8th Grade Math

PA Core Standard	*Vocabulary*	*Eligible Content*	*Resources*
M08.A-N The Number System			
M08.A-N.1.1 Apply concepts of rational and irrational numbers. CC.2.1.8.E.1 Distinguish between rational and irrational numbers using their properties. CC.2.1.8.E.4 Estimate irrational numbers by comparing them to rational numbers.	**Rational Number** **Irrational Number**	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).	8th Grade PSSA Course disk Unit 1 1-1 Number Sets Various worksheets in binder under Numbers and Operations
M08.A-N.1.1 Apply concepts of rational and irrational numbers. CC.2.1.8.E.1 Distinguish between rational and irrational numbers using their properties. CC.2.1.8.E.4 Estimate irrational numbers by comparing them to rational numbers.	**Terminating Decimal** **Repeating Decimal**	M08.A-N.1.1.2 Convert a terminating or repeating decimal to a rational number (limit repeating decimals to thousandths).	8th Grade PSSA Course disk Unit 1 1-4 Convert Decimals to Fractions Various worksheets in binder under Numbers and Operations
M08.A-N.1.1 Apply concepts of rational and irrational numbers. CC.2.1.8.E.1 Distinguish between rational and irrational numbers using their properties. CC.2.1.8.E.4 Estimate irrational numbers by comparing them to rational numbers.		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.	8th Grade PSSA Course disk Unit 1 1-2 Estimating the Value of Irrationals Various worksheets in binder under Numbers and Operations

M08.A-N.1.1 Apply concepts of rational and irrational numbers. CC.2.1.8.E.1 Distinguish between rational and irrational numbers using their properties. CC.2.1.8.E.4 Estimate irrational numbers by comparing them to rational numbers.		M08.A-N.1.1.4 Use rational approximations of irrational numbers to compare and order irrational numbers.	8th Grade PSSA Course disk Unit 1 1-5 Ordering Real Numbers Various worksheets in binder under Numbers and Operations
M08.A-N.1.1 Apply concepts of rational and irrational numbers. CC.2.1.8.E.1 Distinguish between rational and irrational numbers using their properties. CC.2.1.8.E.4 Estimate irrational numbers by comparing them to rational numbers.		M08.A-N.1.1.5 Locate/identify rational and irrational numbers at their approximate locations on a number line.	8th Grade PSSA Course disk Unit 1 1-3 Locating Real Numbers on a Number Line Various worksheets in binder under Numbers and Operations

M08.B-F Algebraic Concepts			
M08.B-E.1.1 Represent and use expressions and equations to solve problems involving radicals and integer exponents. **CC.2.2.8.B.1 Apply concepts of radicals and integer exponents to generate equivalent expressions.**	**Square Root** **Cube Root**	**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: 3^12 × 3^ –15 = 3^ –3 = 1/(3^3)**	8th Grade PSSA Course disk Unit 2 2-2 Multiplication Rule for Exponents 2-3 Division Rule for Exponents 2-4 Power Rule and Exponent Distribution
M08.B-E.1.1 Represent and use expressions and equations to solve problems involving radicals and integer exponents. CC.2.2.8.B.1 Apply concepts of radicals and integer exponents to generate equivalent expressions.		M08.B-E.1.1.2 Use square root and cube root symbols to represent solutions to equations of the form x^2 = p and x^3 = p, where p is a positive rational number. Evaluate square roots of perfect squares (up to and including 12^2) and cube roots of perfect cubes (up to and including 5^3) without a calculator. Example: If x^2 = 25 then x = ±√25.	8th Grade PSSA Course disk Unit 6 6-1 Perfect Square and Cube Roots 6-2 Estimating Cube Roots Various worksheets in binder under Numbers and Operations
M08.B-E.1.1 Represent and use expressions and equations to solve problems involving radicals and integer exponents. CC.2.2.8.B.1 Apply concepts of radicals and integer exponents to generate equivalent expressions.	**Scientific Notation**	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 × 10^8 and the population of the world as 7 × 10^9 and determine that the world population is more than 20 times larger than the United States' population.	8th Grade PSSA Course disk Unit 3 3-1 and 3-2 Conversion of Scientific and Standard 3-3 Comparing Numbers in Scientific Notation Various worksheets in binder under Numbers and Operations

