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Colorado Academic Standards Mathematics 2020 Grade 8

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Prepared by Savvas Learning Company, formerly Pearson K12 Learning.

Colorado Academic Standards' Code	Colorado Academic Standards Mathematics 2020 Grade 8	SuccessMaker Item Descriptions	Item IDs
1	Number and Quantity		
8.NS.A	The Number System: Know that there are numbers that are not rational, and approximate them by rational numbers.		
8.NS.A.2	Use rational approximations of irrational numbers to compare the size of irrational numbers, locate them approximately on a number line diagram, and estimate the value of expressions (e.g., π^2). For example, by truncating the decimal expansion of $\sqrt{2}$, show that $\sqrt{2}$ is between 1 and 2, then between 1.4 and 1.5, and explain how to continue on to get better approximations.	Drag rational and irrational values to their correct positions on a number line.	SMMA_LO_02141
2	Algebra and Functions		
8.EE.A	Expressions & Equations: Work with radicals and integer exponents.		
8.EE.A.1	Know and apply the properties of integer exponents to generate equivalent numerical expressions. For example, $3^2 \times 3^{-5} = 3^{-3} = 1/3^3 = 1/27$.	Evaluate an algebraic expression with exponents (integers -10 to 10).	SMMA_LO_01818
8.EE.A.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 small perfect squares (up to 100) and cube roots of small perfect cubes (up to 64). Know that $\sqrt{2}$ is irrational.	Find the square root of a number using a calculator (numbers to 4000).	SMMA_LO_01120
8.EE.A.3	Use numbers expressed in the form of a single digit times an integer power of 10 to estimate very large or very small quantities, and to express how many times as much one is than the other. For example, estimate the population of the United States as 3 times 10^8 and the population of the world as 7 times 10^9, and determine that the world population is more than 20 times larger.	Write very small numbers in scientific notation.	SMMA_LO_02070
		Write very large numbers in scientific notation.	SMMA_LO_02071

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		Student do operations on scientific notation to compare the speed of planes.	SMMA_LO_02515
8.EE.A.4	Perform operations with numbers expressed in scientific notation, including problems where both decimal and scientific notation are used. Use 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.	Express a number in scientific notation (exponents 1 to 6).	SMMA_LO_01113
		Given the scientific notation, determine the standard notation of a number (the power of 10 has an exponent of 1 to 6).	SMMA_LO_01121
		Find the missing exponent for a number written in scientific notation (the exponent is 1 to 6).	SMMA_LO_01122
		Student do operations on scientific notation to compare the speed of planes.	SMMA_LO_02515
8.EE.B	Expressions & Equations: Understand the connections between proportional relationships, lines, and linear equations.		
8.EE.B.5	Graph proportional relationships, interpreting the unit rate as the slope of the graph. Compare two different proportional relationships represented in different ways. For example, compare a distance-time graph to a distance-time equation to determine which of two moving objects has greater speed.	Graph proportional relationships and interpret the unit rate as the slope of the graph.	SMMA_LO_02073
		Compare a proportional relationship represented as a graph to a proportional relationship represented as a table.	SMMA_LO_02074
		Ratios and Equations Targeted Lesson 13: Identifying Proportional Relationships	

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		Ratios and Equations Targeted Lesson 14: Graphing Proportional Relationships	
8.EE.B.6	Use similar triangles to explain why the slope m is the same between any two distinct points on a non-vertical line in the coordinate plane; 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.	Use similar triangles to explain why the slope m is the same between any two distinct points on a nonvertical line in the coordinate plane.	SMMA_LO_02075
		Derive the equation y = mx for a line through the origin, and y = mx + b for a line intercepting the vertical axis at b.	SMMA_LO_02076
8.EE.C	Expressions & Equations: Analyze and solve linear equations and pairs of simultaneous linear equations.		
8.EE.C.7	Solve linear equations in one variable.		
8.EE.C.7.a	Give examples of 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).	Transform a given multi-step equation into a simpler form.	SMMA_LO_02079
8.EE.C.7.b	Solve linear equations with rational number coefficients, including equations with variables on both sides and whose solutions require expanding expressions using the distributive property and collecting like terms.	Generate and solve an equation with variables on both sides of the equal sign in a real-world context.	SMMA_LO_02145
8.EE.C.8	Analyze and solve pairs of simultaneous linear equations.		

