Mathletics

Georgia Standards of Excellence

Activities (Courses) and Skill Quests

Grades 7-8

August, 2025

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Grade 7

Numerical Reasoning

7.NR.1 Solve relevant, mathematical problems, including multi-step problems, involving the four operations with rational numbers and quantities in any form (integers, percentages, fractions, and decimal numbers).

7.NR.1.1 Show that a number and its opposite have a sum of 0 (are additive inverses). Describe situations in which opposite quantities combine to make 0.	
Course Topics	**Activities**
Teacher directed	
Topics	**Skill Quests**
Opposites	Describing situations involving opposites

7.NR.1.2 Show and explain 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. Interpret sums of rational numbers by describing applicable situations.	
Course Topics	**Activities**
7.NR.1 Add & subtract rational numbers	Add Integers
	Adding Integers: Positive, Negative or Zero
	Subtract Integers
	Integers: Add and Subtract
	Negative or Positive?
	More with Integers
Topics	**Skill Quests**
Add rational numbers	Opposites & absolute value
	Adding rational numbers
	Adding positive & negative fractions
	Adding positive & negative decimals
	Adding integers

7.NR.1.3 Represent addition and subtraction with rational numbers on a horizontal or a vertical number line diagram to solve authentic problems.	
Course Topics	**Activities**
7.NR.1 Add & subtract rational numbers	Add Unlike Fractions
	Add Mixed Numbers: Signs Can Differ
	Subtract Unlike Fractions
	Subtract Mixed Numbers: Signs Differ
	Subtract Negative Mixed Numbers
Topics	**Skill Quests**
Teacher directed	

7.NR.1.4 Show and explain 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 contextual situations.	
Course Topics	**Activities**
Teacher directed	
Topics	**Skill Quests**
Subtract rational numbers	Subtracting rational numbers: adding the inverse
	Subtracting positive & negative fractions
	Subtracting positive & negative decimals
	Subtracting integers
	Subtracting rational numbers: absolute value

7.NR.1.5 Apply properties of operations, including part-whole reasoning, as strategies to add and subtract rational numbers.	
Course Topics	**Activities**
Teacher directed	
Topics	**Skill Quests**
Rational numbers: addition properties	Adding & subtracting rational numbers: properties

7.NR.1.6 Make sense of multiplication of rational numbers using realistic applications.	
Course Topics	**Activities**
Teacher directed	
Topics	**Skill Quests**
Multiply rational numbers	Multiplying rational numbers
	Multiplying positive & negative fractions
	Multiplying positive & negative decimals
	Multiplying integers
	Products of rational numbers: real-world contexts

7.NR.1.7 Show and explain that integers can be divided, assuming the divisor is not zero, and every quotient of integers is a rational number.	
Course Topics	**Activities**
Teacher directed	
Topics	**Skill Quests**
Divide integers	Dividing integers
	Quotients of rational numbers: real-world contexts

7.NR.1.8 Represent the multiplication and division of integers using a variety of strategies and interpret products and quotients of rational numbers by describing them based on the relevant situation.	
Course Topics	**Activities**
	Integers: Multiplication and Division

7.NR.1 Multiply & divide rational numbers	Multiplying and Dividing Integers
	Integers: Order of Operations (PEDMAS)
	Integers: Operations Order
Topics	**Skill Quests**
Teacher directed	

7.NR.1.9 Apply properties of operations as strategies to solve multiplication and division problems involving rational numbers represented in an applicable scenario.	
Course Topics	**Activities**
7.NR.1 Multiply & divide rational numbers	Multiply Two Fractions 2
	Divide Fractions by Fractions 2
	Divide Mixed Numbers with Signs
Topics	**Skill Quests**
Rational numbers: properties	Multiply & divide rational numbers: properties

7.NR.1.10 Convert rational numbers between forms to include fractions, decimal numbers and percentages, using understanding of the part divided by the whole. Know that the decimal form of a rational number terminates in 0s or eventually repeats.	
Course Topics	**Activities**
7.NR.1 Convert between fractions, decimals & percentages	Fractions to Decimals
	Decimals to Fractions 1
	Mixed to Improper Fractions
	Improper Fraction to Mixed Numeral
	Percents to Fractions
	Fractions to Percentages (Non-Calculator)
	Mixed decimal, percentage and fraction conversions
	Decimal to Percentage
	Percents and Decimals
Topics	**Skill Quests**
Convert rational numbers to decimals	Use long division to convert rationals to decimals

7.NR.1.11 Solve multi-step, contextual problems involving rational numbers, converting between forms as appropriate, and assessing the reasonableness of answers using mental computation and estimation strategies.	
Course Topics	**Activities**
7.NR.1 Contextual problems with rational numbers	Fraction Word Problems
	More Fraction Problems
	Percentage Word Problems
Topics	**Skill Quests**
Rational numbers problems: 4 operations	Rational numbers problems: 4 operations

Patterning & Algebraic Reasoning

7.PAR.2 Use properties of operations, generate equivalent expressions and interpret the expressions to explain relevant situations.

7.PAR.2.1 Apply properties of operations as strategies to add, subtract, factor, and expand linear expressions with rational coefficients.	
Course Topics	**Activities**
7.PAR.2 Expand & factorize expressions	Using the Distributive Property
	Expand then Simplify
	Factoring
Topics	**Skill Quests**
Linear expressions: properties	Simplifying algebraic expressions: add & subtract
	Distributive property: algebraic expressions
	Factoring algebraic expressions

7.PAR.2.2 Rewrite an expression in different forms from a contextual problem to clarify the problem and show how the quantities in it are related.	
Course Topics	**Activities**
Teacher directed	
Topics	**Skill Quests**
Interpret expressions	Rearranging expressions to interpret quantities

7.PAR.3 Represent authentic situations using equations and inequalities with variables; solve equations and inequalities symbolically, using the properties of equality.

