Common Core Math Curriculum Grade 7

ESSENTIAL QUESTIONS	DOMAINS AND CLUSTERS	GRADE 7 SKILL	VOCABULARY	MATHEMATICAL PRACTICES	ASSESSMENT
What are the properties of operations?	***Expressions & Equations 7.EE*** Use properties of operations to generate equivalent expressions.	☐ Add linear expressions with rational coefficients. 7.EE.1 ☐ Subtract linear expressions with rational coefficients.7.EE.1 ☐ Factor linear expressions with rational coefficients.7.EE.1 ☐ Expand linear expressions with rational coefficients 7.EE.1 ☐ Apply properties of operations to all operations with rational coefficients. 7.EE.1 ☐ Translate word situations to algebraic expressions. 7.EE.1 ☐ Identify the GCF of rational coefficients in linear expressions. 7.EE.1	▪ Rational ▪ Coefficients ▪ Factor ▪ GCF ▪ properties of operations ▪ Constant	Make sense of problems and preserve in solving them. Reason abstractly and quantitatively.	http://www.nctm.org Performance Tasks Investigations
How do you translate real-world problems to algebraic expressions?		☐ Translate words to expressions 7.EE.2 ☐ Translate situation problems to algebraic expressions. 7.EE.2 ☐ Simplify expressions 7.EE.2 ☐ Rewrite expressions to help analyze problems 7.EE.2 ☐ Explain how an equivalent expression relates to the original situation problem. 7.EE.2	▪ Like Terms ▪ Monomial ▪ Binomial ▪ Variable ▪ Expressions	Construct viable arguments and critique the reasoning of others. Model with mathematics. Use appropriate tools strategically.	Math Journaling
What is the difference between a rational and irrational number?	Solve real-life and mathematical problems using numerical and algebraic expressions and equations.	☐ Solve multi-step real-world problems involving all types of rational numbers. 7.EE.3 ☐ Justify the reasonableness of solutions using mental computation and estimation. 7.EE.3 ☐ Apply properties of operations to solve multi-step real-world problems with all rational numbers. 7.EE.3 ☐ Convert fluently between forms for common decimals, fractions, and percents. 7.EE.3 ☐ Explain the connection between different forms of equivalent rational numbers.7.EE.3 ☐ Construct and solve two step linear equations from real-world problems. 7.EE.4a ☐ Translate verbal situations to two step linear equations. 7.EE.4a ☐ Solve two step linear equations 7.EE.4a ☐ Explain the steps used in solving the equation. 7.EE.4a	▪ rational numbers ▪ estimation ▪ mental computation ▪ integers ▪ fractions ▪ decimals ▪ equivalent ▪ algebraic solution ▪ arithmetic solution ▪ two-step linear equations	Attend to precision. Look for and make use of structure. Look for and express regularity in repeated reasoning.	