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8.EE.C.8.a	Explain that solutions to a system of two linear equations in two variables correspond to points of intersection of their graphs, because points of intersection satisfy both equations simultaneously.	Identify the solution to a system of linear equations by locating the point of intersection on its graph.	SMMA_LO_02080
		Model a real-world problem with a system of linear equations. Then solve it by locating the intersection point of the graphs of the two equations.	SMMA_LO_02134
8.EE.C.8.b	Solve systems of two linear equations in two variables algebraically, and estimate solutions by graphing the equations. Solve simple cases by inspection. For example, $3x$ + $2y$ = 5 and $3x$ + $2y$ = 6 have no solution because $3x$ + $2y$ cannot simultaneously be 5 and 6.	If a system of linear equations has 0 or infinitely many solutions, solve it by inspection. If it has 1 solution, solve it either algebraically or by graphing.	SMMA_LO_02133
8.EE.C.8.c	Solve real-world and mathematical problems leading to two linear equations in two variables. For 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.	Model a real-world problem with a system of linear equations. Then solve it by locating the intersection point of the graphs of the two equations.	SMMA_LO_02134
		Identify the solution to a system of linear equations by locating the point of intersection on its graph.	SMMA_LO_02080
8.F.A	Functions: Define, evaluate, and compare functions.		
8.F.A.1	Define a function as a rule that assigns to each input exactly one output. Show that the graph of a function is the set of ordered pairs consisting of an input and the corresponding output. (Function notation is not required for Grade 8.)	Given a list of ordered pairs of a relation, identify two ordered pairs that show the relation is not a function.	SMMA_LO_01811
		Given a graph of a relation, identify two ordered pairs on the graph that show the relation is not a function.	SMMA_LO_01812

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		Given a set of graphs of relations, identify which graphs represent functions.	SMMA_LO_01835
		Determine the output of one-function machine, given an input and sample inputs and outputs (combinations 2 x 2 to 9 x 9).	SMMA_LO_00358
		Complete an input/output table given a two-step rule; then plot the ordered pairs on coordinate grid.	SMMA_LO_01758
		Complete an input/output table given a one-step rule; then plot the ordered pairs on a coordinate grid.	SMMA_LO_01757
8.F.A.2	Compare properties of two functions each represented in a different way (algebraically, graphically, numerically in tables, or by verbal descriptions). For 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.	Identify the rate of change and the y-intercept of two linear functions, one represented graphically, and one represented either algebraically or in a table.	SMMA_LO_02101
		Identify the rate of change and the y-intercept of two linear functions, one represented in a verbal description, and one represented either graphically or algebraically.	SMMA_LO_02102
		Identify the rate of change and the y-intercept of two linear functions, one represented in a table, and one represented either algebraically or in a verbal description.	SMMA_LO_02103
8.F.A.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. For example, the function $A = s^2$ giving the area of a square as a function of its side length is not linear because its graph contains the points (1,1), (2,4) and (3,9), which are not on a straight line.	Identify if an equation is a linear or exponential function.	SMMA_LO_01828

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		Identify if an equation is a linear or quadratic function.	SMMA_LO_01829
		Identify whether graphs are linear or quadratic.	SMMA_LO_01831
		Identify whether graphs are linear or nonlinear.	SMMA_LO_01832
		Identify if an equation is a linear or nonlinear function.	SMMA_LO_01833
		Determine if a table values represents a linear or nonlinear function.	SMMA_LO_01834
		Determine if a table values represents a linear or exponential function.	SMMA_LO_01881
		Determine if a table values represents a linear or quadratic function.	SMMA_LO_01882
		Identify the function that is represented by a table of values (linear and nonlinear).	SMMA_LO_01883
		Derive the equation y = mx for a line through the origin, and y = mx + b for a line intercepting the vertical axis at b.	SMMA_LO_02076
3	Data, Statistics, and Probability		
8.SP.A	Statistics & Probability: Investigate patterns of association in bivariate data.		

