Unit 1- Skill Maintenance

Content Area: **Mathematics**
Course(s): **Algebra, Math 8**
Time Period: **September**
Length: **Throughout the Year**
Status: **Published**

Standards

MA.7.RP	Ratios and Proportional Relationships
MA.7.RP.A	Analyze proportional relationships and use them to solve real-world and mathematical problems.
MA.8.NS.A	Know that there are numbers that are not rational, and approximate them by rational numbers.
MA.7.RP.A.1	Compute unit rates associated with ratios of fractions, including ratios of lengths, areas and other quantities measured in like or different units.
MA.8.NS.A.1	Know that numbers that are not rational are called irrational. Understand informally that every number has a decimal expansion; for rational numbers show that the decimal expansion repeats eventually, and convert a decimal expansion which repeats eventually into a rational number.
MA.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).
MA.7.RP.A.2	Recognize and represent proportional relationships between quantities.
MA.8.EE.A	Work with radicals and integer exponents.
MA.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 and cube roots of small perfect cubes. Know that √2 is irrational.
MA.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.
MA.7.RP.A.3	Use proportional relationships to solve multistep ratio and percent problems.
MA.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.
MA.7.NS.A	Apply and extend previous understandings of operations with fractions to add, subtract, multiply, and divide rational numbers.
MA.8.EE.C.7a	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).
MA.8.EE.C.7b	Solve linear equations with rational number coefficients, including equations whose solutions require expanding expressions using the distributive property and collecting like terms.
MA.7.NS.A.2d	Convert a rational number to a decimal using long division; know that the decimal form of a rational number terminates in 0s or eventually repeats.
MA.7.EE.A	Use properties of operations to generate equivalent expressions.

MA.7.EE.A.1	Apply properties of operations as strategies to add, subtract, factor, and expand linear expressions with rational coefficients.
MA.7.EE.A.2	Understand that rewriting an expression in different forms in a problem context can shed light on the problem and how the quantities in it are related.
MA.7.EE.B	Solve real-life and mathematical problems using numerical and algebraic expressions and equations.
MA.7.EE.B.3	Solve multi-step real-life and mathematical problems posed with positive and negative rational numbers in any form (whole numbers, fractions, and decimals), using tools strategically. Apply properties of operations to calculate with numbers in any form; convert between forms as appropriate; and assess the reasonableness of answers using mental computation and estimation strategies.
MA.7.EE.B.4	Use variables to represent quantities in a real-world or mathematical problem, and construct simple equations and inequalities to solve problems by reasoning about the quantities.
MA.7.G.B	Solve real-life and mathematical problems involving angle measure, area, surface area, and volume.
MA.7.G.B.4	Know the formulas for the area and circumference of a circle and use them to solve problems; give an informal derivation of the relationship between the circumference and area of a circle.
MA.7.G.B.5	Use facts about supplementary, complementary, vertical, and adjacent angles in a multi-step problem to write and solve simple equations for an unknown angle in a figure.
MA.7.G.B.6	Solve real-world and mathematical problems involving area, volume and surface area of two- and three-dimensional objects composed of triangles, quadrilaterals, polygons, cubes, and right prisms.
MA.8.G.B	Understand and apply the Pythagorean Theorem.
MA.8.G.B.6	Explain a proof of the Pythagorean Theorem and its converse.
MA.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.
MA.8.G.C	Solve real-world and mathematical problems involving volume of cylinders, cones, and spheres.
MA.7.SP.B.4	Use measures of center and measures of variability for numerical data from random samples to draw informal comparative inferences about two populations.
MA.7.SP.C	Investigate chance processes and develop, use, and evaluate probability models.
MA.7.SP.C.5	Understand that the probability of a chance event is a number between 0 and 1 that expresses the likelihood of the event occurring. Larger numbers indicate greater likelihood. A probability near 0 indicates an unlikely event, a probability around 1/2 indicates an event that is neither unlikely nor likely, and a probability near 1 indicates a likely event.
MA.7.SP.C.6	Approximate the probability of a chance event by collecting data on the chance process that produces it and observing its long-run relative frequency, and predict the approximate relative frequency given the probability.
MA.7.SP.C.7	Develop a probability model and use it to find probabilities of events. Compare probabilities from a model to observed frequencies; if the agreement is not good, explain possible sources of the discrepancy.
MA.7.SP.C.7a	Develop a uniform probability model by assigning equal probability to all outcomes, and use the model to determine probabilities of events.
MA.7.SP.C.8	Find probabilities of compound events using organized lists, tables, tree diagrams, and simulation.
MA.7.SP.C.8a	Understand that, just as with simple events, the probability of a compound event is the

	fraction of outcomes in the sample space for which the compound event occurs.
MA.7.SP.C.8b	Represent sample spaces for compound events using methods such as organized lists, tables and tree diagrams. For an event described in everyday language (e.g., “rolling double sixes”), identify the outcomes in the sample space which compose the event.
CAEP.9.2.8.B.3	Evaluate communication, collaboration, and leadership skills that can be developed through school, home, work, and extracurricular activities for use in a career.
TECH.8.1.8.A.CS1	Understand and use technology systems.
TECH.8.1.8.A.CS2	Select and use applications effectively and productively.
TECH.8.1.8.D.CS2	Demonstrate personal responsibility for lifelong learning.

Unit Summary

This unit encompasses a variety of review topics from prior years, as well as revisiting topics covered in prior months of 8th grade. NJSLS involving number theory, fractions, operations with signed numbers, equations, probability, geometry concepts, proportions, and properties of exponents are addressed throughout the year. Problems are formated as multiple choice, short-contructed response and open-ended problems requiring full written responses. Students work independently on weekly assignments and study guides with example problems and vocabulary are provided for many of the topics. Students receive formative feedback to improve understanding and eliminate misconceptions.

Student Learning Objectives

- Students will learn to solve ratio, proportion, and percent problems.
- Students will learn to solve problems involving exponents and roots.
- Students will learn to solve problems involving measures of central tendency.
- Students will learn to compare and order numbers.
- Students will learn to convert between decimals, fractions, and percents.
- Students will learn to solve problems involving the Pythagorean theorem.
- Students will learn to identify polygons by their properties.
- Students will learn to convert measurement system.
- Students will learn to solve word problems applicable to real life including interest, exponential growth, taxes, and percent change.
- Students will learn to find the perimeter, volume, and surface area of basic two-dimensional and three-dimensional figures.
- Students will learn to solve simple and compound probabilities.
- Students will learn to simplfiy expressions using order of operations.
- Students will learn to classify real numbers.

Essential Questions

- What is in your math tool box?

Enduring Understandings

- Students will understand that development of competence in mathematics requires practice and maintenance.

Application

- Students will be able to independently use their learning to apply skills to real world scenarios and word problems.

Skills

Students will be skilled at:

- Solving operations with rational numbers.
- Utilizing the rules for solving problems involving geometry.
- Utilizing the rules for solving problems algebraically.
- Utilizing number theory.
- Calculating measures of central tendency.
- Applying the formulas for basic 2 and 3 dimensional figures to solve problems.
- Utilizing measurement.
- Calculating simple and compound probability.