What is the Distributive Property?		☐ Solve two step linear equations fluently. 7.EE.4a ☐ Identify the sequence of operations used to solve a problem. 7.EE.4a ☐ Compare algebraic solutions to arithmetic solutions. 7.EE.4a ☐ Construct and solve two step linear inequalities from real-world problems. 7.EE.4b ☐ Graph the solution set of two step linear inequalities from real-world problems. 7.EE.4b	▪ Property of Equality ▪ Inverse Operations ▪ Linear equations ▪ Distributive Property		
How do you compare algebraic solutions to arithmetic solutions?	***Geometry 7.G*** Draw construct, and describe geometrical	☐ Interpret and describe the solution in the context of the problem. 7.EE.4b ☐ Identify when the inequality symbol changes to its opposite. 7.EE.4b ☐ Explain when/why an open or closed dot is used on a number line. 7.EE.4b ☐ Write a linear inequality from a given graph. 7.EE.4b ☐ Compute the actual length of a figure from a scale drawing. 7.G.1 ☐ Compute the actual area of a figure from a scale drawing. 7.G.1	▪ two-step linear inequalities ▪ At least ▪ At most ▪ ≤, <,>,≥ ▪ Inequalities ▪ Number line		

	figures and describe the relationships between them.	❑ Apply a scale from one drawing to create a second scale for that drawing. 7.G.1 ❑ Solve problems involving scale drawings of geometric figures. 7.G.1 ❑ Construct a triangle (freehand, with ruler and protractor, and technology) given three angle measures. 7.G.2 ❑ Construct a triangle (freehand, with ruler and protractor, and technology) given three side measures. 7.G.2 ❑ Construct a geometric shape given side lengths /angle measures. 7.G.2 ❑ Describe when angle measures determine a triangle (given angles equal 180°) or no triangle (given angles are greater or less than 180°). 7.G.2 ❑ Describe when side measures determine a unique triangle (a+b>c) or no triangle (a+b ≤ c) 7.G.2 ❑ Define two-dimensional figures that result from slicing a right rectangular prism. 7.G.3 ❑ Define two-dimensional figures that result from slicing a right rectangular pyramid. 7.G.3 ❑ Define two-dimensional figures that result from slicing a triangular pyramid. 7.G.3 ❑ Define two-dimensional figures that result from slicing a cube. 7.G.3 ❑ Define two-dimensional figures that result from slicing a cylinder. 7.G.3 ❑ Define two-dimensional figures that results from slicing a cone. 7.G.3	▪ Closed dot ▪ Open dot ▪ Solution set ▪ Graph the solution set ▪ Scale drawing ▪ Area ▪ Lengths ▪ Geometric figures ▪ Triangle inequality Theorem ▪ Triangle angle sum theorem ▪ Geometric figures ▪ Uniquely defined triangle ▪ Ambiguously defined triangle ▪ Nonexistent triangle ▪ Slice ▪ Two-dimensional figures
How do you describe triangles?	Solve real-life and mathematical problems involving angle measure, area, surface area, and volume.	❑ Derive the relationship between the circumference and area of a circle. (A = Cr/2…..Area of a circle = half the circumference times the radius) Example: C = 16π find the area. 7.G.4 ❑ Solve problems utilizing the circumference of a circle formula. 7.G.4 ❑ Solve problems utilizing the area of a circle formula. 7.G.4 ❑ Define supplementary, complementary, vertical, and adjacent angles. 7.G.5 ❑ Solve for an unknown angle in a figure utilizing definitions of supplementary, complementary, vertical, and adjacent angles. 7.G.5 ❑ Solve area, volume, and surface area problems of two- and three-dimensional objects from real world situations. 7.G.6	▪ 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
How do you solve problems using formulas?	***Statistics & Probability 7.SP*** Use random sampling to draw inferences about a population.	❑ Explain how statistics is used to gain information about a population. 7.SP.1 ❑ Evaluate the validity of a statistical sample from a population. 7.SP.1 ❑ Explain why random sampling produces a sample representative of a population. 7.SP.1 ❑ Draw inferences about a population with a certain characteristic from data gathered from a random sample. 7.SP.2 ❑ Gather data from multiple random samples of the same size in reference to a certain characteristic. 7.SP.2	
	Draw informal comparative	❑ Describe the variability of two numerical data sets 7.SPP.3	

	inferences about two populations.	❑ Compute the mean absolute deviation, range, and interquartile range. 7.SP.3 ❑ Describe how many times larger/smaller the variability of one data set is to another. 7.SP.3 ❑ Read and interpret data from statistical representations (box-and-whisker plot, line/dot plot). 7.SP.3 ❑ Compare/contrast measures of central tendency to draw conclusions about two random samples. 7.SP.4 ❑ Compare/contrast variability of two data sets to draw conclusions about two random samples. 7.SP.4 ❑ Read and interpret data from statistical representations (box-and-whisker plot, line/dot plot). 7.SP.4	▪ Population ▪ Sample ▪ Representative sample ▪ Biased sample ▪ Random sampling ▪ Inferences ▪ Validity ▪ Inference ▪ Random sampling ▪ Population ▪ Characteristic		
How do you explain real-world problems using statistics?					
