COURSE 8th Grade Math WVW

Quarter	Content	Skills	Assessments	Eligible content
1	Rational/Irrational Numbers	Students will determine whether a number is rational or irrational. For rational numbers, show that the decimal expansion terminates or repeats (limit repeating decimals to thousandths).	Q&A Independent practice problems Quiz/Test	2.1.8.E.1 - Distinguish between rational and irrational numbers using their properties.
	Simplifying Rational and Irrational Numbers to Decimal Form	Students will convert a terminating decimal into a rational number. Students will convert a repeating decimal into a rational number (limit repeating decimals to thousandths).	Q&A Independent practice problems Quiz/Test	2.1.8.E.4 Estimate irrational numbers by comparing them to rational numbers.
		Students will 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.	Q&A Independent practice problems Quiz/Test	
	Order and Compare Rational and Irrational Numbers	Students will use rational approximations of irrational numbers to compare and order irrational numbers.	Q&A Independent practice problems Quiz/Test	2.1.8.E.4 Estimate irrational numbers by comparing them to rational numbers. 2.2.8.B.1

		Students will locate or identify rational and irrational numbers at their approximate locations on a number line.	Q&A Independent practice problems Quiz/Test	Apply concepts of radicals and integer exponents to generate equivalent expressions.
	Laws of Exponents	Students will apply exponent rules to generate equivalent numerical expressions without a calculator. Final answers will be expressed in exponential form with positive exponents. Properties will be provided. Example: $3^{12} \times 3^{-15} = 3^{-3} = 1/(3)^3$	Q&A Independent practice problems Quiz/Test	2.1.8.E.4 Estimate irrational numbers by comparing them to rational numbers. 2.2.8.B.1 Apply concepts of radicals and integer exponents to generate equivalent expressions.
	Working with Roots	Students will use square root symbols to represent solutions to equations of the form $x^2 = p$, where p is a positive rational number. Students will use cube root symbols to represent solutions to equations of the form $x^3 = p$, where p is a positive rational number. Students will 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.	Q&A Independent practice problems Quiz/Test	2.1.8.E.4 Estimate irrational numbers by comparing them to rational numbers. 2.2.8.B.1 Apply concepts of radicals and integer exponents to generate equivalent expressions.

		Example: If $x^2 = 25$ then $x = \pm\sqrt{25}$.		
	Apply and Interpret Using Scientific Notation	Students will estimate very large or very small quantities by using numbers expressed in scientific notation with a single digit times an integer power of 10. Students will 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.	Q&A Independent practice problems Quiz/Test	2.1.8.E.4 Estimate irrational numbers by comparing them to rational numbers. 2.2.8.B.1 Apply concepts of radicals and integer exponents to generate equivalent expressions.
	Scientific Notation: Operations, Units and Technology	Students will perform operations with numbers expressed in scientific notation, including problems where both decimal and scientific notation are used. Students will 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).	Q&A Independent practice problems Quiz/Test	2.1.8.E.4 Estimate irrational numbers by comparing them to rational numbers. 2.2.8.B.1 Apply concepts of radicals and integer exponents to generate equivalent expressions

		Students will interpret scientific notation that has been generated by technology (e.g., interpret 4.7EE9 displayed on a calculator as 4.7×10^9)		
	Applications of the Pythagorean Theorem and it's Converse	Students will apply the converse of the Pythagorean theorem to show a triangle is a right triangle.	Q&A Independent practice problems Quiz/Test	2.3.8.A.2 Understand and apply the Pythagorean Theorem to solve problems.
2	Pythagorean theorem: Find Side Lengths	Students will 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.)	Q&A Independent practice problems Quiz/Test	2.3.8.A.2 Understand and apply the Pythagorean Theorem to solve problems.
	Pythagorean theorem: Distance	Students will apply Pythagorean theorem to find the distance between two points in a coordinate system.	Q&A Independent practice problems Quiz/Test	2.3.8.A.2 Understand and apply the Pythagorean Theorem to solve problems.

	Proportional Relationships: Unit Rate and Compare	Students will graph proportional relationships, interpreting the unit rate as the slope of the graph. Students 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.	Q&A Independent practice problems Quiz/Test	2.2.8.B.2 Understand the connections between proportional relationships, lines, and linear equations.
	Using Similar Right Triangles with Slope	Students will 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.	Q&A Independent practice problems Quiz/Test	2.2.8.B.2 Understand the connections between proportional relationships, lines, and linear equations.
	Using the Slope, Derive the Equation y=mx and the Equation y=mx + b	Students will 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.	Q&A Independent practice problems Quiz/Test	2.2.8.B.2 Understand the connections between proportional relationships, lines, and linear equations.
	Write and Solve Linear Equations	Students will write and identify linear equations in one variable with one solution, infinitely many solutions, or no solutions. Students will show which of these possibilities is the case by successively	Q&A Independent practice problems Quiz/Test	2.2.8.B.2 Understand the connections between proportional relationships, lines, and linear equations. 2.2.8.B.3

