Essential Questions	Domains & Clusters	7th Grade Skill		7	8	Vocabulary	Resources
What are the properties of operations? How do you translate real-world problem to algebraic expressions? What is the difference between a rational and irrational number? What is the Distributive Property? How do you compare algebraic solutions to arithmetic solutions?	***Expressions & Equations (EE)*** Use properties of operations to generate equivalent expressions. Solve real-life and mathematical problems using algebraic expressions and equations.	7.EE.1a	Add and subtract linear expressions with rational coefficients.			Rational Coefficients Factor GCF Properties of operations Constant Like Terms Monomial Binomial Variable Expressions Rational numbers Estimation Mental computation Integers Fractions Decimals Equivalent Algebraic solution Arithmetic solution Two-step linear equations Property of equality Inverse operations Linear equations Distributive property Two-step linear inequalities At least At most ≤, <, >, ≥ Inequalities Number line Closed circle Open circle Solution set Graph the solution set	
		7.EE.1b	Factor linear expressions with rational coefficients.				
		7.EE.1c	Expand linear expressions with rational coefficients.				
		7.EE.1d	Apply properties of operations to all operations with rational coefficients.				
		7.EE.1e	Identify the GCF of rational coefficients in linear expressions.				
		7.EE.1f (8.EE.1)	Know and apply the properties of integer exponents to generate equivalent numerical expressions. For example, $3^2 \, x \, 3^{-5} = 1/3^3 = 1/27$				
		7.EE.2a	Translate word situations to algebraic expressions.				
		7.EE.2b	Simplify expressions.				
		7.EE.2c	Rewrite expressions to help analyze problems.				
		7.EE.2d	Explain how an equivalent expression relates to the original situation problem.				
		7.EE.2e (8.EE.2a)	Evaluate square roots of perfect squares.				
		7.EE.2f (8.EE.2b)	Use square root symbols to represent solutions to equation of the form $x^2 = p$				
		7.EE.3a	Solve multi-step real-world problems involving all types of rational numbers.				
		7.EE.3b	Justify the reasonableness of solutions using mental computation and estimation.				
		7.EE.3c	Apply properties of operations to solve multi-step real-world problems with all rational numbers.				
		7.EE.3d	Convert fluently between forms for common decimals, fractions, and percents.				
		7.EE.3e	Explain the connection between different forms of equivalent rational numbers.				
		7.EE.3f (8.EE.3a)	Use scientific notation to estimate very large or very small quantities.				
		7.EE.3g	Use scientific notation to express how many times				

		(8.EE.3b)	as much on is than the other.				
		7.EE.4a	Construct and solve one and two step simple linear equations from real-world problems using variables to represent quantities.				
		7.EE.4b	Explain the steps used in solving the equation.				
		7.EE.5a	Construct and solve one and two-step linear inequalities from real world problems by using variables to represent quantities.				
		7.EE.5b	Graph the solution set to two-step linear inequalities.				
		7.EE.5c	Identify when the inequality symbol changes to its opposite.				
		7.EE.5d	Explain when/why an open or closed circle is used on a number line.				
		7.EE.5e	Write a linear from a given graph.				
		7.EE.5f (8.EE.A4a)	Perform operations with numbers expressed in scientific notation, including problems where both decimal and scientific notation are used.				
		7.EE.5g (8.EE.A4b)	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.)				
		7.EE.5h (8.EE.A4c)	Interpret scientific notation that has been generated by technology.				

Essential Questions	Domains & Clusters	7th Grade Skill		7	8	Vocabulary	Resources
	Geometry (G) Draw, construct, and describe geometrical figures and describe the relationships	7.G.1a	Compute the actual length of a figure from a scale drawing.			Scale drawing Area Lengths Geometric figures Triangle inequality theorem Triangle angle sum theorem Geometric figures Uniquely defined triangle	
		7.G.1b	Compute the actual area of a figure from a scale drawing.				
		7.G.1c	Apply a scale drawing from one drawing to create a second scale for that drawing.				
		7.G.1d	Solve problems involving scale drawings of geometric figures.				
		7.G.1e (8.G.A1)	Verify experimentally the properties of rotations, reflections, and translations: a) lines are taken to				