How do you interpret data from statistical representations?	Investigate chance processes and develop, use, and evaluate probability models.	❑ Define probability as number between 0 and 1. 7.SP.5 ❑ Describe a situation in which the event is unlikely. 7.SP.5 ❑ Identify the probability of an unlikely event as a number near 0. 7.SP.5 ❑ Describe a situation in which the event is likely. 7.SP.5 ❑ Identify the probability of a likely event as a number near 1. 7.SP.5	▪ variability (how far away from the mean) ▪ mean absolute deviation ▪ range ▪ outlier ▪ interquartile range ▪ measures of central tendency (mean, median, mode) ▪ variability		
	Investigate chance processes and develop, use, and evaluate probability models.	❑ Describe a situation in which the event is neither likely nor unlikely. 7.SP.5 ❑ Identify the probability of an event that is neither likely nor unlikely as a number near ½. 7.SP.5 ❑ Predict the number of times an event occurs by multiplying the theoretical probability by the number of trials. 7.SP.6 ❑ Compute the experimental probability of an event occurring through repeated trials. 7.SP.6			
How do you predict future probabilities based on data?		❑ Compare the theoretical probability of an event occurring and the experimental probability. 7.SP.6 ❑ Predict future probabilities based on data collected 7.SP.6 ❑ Create a uniform probability model (a situation in which all outcomes are equally likely). 7.SP.7a ❑ Calculate simple probabilities of events. 7.SP.7a	▪ Probability ▪ Event ▪ Likely event ▪ Unlikely event ▪ Outcomes ▪ Possible outcomes ▪ Favorable outcomes ▪ Theoretical probability ▪ Experimental probability ▪ Trials ▪ simple probability		
What is the constant of proportionality?		❑ Design an experiment to investigate the likelihood of an outcome. 7.SP.7b ❑ Compare the results of a series of trials and draw conclusions. 7.SP.7b ❑ Calculate compound probabilities 7.SP.8a ❑ Determine the total number of possible outcomes (sample space or Counting Principle). 7.SP.8a ❑ Define compound probabilities as fractions of the sample space taken from. 7.SP.8a			
How do you use formulas to solve proportional		❑ Construct a tree diagram, list, or table to illustrate all possible outcomes of a compound event. 7.SP.8b ❑ Calculate the probability of a compound event based on a table, list, or tree diagram.7.SP.8b			

relationships?		☐ Design a simulation to generate data for compound events. 7.SP.8c ☐ Calculate the probability of a compound event from data generated in a simulation. 7.SP.8c	▪ 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 Principle ▪ Lists ▪ Tables ▪ Compound events ▪ Data		
How do you apply properties to solve rational numbers problems? How can a negative symbol be written in a fraction? How do you multiply and divide rational numbers?	***Ratios & Proportional Relationships 7.RP*** Analyze proportional relationships and use them to solve real-world and mathematical problems.	☐ Solve unit rate problems that have fractional quantities. (Problems may require solving complex fractions). 7.RP.1 ☐ Solve ratio problems whose quantities are lengths of the same unit and different units. 7.RP.1 ☐ Solve ratio problems whose quantities are areas of the same unit and different units. 7.RP.1 ☐ Solve ratio problems of other quantities with the same unit and different units. 7.RP.1 ☐ Divide two fractions by taking the reciprocal of the divisor. 7.RP.1 ☐ Compute the unit rate. 7.RP.1 ☐ Calculate the cross product to determine if the two ratios are in proportion (equivalent).7.RP.2a ☐ Analyze ratios in a table to determine if the ratios are equivalent by finding the constant of proportionality (slope). 7RP.2a ☐ 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.2a ☐ Solve proportions by cross multiplication. 7.RP.2a ☐ Write and solve proportions. 7.RP.2a ☐ Calculate the constant of proportionality/unit rate from a table or diagram. 7.RP.2b ☐ Compute the rate of change/slope from a graph (rise over run) or equation (m in y=mx). 