in scientific notation, including problems where both decimal and scientific notation are used. Express answers in scientific notation and choose units of appropriate size for measurements of very large or very small quantities (e.g., use millimeters per year for seafloor spreading). Interpret scientific notation that has been generated by technology (e.g., interpret 4.7EE9 displayed on a calculator as 4.7 × 109). | NO MATCH |   |
| **M08.B-E.2.1.1** Graph proportional relationships, interpreting the unit rate as the slope of the graph. Compare two different proportional relationships represented in different ways.*Example: Compare a distance-time graph to a distance-time equation to determine which of two moving objects has greater speed.*Page 16 (anchor descriptor)Page 17 | **A1.2.2.1.1** Identify, describe, and/or use constant rates of change.Page 38 |   |
| **A1.2.2.1.4** Determine the slope and/or y-intercept represented by a linear equation or graph.Page 39 |  |
| **M08.B-E.2.1.2** Use similar right triangles to show and explain why the slope m is the same between any two distinct points on a non-vertical line in the coordinate plane.Page 18 | NO MATCH |   |
| **M08.B-E.2.1.3** Derive the equation y = mx for a line through the origin and the equation y = mx + b for a line intercepting the vertical axis at b.Page 19, 27 | **A1.1.2.1.1** Write, solve, and/or apply a linear equation (including problem situations).Page 14 | This is a match, but the Keystone uses the additional verbs of "solve" and "apply". Also the Keystone mentions problem situations. |
| **A1.2.2.1.3** Write or identify a linear equation when given• the graph of the line,• two points on the line, or• the slope and a point on the line.Note: Linear equation may be in point-slope, standard, and/or slope-intercept form.Page 39 | Keystone mentions point-slope and standard forms in addition to the slope-intercept form addressed in the PSSA. |
| **NO MATCH** | **A1.1.2.1.2** Use and/or identify an algebraic property to justify any step in an equation-solving process.Note: Linear equations only.Page 14 | Properties are provided on the Keystone formula sheet. |
| **M08.B-E.3.1.1** Write and identify linear equations in one variable with one solution, infinitely many solutions, or no solutions. Show which of these possibilities is the case by successively transforming the given equation into simpler forms, until an equivalent equation of the form x = a, a = a, or a = b results (where a and b are different numbers).Page 20 (anchors descriptor) | NO MATCH |  |
| **M08.B-E.3.1.2** Solve linear equations that have rational number coefficients, including equations whose solutions require expanding expressions using the distributive property and collecting like terms.Page 21 | NO MATCH |  |
| **M08.B-E.3.1.3** Interpret solutions to a system of two linear equations in two variables as points of intersection of their graphs, because points of intersection satisfy both equations simultaneously.Page 22 | **A1.1.2.2.2** Interpret solutions to problems in the context of the problem situation.Note: Limit systems to two linear equations.Page 16 |  |
| **M08.B-E.3.1.4** Solve systems of two linear equations in two variables algebraically, and estimate solutions by graphing the equations. Solve simple cases by inspection.*Example: 3x + 2y = 5 and 3x + 2y = 6 have no solution because 3x + 2y cannot simultaneously be 5 and 6.* | **A1.1.2.2.1** Write and/or solve a system of linear equations (including problem situations) using graphing, substitution, and/or elimination.Note: Limit systems to two linear equations.Page 16 | The PSSA includes estimating solutions and solving simple cases by inspection. |
| **M08.B-E.3.1.5** Solve real-world and mathematical problems leading to two linear equations in two variables.*Example: Given coordinates for two pairs of points, determine whether the line through the first pair of points intersects the line through the second pair.*Page 23 | **A1.1.2.2.1** Write and/or solve a system of linear equations (including problem situations) using graphing, substitution, and/or elimination.Note: Limit systems to two linear equations.Page 16 |  |
| **A1.1.2.2.2** Interpret solutions to problems in the context of the problem situation.Note: Limit systems to two linear equations.Page 16 |
| NO MATCH | **A1.1.1.5.1** Add, subtract, and/or multiply polynomial expressions (express answers in simplest form).Note: Nothing larger than a binomial multiplied by a trinomial.Page 9 |   |
| NO MATCH | **A1.1.1.5.2** Factor algebraic expressions, including difference of squares and trinomials.Note: Trinomials are limited to the form ax2+bx+c where a is equal to 1 after factoring out all monomial factors.Page 9 |   |
| NO MATCH | **A1.1.1.5.3** Simplify/reduce a rational algebraic expression.Page 9 |   |
| NO MATCH | **A1.1.2.1.3** Interpret solutions to problems in the context of the problem situation.Note: Linear equations only.Page 15 |   |
| NO MATCH | **A1.1.3.1.1** Write or solve compound inequalities and/or graph their solution sets on a number line (may include absolute value inequalities).Page 21 |   |
| NO MATCH | **A1.1.3.1.2** Identify or graph the solution set to a linear inequality on a number line.Page 21 |  |
| NO MATCH | **A1.1.3.1.3** Interpret solutions to problems in the context of the problem situation.Note: Limit to linear inequalities.Page 21 |   |
| NO MATCH | **A1.1.3.2.1** Write and/or solve a system of linear inequalities using graphing.Note: Limit systems to two linear inequalities.Page 23 |   |
| NO MATCH | **A1.1.3.2.2** Interpret solutions to problems in the context of the problem situation.Note: Limit systems to two linear inequalities.Page 24 |   |
| **M08.B-F.1.1.1** Determine whether a relation is a function.Page 24 | **A1.2.1.1.2** Determine whether a relation is a function, given a set of points or a graph.Page30 |   |