How do you describe triangles?	between them.		lines, and line segments of the same length, b) angles are taken to angles of the same measure, c) parallel lines are taken to parallel lines.			Ambiguously defined triangle Nonexistent triangle Slice Two-dimensional figures Pyramid Rectangular prism Cylinder Triangular pyramid Cube, cone, circle Circumference Area Diameter Radius Vertical angles Supplementary Complementary Adjacent angles Volume Surface area Two- and three-dimensional figures Pythagorean Theorem	
		7.G.2a	Construct a triangle (freehand, with ruler/protractor, and technology) given three side measures. Construct a triangle (freehand, with ruler/protractor, and technology) given three angle measures.				
		7.G.2b	Construct a geometric shape given side lengths/angle measures.				
		7.G.2c	Describe when angle measures determine a triangle (given angles equal 180^o) or no triangle (given angles are greater or less than 180^o).				
		7.G.2d	Describe when side measures determine a unique triangle (a + b > c) or no triangle (a + b $\leq$ c).				
		7.G.3a	Define two-dimensional figures that result from slicing a right rectangular prism, a right rectangular pyramid, a triangular pyramid, a cube, a cylinder, a cone.				
		7.G.3b (8.G.3)	Describe the effect of dilations, translations, rotations, reflections, on two-dimensional figures using coordinates.				
	Solve real-life and mathematical problems involving angle measure, area, surface area, and volume.						
		7.G.4a	Derive the relationship between the circumference and area of a circle. (A = Cr/2….. Area of circle = half the circumference times the radius) Example: $C = 16\pi$, find the area.				
		7.G.4b	Solve the problems utilizing the circumference of a circle formula.				
		7.G.4c	Solve the problems utilizing the area of a circle formula.				
		7.G.5a	Define supplementary, complimentary, vertical, and adjacent angles.				
		7.G.5b	Solve for unknown angle in a figure utilizing definitions of supplementary, complementary, vertical, and adjacent angles.				
		7.G.5c (8.G.A5)	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.				
		7.G.6a	Solve area, volume, and surface area problems of two- and three-dimensional objects from real world situations.				
		7.G.6b (8.G.C.9)	Know the formulas for the volumes of cones, cylinders, and spheres and use them to solve real-world and mathematical problems.	I	M		
		7.G.7 (8.G.B6)	Explain a proof of the Pythagorean Theorem and its converse.				

Essential Questions	Domains & Clusters	7th Grade Skill		7	8	Vocabulary	Resources
How do you solve problems using formulas?	***Statistics & Probability (SP)*** Use random sampling to draw inferences about a population. Draw informal comparative inferences about two populations.	7.SP.1a	Explain how statistics is used to gain information about a population.			Population Sample Representative sample Biased sample Random sample Inferences Validity Inference Random sampling Variability (how far away from the mean) Mean absolute Deviation Range Outlier Interquartile range Measures of central tendency (mean, median, mode) Variability Probability	
		7.SP.1b	Evaluate the validity of a statistical sample from a population.				
		7.SP.1c	Explain why random sampling produces a sample representative of a population.				
		7.SP.2a	Draw inferences about a population with a certain characteristic from data gathered from a random sample.				
		7.SP.2b	Gather data from multiple random samples of the same size in reference to a certain characteristic.				
		7.SP.3a	Describe the variability of two numerical data sets.				
		7.SP.3b	Compute the mean absolute deviation, range, and interquartile range.				
		7.SP.3c	Describe how many times larger/smaller the variability of one data set is to another.				
		7.SP.3d	Read and interpret data from statistical representations (box-and-whisker plot, line/dot plot).				
		7.SP.4a	Compare/contrast measure of central tendency to				

	(continued from pg. 3) draw conclusions about two random samples.			Event Likely event Unlikely event Outcomes Possible outcomes Favorable outcomes Theoretical probability Experimental probability Trials Simple probability Equally likely Uniform probability model Probability model (not uniform) Probability model (uniform) Frequencies Data Tree diagrams Simulation Sample space Compound events Simple events Outcomes Fundamental Counting Principal Lists Tables Compound events Data
7.SP.4b	Compare/contrast variability of two data sets to draw conclusions about two random samples.			
7.SP.4c	Read and interpret data from statistical representations (box-and-whisker plot, line/dot plot).			
7.SP.5a	Define probability as a number between 0 and 1.			
7.SP.5b	Describe a situation in which the event is unlikely.			
7.SP.5c	Identify the probability of an unlikely event as a number near 0.			
7.SP.5d	Describe a situation in which the event is likely.			
7.SP.5e	Identify the probability of a likely event as a number 1.			
7.SP.5f	Describe a situation in which the event is neither likely nor unlikely.			
7.SP.5g	Identify the probability of likely event as a number near 1.			
7.SP.6a	Predict the number of times an event occurs by multiplying the theoretical probability by the number of trials.			
7.SP.6b	Compute the experimental probability of an event occurring through repeated trials.			
7.SP.6c	Compare the theoretical probability of an event occurring and the experimental probability.			
7.SP.6d	Predict future probabilities based on data collected.			
7.SP.7a	Create a situation in which all outcomes are equally likely (uniform probability model).			
7.SP.7b	Calculate simple probabilities of events.			
7.SP.7c	Design an experiment to investigate the likelihood of an outcome.			
7.SP.7d	Compare the results of a series of trial and draw conclusions.			
7.SP.8a	Calculate compound probabilities.			
7.SP.8b	Determine the total number of possible outcomes			

			(sample space or fundamental counting principle).				
		7.SP.8c	Define compound probabilities as fractions of the sample space taken from.				
		7.SP.8d	Construct a tree diagram, list, or table to illustrate all possible outcomes of a compound event.				
		7.SP.8e	Calculate the probability of a compound event based on a table, list, or tree diagram.				
		7.SP.8f	Design a simulation to generate data for compound events.				
		7.SP.8g	Calculate the probability of a compound event from data generated in a simulation.				