M08.B-E.1.1 Represent and use expressions and equations to solve problems involving radicals and integer exponents. CC.2.2.8.B.1 Apply concepts of radicals and integer exponents to generate equivalent expressions.		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 × 10^9).	8th Grade PSSA Course disk Unit 3 3-4 Operations with Scientific Notation Various worksheets in binder under Numbers and Operations
M08.B-E.2.1 Analyze and describe linear relationships between two variables, using slope. CC.2.2.8.B.1 Apply concepts of radicals and integer exponents to generate equivalent expressions.	**Slope** **Y intercept**	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.	8th Grade PSSA Course disk Unit 10 10-2 Find Slope from a Graph Slope Unit in binder under Algebraic Concepts
M08.B-E.2.1 Analyze and describe linear relationships between two variables, using slope. CC.2.2.8.B.1 Apply concepts of radicals and integer exponents to generate equivalent expressions.		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.	8th Grade PSSA Course disk Unit 10 10-1 Find Slope Given Two Points Slope Unit in binder under Algebraic Concepts

M08.B-E.2.1 Analyze and describe linear relationships between two variables, using slope. CC.2.2.8.B.1 Apply concepts of radicals and integer exponents to generate equivalent expressions.		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.	8th Grade PSSA Course disk Unit 10 10-4 Graphing a Line from Slope-Intercept Form Slope Unit in binder under Algebraic Concepts
M08.B-E.3.1 Write, solve, graph, and interpret linear equations in one or two variables, using various methods. CC.2.2.8.B.1 Apply concepts of radicals and integer exponents to generate equivalent expressions. CC.2.2.8.B.3 Analyze and solve linear equations and pairs of simultaneous linear equations.	**Distributive Property**	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).	8th Grade PSSA Course disk Unit 10 10-5 Writing an Equation in Slope-Intercept Form Slope Unit in binder under Algebraic Concepts
M08.B-E.3.1 Write, solve, graph, and interpret linear equations in one or two variables, using various methods. CC.2.2.8.B.1 Apply concepts of radicals and integer exponents to generate equivalent expressions. CC.2.2.8.B.3 Analyze and solve linear equations and pairs of simultaneous linear equations.		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.	8th Grade PSSA Course disk Unit 5 5-3 Solving Multi-Step Equations 5-4 Simplifying and Solving Solving Equations Unit in binder under Algebraic Concepts

M08.B-E.3.1 Write, solve, graph, and interpret linear equations in one or two variables, using various methods. CC.2.2.8.B.1 Apply concepts of radicals and integer exponents to generate equivalent expressions. CC.2.2.8.B.3 Analyze and solve linear equations and pairs of simultaneous linear equations.		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.	8th Grade PSSA Course disk Unit 13 13-1 Solving Systems by Graphing Slope Unit in binder under Algebraic Concepts
M08.B-E.3.1 Write, solve, graph, and interpret linear equations in one or two variables, using various methods. CC.2.2.8.B.1 Apply concepts of radicals and integer exponents to generate equivalent expressions. CC.2.2.8.B.3 Analyze and solve linear equations and pairs of simultaneous linear equations.		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.	8th Grade PSSA Course disk Unit 13 13-2 Solving Systems by Substitution 13-2 Solving Systems by Elimination

M08.B-E.3.1 Write, solve, graph, and interpret linear equations in one or two variables, using various methods. CC.2.2.8.B.1 Apply concepts of radicals and integer exponents to generate equivalent expressions. CC.2.2.8.B.3 Analyze and solve linear equations and pairs of simultaneous linear equations.		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	8th Grade PSSA Course disk Unit 13 13-4 Real World Systems Slope Unit in binder under Algebraic Concepts
M08.B-F.1.1 Define, evaluate, and compare functions displayed algebraically, graphically, or numerically in tables or by verbal descriptions. CC.2.2.8.C.1 Define, evaluate, and compare functions.	**Function**	M08.B-F.1.1.1 Determine whether a relation is a function.	8th Grade PSSA Course disk Unit 11 11-1 Functions Functions Unit in binder under Algebraic Concepts
M08.B-F.1.1 Define, evaluate, and compare functions displayed algebraically, graphically, or numerically in tables or by verbal descriptions. CC.2.2.8.C.1 Define, evaluate, and compare functions.		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.	8th Grade PSSA Course disk Unit 11 11-2 Comparing Linear Functions in Different Forms Functions Unit in binder under Algebraic Concepts

M08.B-F.1.1 Define, evaluate, and compare functions displayed algebraically, graphically, or numerically in tables or by verbal descriptions. CC.2.2.8.C.1 Define, evaluate, and compare functions.	**Linear** **Nonlinear**	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.	8th Grade PSSA Course disk Unit 11 11-4 Linear or Nonlinear Functions Unit in binder under Algebraic Concepts
M08.B-F.2.1 Represent or interpret functional relationships between quantities using tables, graphs, and descriptions. CC.2.2.8.C.2 Use concepts of functions to model relationships between quantities.		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.	8th Grade PSSA Course disk Unit 11 11-3 Rate of Change in Functions Functions Unit in binder under Algebraic Concepts
M08.B-F.2.1 Represent or interpret functional relationships between quantities using tables, graphs, and descriptions. CC.2.2.8.C.2 Use concepts of functions to model relationships between quantities.		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.	8th Grade PSSA Course disk Unit 12 12-2 Properties of Functions (Increasing/Decreasing) 12-3 Graphing a Real World Situation

