AzMERIT MATH Grade 8

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PLD	**Standard**	**Minimally Proficient**	**Partially Proficient**	**Proficient**	**Highly Proficient**
		The Minimally Proficient student	The Partially Proficient student	The Proficient student	The Highly Proficient student
The Number System					
Detailed	8.NS.A [1 to 2]	Identifies square roots of nonsquare numbers and pi as irrational numbers. Understands that every number has a decimal expansion. Identifies rational or irrational numbers and converts familiar rational numbers with one repeating digit to fraction form.	Compares and orders rational and irrational numbers. Identifies irrational decimal expansions as approximations. Identifies rational and irrational numbers and converts less familiar rational numbers to fraction form.	Places irrational numbers on a number line. Uses approximations of irrational numbers to estimate the value of an expression. Converts decimals into rational numbers.	Explains how to get more precise approximations of square roots. Notices and explains the patterns that exist when writing rational numbers as fractions.
Expressions and Equations					
Detailed	8.EE.A [1 to 2]	Knows the properties of natural number exponents. Evaluates square roots of small perfect squares.	Applies the properties of natural number exponents to generate equivalent numerical expressions. Solves mathematical equations without context of the form x ^2=p and x ^3=p , where p is a positive rational number.	Knows and applies the properties of integer exponents to generate equivalent numerical expressions. Uses 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.	Uses properties of integer exponents to order or evaluate multiple numerical expressions with integer exponents. Explains how square roots and cube roots relate to each other and to their radicands.
Detailed	8.EE.A [3 to 4]	Uses numbers expressed in the form of a single digit times an integer power of 10. Represents very large and very small quantities in scientific notation.	Uses numbers expressed in the form of a single digit times an integer power of 10 to estimate very large or very small quantities. Multiplies and divides numbers in scientific notation.	Expresses how many times as much a number written as an integer power of 10 is than another number. Performs operations with numbers expressed in scientific notation, including problems where both decimal and scientific notation are used.	Converts between decimal notation and scientific notation and compares numbers written in different forms. Calculates and interprets values written in scientific notation within a context.
Detailed	8.EE.B [5 to 6]	Graphs proportional relationships, interpreting the unit rate as the slope. Determines the slope of a line given a graph.	Compares two different proportional relationships using the same representation. Derives the equation y=mx for a line through the origin.	Compares two different proportional relationships represented in different ways. Recognizes and explains why the slope m is the same between any two distinct points on a non-vertical line. Derives the equation y=mx+b for a line that does not pass through the origin.	Generates a representation of a proportional relationship with specific qualities. Compares and contrasts situations in which similar triangles would and would not yield lines with the same slope.

Detailed	8.EE.C [7 to 8c]	Solves simple linear equations with integer coefficients. Identifies systems of equations that have one, infinite, or no solutions from graph. Estimates the solution of a system given a graph.	Solves multistep linear equations with rational coefficients and identifies equations that have one solution, infinitely many solutions, or no solutions. Solves a system of linear equations using any method.	Solves multistep linear equations with rational coefficients and variables on both sides and provides examples of equations that have one solution, infinitely many solutions, or no solutions. Provides examples of systems of equations that have a specified number of solutions. Creates and utilizes a system of linear equations to solve a real-world problem.	Justifies why an equation has one solution, infinitely many solutions, or no solution. Solves real-world and mathematical problems leading to two linear equations in two variables.
Functions					
Detailed	8.F.A [1 to 3]	Identifies whether a relation is a function from a graph or a mapping. Creates a graph from a function expressed as an equation. Determines whether a function is linear or nonlinear from a graph.	Identifies whether a relation is a function from any representation. Given a representation of a function, creates another representation of that function. Determines whether a function is linear or nonlinear from an equation.	Explains that a function is a rule that assigns to each input exactly one output and that the graph of a function is the set of ordered pairs consisting of an input and the corresponding output. Compares properties of two functions each represented in a different way. Determines whether or not a function is linear or nonlinear from any representation. Gives examples of functions that are not linear.	Creates any representation of a relation and explain why it is a function or not a function. Justifies whether two functions represented in different ways are equivalent or not by comparing their properties. Explains why the function is linear or nonlinear.
Detailed	8.F.B [4 to 5]	Determines the rate of change of the function from a graphical description of the linear function. Describes qualitatively the functional relationship between two quantities by analyzing some features of a graph (e.g., linear and nonlinear).	Determines the rate of change and initial value of the function from two (x,y) values. Creates a graph of identified information. Describes qualitatively the functional relationship between two quantities by analyzing a graph (e.g., where the function is increasing or decreasing).	Interprets the rate of change and initial value of a linear function in terms of the situation it models or its graph/table of values. Constructs a function to model a linear relationship between two quantities. Sketches a graph that exhibits given qualitative features of a function.	Identifies what prevents a set of values in either a table or graph from being linear and adjusts the values to make them linear. Interprets qualitative features of a function in a context.