Essential Questions	Domains & Clusters	7th Grade Skill		7	8	Vocabulary	Resources
How do you apply properties to solve rational numbers problems?	***Ratios & Proportional Relationships (RP)*** Analyze proportional relationships and use them to solve real-world and mathematical problems.	7.RP.1a	Compare the unit rate.			Rate Complex fraction Unit rate Rate Proportion Equivalent Constant of proportionality Rate of change Slope Cross product Origin Quantities Proportional relationship Direct proportional relationship *x*-coordinate *y*-coordinate	
		7.RP.1b	Solve unit rate problems that fractional quantities. (Problems may require solving complex fractions.)				
		7.RP.1c	Solve ratio problems whose quantities are lengths of the same unit and different units.				
		7.RP.1d	Solve ratio problems whose quantities are areas of the same unit and different units.				
		7.RP.1e	Solve ratio problems of other quantities with the same and different units.				
		7.RP.2a	Analyze ratios in a table to determine if the ratios are equivalent by finding the constant of proportionality (slope).				
		7.RP.2b	Graph ratios on a coordinate plane to determine if the ratios are proportional by observing if the graph is a straight line through the origin (y=mx, where m is the slope/constant of proportionality).				
		7.RP.2c	Solve proportions by cross multiplication.				
		7.RP.2d	Write and solve proportions.				
		7.RP.2e	Calculate the constant of proportionality/unit rate from a table or diagram.				
		7.RP.2f	Calculate the constant of proportionality/unit rate given a verbal description of a proportional relationship.				
		7.RP.2g	Write an equation from a proportional				

			relationship.				
		7.RP.2h	Solve equations created from proportional relationships.				
		7.RP.2i	Define the rate of proportionality from a graph.				
		7.RP.2j	Explain the meaning of a point on a graph y=mx of a real life situation.				
		7.RP.2k	Calculate the unit rate by identifying that on a graph when the *x*-coordinate is 1, the *y*-coordinate is the unit rate.				
		7.RP.3a	Solve multistep ratio problems using proportions. Focus on simple interest, tax, markups/down, gratuities and commissions, fees, percent increase/decrease, and percent error.				
		7.RP.3b	Solve multistep percent problems using proportions. Focus on simple interest, tax, markups/downs, gratuities and commissions, fees, percent increase/decrease, and percent error.				

Essential Questions	Domains & Clusters	7th Grade Skill		7	8	Vocabulary	Resources
	The Number System (NS) Apply and extend previous understandings of operations with fractions to add, subtract, multiply or divide rational numbers.	7.NS.1a	Apply and extend previous understandings of addition and subtraction to add, subtract, multiply, and divide rational numbers; represent addition and subtraction on a horizontal or vertical number line diagram.			Additive inverse Rational numbers Distance Addend Sum Additive inverse Absolute value Commutative property Associative property Distributive property Fractions Signed numbers Division Rational numbers	
		7.NS.1b	Describe situations in which opposite quantities combine to make 0. *For example, a hydrogen atom has 0 charge because its two constituents are oppositely charged.*				
		7.NS.1c	Understand $p + q$ as the number located a distance $\|q\|$ from p, in the positive or negative direction depending on whether q is positive or negative. Show that a number and its opposite have a sum of *0* (are additive inverses). Interpret sums of rational numbers by describing real-world contexts.				
		7.NS.1d	Understand subtraction of rational numbers as				

			adding the additive inverse, *p - q = p + (-q)*. Show that the distance between two rational numbers on the number line is the absolute value of their difference, and apply this principle in real-world contexts.			Negative symbol Integer Numerator Denominator Quotient Divisor Long division Terminates Repeats Rational numbers Order of operations
		7.NS.1e	Apply properties of operations as strategies to add and subtract rational numbers.			
		7.NS.2a	Apply and extend previous understandings of multiplication and division and of fractions to multiply and divide rational numbers.			
		7.NS.2b	Understand that multiplication is extended from fractions to rational numbers by requiring that operations continue to satisfy the properties of operations, particularly the distributive property, leading to products such as *(-1)(-1) = 1* and the rules for multiplying signed numbers. Interpret products of rational numbers by describing real-world contexts.			
		7.NS.2c	Understand that integers can be divided, provided that the divisor is not zero, and every quotient of integers (with non-zero divisor) is a rational number. If *p* and *q* are integers, then *-(p/q) = (-p)/q = p/(-q).* Interpret quotients of rational numbers by describing real-world contexts.			
		7.NS.2d	Apply properties of operations as strategies to multiply and divide rational numbers.			
		7.NS.2e	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.			
		7.NS.3	Solve real-world and mathematical problems involving the four operations with rational numbers.			
		7.NS.4 (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.			

		7.NS.5 (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., π2). *For example, by truncating the decimal expansion of √2, show that √2 is between 1 and 2, then between 1.4 and 1.5, and explain how to continue on to get better approximations.*				