M08.C-G Geometry			
M08.C-G.1.1 Apply properties of geometric transformations to verify congruence or similarity. CC.2.3.8.A.2 Understand and apply congruence, similarity, and geometric transformations using various tools.	**Rotation** **Translation** **Reflection** **Dilation**	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.	8th Grade PSSA Course disk Unit 8 8-1 Rotations, Reflections and Translations
M08.C-G.1.1 Apply properties of geometric transformations to verify congruence or similarity. CC.2.3.8.A.2 Understand and apply congruence, similarity, and geometric transformations using various tools.		M08.C-G.1.1.2 Given two congruent figures, describe a sequence of transformations that exhibits the congruence between them.	8th Grade PSSA Course disk Unit 8 8-2 Identifying Transformations to Prove Congruence
M08.C-G.1.1 Apply properties of geometric transformations to verify congruence or similarity. CC.2.3.8.A.2 Understand and apply congruence, similarity, and geometric transformations using various tools.		M08.C-G.1.1.3 Describe the effect of dilations, translations, rotations, and reflections on two-dimensional figures using coordinates.	8th Grade PSSA Course disk Unit 8 8-1 Rotations, Reflections and Translations
M08.C-G.1.1 Apply properties of geometric transformations to verify congruence or similarity. CC.2.3.8.A.2 Understand and apply congruence, similarity, and geometric transformations using various tools.		M08.C-G.1.1.4 Given two similar two-dimensional figures, describe a sequence of transformations that exhibits the similarity between them.	8th Grade PSSA Course disk Unit 8 8-3 Dilations and Similarity

M08.C-G.2.1 Solve problems involving right triangles by applying the Pythagorean theorem. CC.2.3.8.A.3 Understand and apply the Pythagorean Theorem to solve problems.	**Pythagorean Theorem** **Right Triangle**	M08.C-G.2.1.1 Apply the converse of the Pythagorean theorem to show a triangle is a right triangle.	Pythagorean Theorem Unit in binder under Geometry "Pythagorean Theorem" "The Pythagorean Theorem"
M08.C-G.2.1 Solve problems involving right triangles by applying the Pythagorean theorem. CC.2.3.8.A.3 Understand and apply the Pythagorean Theorem to solve problems.		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.)	Pythagorean Theorem Unit in binder under Geometry "Apply the Pythagorean Theorem"
M08.C-G.2.1 Solve problems involving right triangles by applying the Pythagorean theorem. CC.2.3.8.A.3 Understand and apply the Pythagorean Theorem to solve problems.		M08.C-G.2.1.3 Apply the Pythagorean theorem to find the distance between two points in a coordinate system.	Pythagorean Theorem Unit in binder under Geometry "Find the Distance Between Points"
M08.C-G.3.1 Apply volume formulas of cones, cylinders, and spheres. CC.2.3.8.A.1 Apply the concepts of volume of cylinders, cones, and spheres to solve real-world and mathematical problems.	**Cone** **Cylinder** **Sphere** **Volume**	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.	8th Grade PSSA Course disk Unit 14 14-3 Volumes of Cylinders And Shperes 14-4 Volume of Cones 14-5 Real World Area and Volume

M08.D-S Statistics and Probability			
M08.D-S.1.1 Analyze and interpret bivariate data displayed in multiple representations. CC.2.4.8.B.1 Analyze and/or interpret bivariate data displayed in multiple representations.	**Scatter Plot** **Bivariate Outliers** **Positive and Negative Correlation** **Line of Best Fit**	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.	8th Grade PSSA Course disk Unit 15 15-1 Scatter Plots 15-2 Patterns in Plots
M08.D-S.1.1 Analyze and interpret bivariate data displayed in multiple representations. CC.2.4.8.B.1 Analyze and/or interpret bivariate data displayed in multiple representations.		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.	8th Grade PSSA Course disk Unit 15 15-3 Using a 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.	8th Grade PSSA Course disk Unit 15 15-4 Equation of a Line of Best Fit 15-5 Two-way Tables

M08.D-S.1.2 Understand that patterns of association can be seen in bivariate categorical data by displaying frequencies and relative frequencies in a two-way table. CC.2.4.8.B.2 Understand that patterns of association can be seen in bivariate data utilizing frequencies.		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?	