Geometry					
Detailed	8.G.A [1a to 4]	Identifies visual representations and congruent figures that result after one transformation. Recognizes that it takes a combination of transformations and dilations to produce a similar figure.	Identifies the angles that correspond after a transformation. Identifies a transformation between two congruent figures. Describes the effect of reflections and translations on two-dimensional figures using coordinates and coordinate notation. Identifies dilations of figures by a given scale factor and transformations.	Verifies experimentally the properties of rotations, reflections and translations. Describes the effect of transformations on two-dimensional figures using coordinates and coordinate notation, including whether the transformations lead to similar or congruent figures.	Recognizes and explains the properties of transformations in real-world graphic illustrations and visual representations, including whether the transformations lead to similar or congruent figures.
Detailed	8.G.A [5]	Knows that the sum of angles of a triangle equals 180 degrees, and identifies angle pairs when parallel lines are cut by a transversal.	Finds unknown angle measures in a triangle, and unknown angle measures for angle pairs when parallel lines are cut by a transversal.	Gives an informal argument for the sum of angles of a triangle, the measure of an exterior angle of a triangle, and congruent angle relationships when parallel lines are cut by a transversal.	Gives an informal argument that a triangle can only have one 90 degree angle. Gives an informal argument for the pairs of angles that are supplementary when parallel lines are cut by a transversal.
Detailed	8.G.B [6 to 8]	Knows the Pythagorean Theorem and that it applies to right triangles. Calculates unknown hypotenuse side length given the Pythagorean Theorem. Applies the Pythagorean Theorem to find the distance between two points in a coordinate system with the right triangle drawn where the Pythagorean Theorem is given.	Understands the proof of the Pythagorean Theorem and its converse. Calculates unknown side lengths using the Pythagorean Theorem given at least two different side lengths of a right triangle. Applies the Pythagorean Theorem to find the distance between two points in a coordinate system with the right triangle drawn where the Pythagorean Theorem is not given.	Understands and explains the proof of the Pythagorean Theorem and its converse. Applies the Pythagorean Theorem to a real-world situations in two and three dimensions to determine unknown side lengths. Applies the Pythagorean Theorem to find the distance between two points in a coordinate system.	Models a proof of the Pythagorean Theorem and its converse using a pictorial representation. Recognizes situations and applies the Pythagorean Theorem in multi- step problems. Finds the coordinates of a point which is a given distance (non-vertical and non-horizontal) from another point.
Detailed	8.G.C [9]	Finds the volume of a cylinder.	Finds the volume of a cone, cylinder or sphere.	Knows the formulas for the volumes of cones, cylinders, and spheres and use them to solve real-world mathematical problems.	Describes the relationship between the formulas for volumes of cones, cylinders, or spheres. Explains the derivation of the formulas for cones, cylinders, and spheres.

Statistics and Probability					
Detailed	8.SP.A [1 to 4]	Constructs a scatter plot. Recognizes a straight line can be used to describe a linear association on a scatter plot. Identifies the slope and y-intercept of a linear model on a scatter plot. Completes a partially filled-in two-way table and interpret the table by row or column.	Constructs a scatter plot and describes the pattern as positive, negative or no relationship. Draws a straight line on a scatter plot that closely fits the data points. Identifies possible data points given a linear model. Constructs a two-way table of categorical data.	Describes patterns in a scatter plot. Judges how well the trend line fits the data by looking at the closeness of the data points. Interprets the meaning of the slope and y-intercept in context. Interprets and describes relative frequencies for possible associations from a two-way table.	Constructs and interprets scatter plots to investigate patterns of association between two quantities. Compares more than one trend line for the same scatter plot and justifies which one best fits the data. Creates and uses a linear model based on a set of bivariate data to solve a real-world problem. Interprets and compares relative frequencies to identify patterns of association.