2019 - 2020 8th Grade Mathematics Skills: Students Will Know/ Students Will Be Able To...

Report Card Skill: EXPONENT Rules	
For this skill, students will know: ● bases must be the same before exponents can be added, subtracted, or multiplied. ● exponents are added with a product of powers. ● exponents are multiplied with a power of a power. ● exponents are subtracted with the quotient of powers. ● a number raised to the zero (0) power is equal to one. ● understand the relationship between negative exponents and reciprocals. ● several properties may be used to simplify an expression.	**For this skill, students will be able to:** ● apply the properties of integer exponents to generate equivalent numerical expressions.

Report Card Skill: Solve EQUATIONS	
For this skill, students will know: ● the solution to an equation is the value of the variable, which makes a true equality when substituted back into the equation.	**For this skill, students will be able to:** ● use inverse operations to solve linear equations containing rational number coefficients in one variable, including equations whose solutions require expanding expressions using the distributive property and combining like terms.
● equations have one solution when the variables do not cancel out. ● equations have no solution when the variables cancel out and the constants are not equal. ● equations have infinitely many solutions when both sides of the equation are the same.	● determine the number of solutions to an equation algebraically.

Report Card Skill: FUNCTIONS: Write and Graph	
For this skill, students will know: ● the connections (relationships) between proportional relationships, lines, and linear equations.	**For this skill, students will be able to:** ● compare graphs, tables, and equations of functions. ● identify the unit rate (slope) from tables, graphs, and equations. ● compare two functions represented in different ways.
● triangles are similar when there is a constant rate of proportionality between them. ● why the slope (m) is the same between any two distinct points on a non-vertical line in the coordinate plane.	● construct triangles between any two points on a line and compare the sides to understand that the slope is the same between any two points on a line. ● write and graph equations in slope-intercept form.
● a function is a rule that assigns to each input exactly one output. ● the graph of a function is the set of ordered pairs consisting of an input and the corresponding output.	● identify functions from equations, graphs, and tables/ordered pair. ● use the vertical line test to determine if a relation is a function.
● linear functions have a constant rate of change between any two points.	● use equations, graphs, and tables to categorize functions as linear or nonlinear.

Report Card Skill: SYSTEMS: Solve and graph	
For this skill, students will know: ● the solution to a system of equations is the point of intersection or a point that satisfies both equations. ● a system of equations resulting in parallel lines will have no solution. ● a system of equations resulting in a single line will have infinitely many solutions.	**For this skill, students will be able to:** ● solve a system of linear equations by graphing and/or algebraically. ● recognize solutions to special systems that have infinitely many or no solutions (graphically and algebraically).

Report Card Skill: PYTHAGOREAN THEOREM	
For this skill, students will know: ● the sum of the squares of the legs of a triangle is equal to the square of the hypotenuse in a right triangle. ● the converse of the Pythagorean Theorem.	**For this skill, students will be able to:** ● apply the Pythagorean Theorem to determine unknown side lengths of a right triangle. ● determine if three given side lengths form a right triangle. ● apply the Pythagorean Theorem to solve real-world problems

Report Card Skill: VOLUME of Cones, Spheres, and Cylinders	
● the formulas for the volumes of cones, cylinders, and spheres. ● how the volume of a cylinder relates to the area of a circle. ● how the volume of a cone relates to the volume of a cylinder.	● have an understanding of why the formula for the volume of cylinders, cones, and spheres works. ● solve real-world problems involving the volumes of cylinders, cones, and spheres. ● provide answers in terms of pi.

Report Card Skill: TRANSFORMATIONS in the coordinate plane	
For this skill, students will know: ● 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	**For this skill, students will be able to:** ● identify transformations on coordinates ● perform translations, rotations, reflections, and dilations with coordinates ● describe the effect of dilations, translations, rotations, and reflections on two-dimensional figures using coordinates

Report Card Skill: SCATTER PLOTS: Construct, interpret, and analyze	
For this skill, students will know: ● Bivariate data refers to two-variable data, one to be graphed on the x-axis and the other on the y-axis.	**For this skill, students will be able to:** ● Construct and interpret scatter plots for bivariate measurement data to investigate patterns of association between two quantities.
● numerical data can be represented with a scatter plot, to examine relationships between variables	● Describe patterns such as clustering, outliers, positive or negative association, linear association, and nonlinear association.
● That straight lines are widely used to model and make predictions about relationships.	● Determine the line of best fit for a scatter plot and use the equation of the linear model to solve problems in the context of bivariate measurement data, interpreting the slope and intercept.

Report Card Skill: PROBLEM SOLVING/REASONING	
For this skill, students will know: ● how to make sense of problems and persevere in solving them	**For this skill, students will be able to:** ● solve real-world problems through the application of algebraic and geometric concepts. ● seek the meaning of a problem and look for different ways to represent and solve it.
● how to construct viable arguments and critique the reasoning of others	● construct arguments using verbal or written explanations accompanied by expressions, equations, inequalities, models and graphs, tables, and other data displays. ● refine their mathematical communication skills through discussions that evaluate their own thinking and the thinking of their peers.
● different representations can be used to model mathematics	● model problem situations symbolically, graphically, tabularly, and contextually. ● explain the connections between different representations. ● consider available tools when solving a mathematical problem and decide when certain tools may be helpful.