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8.SP.A.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 association, linear association, and nonlinear association.	Identify positive, negative, or no association for sets of actual data.	SMMA_LO_01222
8.SP.A.2	Know that straight lines are widely used to model relationships between two quantitative variables. For scatter plots that suggest a linear association, informally fit a straight line, and informally assess the model fit by judging the closeness of the data points to the line.	Determine the line of best fit for data in a scatter plot.	SMMA_LO_02179
8.SP.A.3	Use the equation of a linear model to solve problems in the context of bivariate measurement data, interpreting the slope and intercept.	Determine the slope and intercept of a linear equation in context.	SMMA_LO_02180
8.SP.A.4	Explain that patterns of association can also be seen in bivariate categorical data by displaying frequencies and relative frequencies in a two-way table. 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 association between the two variables.	Determine the relative frequency of events using a two-way frequency table.	SMMA_LO_02206
4	Geometry		

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8.G.A	Geometry: Understand congruence and similarity using physical models, transparencies, or geometry software.		
8.G.A.1	Verify experimentally the properties of rotations, reflections, and translations:	Reflect a figure on a coordinate plane over the x-axis, the y-axis, or the line y = x; verify properties of the rotation.	SMMA_LO_02122
		Translate a figure on a coordinate plane; verify properties of the rotation.	SMMA_LO_02123
		Rotate a figure on a coordinate plane; verify properties of the rotation.	SMMA_LO_02121
		Translate a figure on a coordinate plane.	SMMA_LO_02120
8.G.A.2	Demonstrate that a two-dimensional figure is congruent to another if the second can be obtained from the first by a sequence of rotations, reflections, and translations; given two congruent figures, describe a sequence that exhibits the congruence between them.	Given two congruent figures, transform one figure so that it lines up with the other. Then, identify the sequence of transformations used.	SMMA_LO_02124
		Identify matching congruent figures under rotation and/or reflection.	SMMA_LO_00557
8.G.A.3	Describe the effect of dilations, translations, rotations, and reflections on two-dimensional figures using coordinates.	Reflect a figure, find the coordinates of the reflected figure, and describe the effect of the reflection on the coordinates.	SMMA_LO_02125
		Determine the algebraic expression used to find the coordinates of the image of a figure under a dilation with the origin as the center of dilation.	SMMA_LO_02142
		Translate a figure on a coordinate plane.	SMMA_LO_02120
		Translate a figure on a coordinate plane; verify properties of the rotation.	SMMA_LO_02123

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8.G.A.4	Demonstrate that a two-dimensional figure is similar to another if the second can be obtained from the first by a sequence of rotations, reflections, translations, and dilations; given two similar two-dimensional figures, describe a sequence that exhibits the similarity between them.	Identify the polygon that is not similar to the others (counterexample)	SMMA_LO_00645
		Identify the figure that is not similar to the others. (simple shapes, counterexample)	SMMA_LO_00649
		Identify similar triangles or rectangles on a geoboard.	SMMA_LO_00847
8.G.A.5	Use informal arguments to establish facts about the angle sum and exterior angle of triangles, about the angles created when parallel lines are cut by a transversal, and the angle-angle criterion for similarity of triangles. For example, arrange three copies of the same triangle so that the sum of the three angles appears to form a line, and give an argument in terms of transversals why this is so.	Establish that alternate interior angles are congruent for parallel lines.	SMMA_LO_00672
		Arrange statements to write a proof of a fact about either the angle sum or the exterior angle of a triangle.	SMMA_LO_02126
		In a figure in which parallel lines are cut by a transversal, identify the transformations that would line one angle up with another angle. Then, describe the relationship between the two angles.	SMMA_LO_02129
8.G.B	Geometry: Understand and apply the Pythagorean Theorem.		

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8.G.B.6	Explain a proof of the Pythagorean Theorem and its converse.	Explain a proof of the Pythagorean Theorem.	SMMA_LO_02131
		Explain a proof of the converse of the Pythagorean Theorem.	SMMA_LO_02132
8.G.B.7	Apply the Pythagorean Theorem to determine unknown side lengths in right triangles in real-world and mathematical problems in two and three dimensions.	Find the measurement of the hypotenuse using the Pythagorean theorem. (2D)	SMMA_LO_01854
8.G.B.8	Apply the Pythagorean Theorem to find the distance between two points in a coordinate system.	Given two points on a coordinate grid, draw a right triangle whose hypotenuse connects the two points. Then use the Pythagorean Theorem to find the distance between the two points.	SMMA_LO_02100
8.G.C	Geometry: Solve real-world and mathematical problems involving volume of cylinders, cones, and spheres.		
8.G.C.9	State the formulas for the volumes of cones, cylinders, and spheres and use them to solve real-world and mathematical problems.	Use a formula to find the volume of a cylinder.	SMMA_LO_00839
		Use a formula to find the volume of a cone or a sphere.	SMMA_LO_00844