| **M08.B-F.1.1.2** Compare properties of two functions each represented in a different way (i.e., algebraically, graphically, numerically in tables, or by verbal descriptions).*Example: Given a linear function represented by a table of values and a linear function represented by an algebraic expression, determine which function has the greater rate of change.**Page 25,26* | NO MATCH |   |
| **M08.B-F.1.1.3** Interpret the equation y = mx + b as defining a linear function whose graph is a straight line; give examples of functions that are not linear.Page 27 | NO MATCH | The PSSA requires students to give examples of nonlinear functions. |
| **M08.B-F.2.1.1** Construct a function to model a linear relationship between two quantities. Determine the rate of change and initial value of the function from a description of a relationship or from two (x, y) values, including reading these from a table or from a graph. Interpret the rate of change and initial value of a linear function in terms of the situation it models and in terms of its graph or a table of values.Page 27Page 58 | **A1.2.1.2.1** Create, interpret, and/or use the equation, graph, or table of a linear function.Page 32**A1.2.2.1.2** Apply the concept of linear rate of change (slope) to solve problems.**A1.2.2.1.4** Determine the slope and/or y-intercept represented by a linear equation or graph.Page 39 |  |
| **M08.B-F.2.1.2** Describe qualitatively the functional relationship between two quantities by analyzing a graph (e.g., where the function is increasing or decreasing, linear or nonlinear). Sketch or determine a graph that exhibits the qualitative features of a function that has been described verbally.Page 28, 29,30 | **NO MATCH** |  |
| NO MATCH | **A1.2.1.1.1** Analyze a set of data for the existence of a pattern and represent the pattern algebraically and/or graphically.Page 29 |   |
| NO MATCH | **A1.2.1.1.3** Identify the domain or range of a relation (may be presented as ordered pairs, a graph, or a table).Page 31 |   |
| NO MATCH | **A1.2.1.2.2** Translate from one representation of a linear function to another (i.e., graph, table, and equation).Page 32 |   |
| **M08.C-G.1.1.1** Identify and apply properties of rotations, reflections, and translations.*Example: Angle measures are preserved in rotations, reflections, and translations.*Page 31 (Anchor descriptor)Page 32 | NO MATCH |   |
| **M08.C-G.1.1.2** Given two congruent figures, describe a sequence of transformations that exhibits the congruence between them. | NO MATCH |   |
| **M08.C-G.1.1.3** Describe the effect of dilations, translations, rotations, and reflections on two-dimensional figures, using coordinates. | NO MATCH |   |
| **M08.C-G.1.1.4** Given two similar two-dimensional figures, describe a sequence of transformations that exhibits the similarity between them. | NO MATCH |   |
| **M08.C-G.2.1.1** Apply the converse of the Pythagorean theorem to show a triangle is a right triangle.Page 33(Anchors Descriptor)Page 34 | NO MATCH |   |
| **M08.C-G.2.1.2** Apply the Pythagorean theorem to determine unknown side lengths in right triangles in real-world and mathematical problems in two and three dimensions. (Figures provided for problems in three dimensions will be consistent with Eligible Content in grade 8 and below.)Page 35 | NO MATCH |   |
| **M08.C-G.2.1.3** Apply the Pythagorean theorem to find the distance between two points in a coordinate system.Page 36 | NO MATCH |   |
| **M08.C-G.3.1.1** Apply formulas for the volumes of cones, cylinders, and spheres to solve real-world and mathematical problems. **Formulas will be provided.****Page 37** | NO MATCH |   |
| **M08.D-S.1.1.1** Construct and interpret scatter plots for bivariate measurement data to investigate patterns of association between two quantities. Describe patterns such as clustering, outliers, positive or negative correlation, linear association, and nonlinear association.Page 40,41Page 78 | NO MATCH |   |
| **M08.D-S.1.1.2** For scatter plots that suggest a linear association, identify a line of best fit by judging the closeness of the data points to the line.Page 42, 78 | **A1.2.2.2.1** Draw, identify, find, and/or write an equation for a line of best fit for a scatter plot.Page 40 | The PSSA only requires identifying a line of best fit, whereas the Keystone adds draw, find and writing an equation for the line of best fit. |
| **M08.D-S.1.1.3** Use the equation of a linear model to solve problems in the context of bivariate measurement data, interpreting the slope and intercept.*Example: In a linear model for a biology experiment, interpret a slope of 1.5 cm/hr as meaning that an additional hour of sunlight each day is associated with an additional 1.5 cm in mature plant height.*Page 39, 42 | **A1.2.3.2.3** Make predictions using the equations or graphs of best-fit lines of scatter plots.Page 49 |  |
| **M08.D-S.1.2.1** Construct and interpret a two-way table summarizing data on two categorical variables collected from the same subjects. Use relative frequencies calculated for rows or columns to describe possible associations between the two variables.*Example: Given data on whether students have a curfew on school nights and whether they have assigned chores at home, is there evidence that those who have a curfew also tend to have chores?**Page 43* | NO MATCH |   |
| NO MATCH | **A1.2.3.1.1** Calculate and/or interpret the range, quartiles, and interquartile range of data.Page 46 |   |
| NO MATCH | **A1.2.3.2.1** Estimate or calculate to make predictions based on a circle, line, bar graph, measures of central tendency, or other representations.Page 47 |  |
| NO MATCH | **A1.2.3.2.2** Analyze data, make predictions, and/or answer questions based on displayed data (box-and-whisker plots, stem-and-leaf plots, scatter plots, measures of central tendency, or other representations).Page 48 |  |
| NO MATCH | **A1.2.3.3.1** Find probabilities for compound events (e.g., find probability of red and blue, find probability of red or blue) and represent as a fraction, decimal, or percent.Page 50 |  |