		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).		Analyze and solve linear equations and pairs of simultaneous linear equations.
		Students will solve linear equations that have rational number coefficients, including equations whose solutions require expanding expressions using the distributive property and collecting like terms.	Q&A Independent practice problems Quiz/Test	
	Define and Understand a Function	Students will determine whether a relation is a function.	Q&A Independent practice problems Quiz/Test	2.2.8.B.2 Understand the connections between proportional relationships, lines, and linear equations. 2.1.8.C.1 Define, evaluate, and compare functions. 2.1.8.C.2 Use concepts of functions to model relationships between quantities.
	Compare Properties of Functions	Students will 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	Q&A Independent practice problems Quiz/Test	2.2.8.B.2 Understand the connections between proportional relationships, lines, and linear equations. 2.1.8.C.1 Define, evaluate, and compare functions.

		function represented by an algebraic expression, determine which function has the greater rate of change.		2.1.8.C.2 Use concepts of functions to model relationships between quantities.
	Linear and Non-Linear Functions	Students will interpret the equation y = mx + b as defining a linear function whose graph is a straight line. Students will give examples of functions that are not linear.	Q&A Independent practice problems Quiz/Test	2.2.8.B.2 Understand the connections between proportional relationships, lines, and linear equations. 2.1.8.C.1 Define, evaluate, and compare functions. 2.1.8.C.2 Use concepts of functions to model relationships between quantities.
3	Understand the Solution to a Systems of Equations	Students will 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.	Q&A Independent practice problems Quiz/Test	2.2.8.B.2 Understand the connections between proportional relationships, lines, and linear equations. 2.2.8.B.3 Analyze and solve linear equations and pairs of simultaneous linear equations.

	Solve a System of Two Linear Equations Algebraically	Students will solve systems of two linear equations in two variables algebraically. Students will estimate solutions by graphing the equations. Solve simple cases by inspection. Students will 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.	Q&A Independent practice problems Quiz/Test	2.2.8.B.2 Understand the connections between proportional relationships, lines, and linear equations. 2.2.8.B.3 Analyze and solve linear equations and pairs of simultaneous linear equations.
	Apply Systems of Equations to Real World Situations	Students will 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.	Q&A Independent practice problems Quiz/Test	2.2.8.B.2 Understand the connections between proportional relationships, lines, and linear equations. 2.1.8.C.1 Define, evaluate, and compare functions. 2.1.8.C.2 Use concepts of functions to model relationships between quantities.

	Model Relationships Using Functions	Students will construct a function to model a linear relationship between two quantities. Students will 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. Students will 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.	Q&A Independent practice problems Quiz/Test	2.2.8.B.2 Understand the connections between proportional relationships, lines, and linear equations. 2.1.8.C.1 Define, evaluate, and compare functions. 2.1.8.C.2 Use concepts of functions to model relationships between quantities.
	Analyze the Relationship Between Quantities From a Graph	Students will describe qualitatively the functional relationship between two quantities by analyzing a graph (e.g., where the function is increasing or decreasing, linear or nonlinear). Students will sketch or determine a graph that exhibits the qualitative features of a function that has been described verbally.	Q&A Independent practice problems Quiz/Test	2.2.8.B.2 Understand the connections between proportional relationships, lines, and linear equations. 2.1.8.C.1 Define, evaluate, and compare functions. 2.1.8.C.2 Use concepts of functions to model relationships between quantities.

	Frequency and Relative Frequency	Students will construct and interpret scatter plots for bivariate measurement data to investigate patterns of association between two quantities. Students will describe patterns such as clustering, outliers, positive or negative correlation, linear association, and nonlinear association.	Q&A Independent practice problems Quiz/Test	2.4.8.B.1 Analyze and/or interpret bivariate data displayed in multiple representations 2.4.8.B.2 Understand that patterns of association can be seen in bivariate data utilizing frequencies.
	Line of Best Fit	Students, for scatter plots that suggest a linear association, will identify a line of best fit by judging the closeness of the data points to the line.	Q&A Independent practice problems Quiz/Test	2.4.8.B.1 Analyze and/or interpret bivariate data displayed in multiple representations 2.4.8.B.2 Understand that patterns of association can be seen in bivariate data utilizing frequencies.
	Use and Interpret the Slope and Intercept of the Line of Best Fit (linear regression line, trend line, linear model)	Students will 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.	Q&A Independent practice problems Quiz/Test	2.4.8.B.1 Analyze and/or interpret bivariate data displayed in multiple representations 2.4.8.B.2 Understand that patterns of association can be seen in bivariate data utilizing frequencies.

	Frequency Table	Students will construct and interpret a two way table summarizing data on two categorical variables collected from the same subjects. Students will 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.	Q&A Independent practice problems Quiz/Test	2.4.8.B.2 Understand that patterns of association can be seen in bivariate data utilizing frequencies.
	Apply Volume of Cones, Cylinders, and Spheres	Students will apply formulas for the volumes of cones, cylinders, and spheres to solve real-world and mathematical problems. Formulas will be provided.	Q&A Independent practice problems Quiz/Test	2.3.8.A.3 Apply the concepts of volume of cylinders, cones, and spheres to solve real-world and mathematical problems.
4	Select Topics from 9th Grade Advanced Algebra 1		Q&A Independent practice problems Quiz/Test	