7.RP.2b ☐ Calculate the constant of proportionality/unit rate given a verbal description of a proportional relationship 7.RP.2b ☐ Write an equation from a proportional relationship. 7.RP.2c ☐ Solve equations created from proportional relationships. 7RP.2c ☐ Define the rate of proportionality from a graph.7.RP.2d ☐ Explain the meaning of a point on a graph y=mx of a real life situation. 7.RP.2d ☐ 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.2d ☐ Solve multistep ratio problems using proportions. Focus on simple interest, tax, markups/downs, gratuities and commissions, fees, percent increase/decrease, and percent error. 7.RP.3 ☐ Solve multistep percent problems using proportions. Focus on simple interest, tax, markups/downs, gratuities and commissions, fees, percent increase/decrease, and percent error. 7.RP.3	▪ Ratio ▪ Complex fraction ▪ Unit rate ▪ Rate ▪ Proportion ▪ Equivalent ▪ constant of proportionality ▪ rate of change ▪ slope ▪ cross product ▪ origin ▪ quantities ▪ proportional relationship ▪ rate of change ▪ direct proportional relationship ▪ x-coordinate		
	The Number System 7.NS Apply and extend	☐ Solve problems where two quantities add to make a sum of 0 (additive inverse).			

previous understandings of operations with fractions to add, subtract, multiply, and divide rational numbers.	7.NS.1a ❑ Describe real world situations where two quantities add to make a sum of zero. 7.NS.1a ❑ Define the sum of two rational numbers as the distance one addend is away from the total by the absolute value of the other addend. 7.NS.1b ❑ Define the direction of the distance on a number line based on the sign of the addend. Negative is left/down and positive is right/up. 7.NS.1b ❑ Define additive inverse as a rational number added to its negative which results in a sum of zero. 7.NS.1b ❑ Solve real world problems involving adding rational numbers. 7.NS.1b ❑ Compare subtracting rational numbers to adding the additive inverse. 7.NS.1c ❑ Prove that the distance between two rational numbers is equal to the absolute value of their difference. 7.NS.1c ❑ Solve real world problems describing the skill above 7.NS.1c ❑ Apply commutative, associative, additive inverse, and distributive properties to solve addition and subtraction of rational numbers. 7.NS.1d	▪ y-coordinate ▪ additive inverse ▪ rational numbers ▪ Distance ▪ Addend ▪ Sum ▪ additive inverse ▪ absolute value ▪ distance ▪ commutative property ▪ associative property ▪ distributive property	
Apply and extend previous understandings of operations with fractions to add, subtract, multiply, and divide rational numbers.	❑ Apply and extend the commutative, associative, and distributive property of multiplication from fractions to rational numbers. Focus on the distributive property. 7.NS.2a ❑ Prove the rules for multiplying signed numbers by applying the distributive property. 7.NS.2a ❑ Solve real-world problems involving signed numbers. 7.NS.2a ❑ Define the quotient of two integers (divisor not = 0) as a rational number. 7.NS.2b ❑ Solve real word problems involving division of rational numbers. 7.NS.2b ❑ Explain that a negative symbol can be written in the numerator, denominator, or next to the fraction without changing the value of the fraction. 7.NS.2b ❑ Multiply and divide rational numbers by applying commutative, associative, and distributive properties. 7NS.2c ❑ Divide the numerator of a fraction by its denominator using long division. 7.NS.2d ❑ Define a rational number as a decimal that terminates or eventually repeats. 7.NS.2d ❑ Solve real world problems involving all four operations with rational numbers. 7.NS.3	▪ fractions ▪ signed numbers ▪ Division ▪ rational numbers ▪ negative symbol ▪ integer ▪ numerator ▪ denominator ▪ quotient ▪ divisor ▪ long division ▪ fractions ▪ numerator ▪ denominator ▪ divide ▪ terminates ▪ repeats ▪ add ▪ subtract ▪ multiply ▪ divide ▪ rational numbers ▪ order of operations	