7.PAR.3.1 Construct algebraic equations to solve practical problems leading to equations of the form $px + q = r$ and $p(x + q) = r$, where p, q, and r are specific rational numbers. Interpret the solution based on the situation.	
Course Topics	**Activities**
7.PAR.3 Equations & Inequalities	Write an Equation: Word Problems
	Solve Equations: Add, Subtract 2
	Solve Equations: Multiply, Divide 2
	Solve Multi-Step Equations
	Solving Simple Equations
Topics	**Skill Quests**
Solve 2-step equations	Solving 2-step equations: word problems
	2-step equations, positive integer coefficients
	2-step equations, integer coefficients
	2-step equations, positive rational coefficients
	2-step equations, rational coefficients
	2-step equations, distributive property

7.PAR.3.2 Construct algebraic inequalities to solve problems, leading to inequalities of the form $px + q > r$, $px + q < r$, $px + q \leq r$, or $px + q \geq r$, where p, q, and r are specific rational numbers. Graph and interpret the solution based on the realistic situation that the inequalities represent.	
Course Topics	**Activities**
7.PAR.3 Equations & Inequalities	Inequalities on a Number Line: Basics
	Solving Inequalities 2
	Solve One-Step Inequalities 1
	Solve One-Step Inequalities 2
Topics	**Skill Quests**
Solve 2-step inequalities	Creating & solving 2-step inequalities
	Representing inequalities
	Graphing the solution of an inequality
	Solving 2-step inequalities

7.PAR.4 Recognize proportional relationships in relevant, mathematical problems; represent, solve, and explain these relationships with tables, graphs, and equations.

7.PAR.4.1 Compute unit rates associated with ratios of fractions, including ratios of lengths, areas and other quantities measured in like or different units presented in realistic problems.	
Course Topics	**Activities**
7.PAR.4 Rates, Ratios & Proportions	Rates
Topics	**Skill Quests**
Unit rates with fractions	Solving unit rate problems involving fractions

7.PAR.4.2 Determine the unit rate (constant of proportionality) in tables, graphs (1, r), equations, diagrams, and verbal descriptions of proportional relationships to solve realistic problems.	
Course Topics	**Activities**
Teacher directed	
Topics	**Skill Quests**
Constant of proportionality	Identifying the constant of proportionality

7.PAR.4.3 Determine whether two quantities presented in authentic problems are in a proportional relationship.	
Course Topics	**Activities**
7.PAR.4 Rates, Ratios & Proportions	Average Speed
	Distance Travelled
	Time Taken
Topics	**Skill Quests**
Teacher directed	

7.PAR.4.4 Identify, represent, and use proportional relationships.	
Course Topics	**Activities**
7.PAR.4 Rates, Ratios & Proportions	y=ax
Topics	**Skill Quests**
Represent proportional relationships	Representing proportional relationships: equations

7.PAR.4.5 Use context to explain what a point (x, y) on the graph of a proportional relationship means in terms of the situation, with special attention to the points (0, 0) and (1, r) where r is the unit rate.	
Course Topics	**Activities**
7.PAR.4 Rates, Ratios & Proportions	Conversion Graphs
Topics	**Skill Quests**
Graphs of proportional relationships	Interpreting graphs of proportional relationships
Ratio & percent problems	Solving multi-step ratio & percent problems

7.PAR.4.6 Solve everyday problems involving scale drawings of geometric figures, including computing actual lengths and areas from a scale drawing and reproducing a scale drawing at a different scale.	
Course Topics	**Activities**
7.PAR.4 Rates, Ratios & Proportions	Scale Factor
	Scale Measurement
	Floor Plans
Topics	**Skill Quests**
Scale drawings	Scale drawings

7.PAR.4.7 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.	
Course Topics	**Activities**
Teacher directed	
Topics	**Skill Quests**
Construct triangles	Triangle inequality theorem
	Constructing triangles with given conditions

7.PAR.4.8 Graph proportional relationships, interpreting the unit rate as the slope of the graph. Compare two different proportional relationships represented in different ways.	
Course Topics	**Activities**
7.PAR.4 Rates, Ratios & Proportions	Slope of a Line
	Equation of a Line 1
Topics	**Skill Quests**
Teacher directed	

7.PAR.4.9 Use proportional relationships to solve multi-step ratio and percent problems presented in applicable situations.	
Course Topics	**Activities**
7.PAR.4 Percentage problems	Commission
	Successive Discounts
	Profit and Loss
	Simple Interest
	Percentage Error
Topics	**Skill Quests**
Teacher directed	

7.PAR.4.10 Predict characteristics of a population by examining the characteristics of a representative sample. Recognize the potential limitations and scope of the sample to the population.	
Course Topics	**Activities**
Teacher directed	
Topics	**Skill Quests**
Teacher directed	

7.PAR.4.11 Analyze sampling methods and conclude that random sampling produces and supports valid inferences.	
Course Topics	**Activities**
7.PAR.4.11 Data sampling	Data sampling
	Methods of Data Sampling
Topics	**Skill Quests**
Teacher directed	

7.PAR.4.12 Use data from repeated random samples to evaluate how much a sample mean is expected to vary from a population mean. Simulate multiple samples of the same size.	
Course Topics	**Activities Title**
Teacher directed	
Topics	**Skill Quests**
Teacher directed	

Geometric & Spatial Reasoning

7.GSR.5 Solve practical problems involving angle measurement, circles, area of circles, surface area of prisms and cylinders, and volume of cylinders and prisms composed of cubes and right prisms.

7.GSR.5.1 Measure angles in whole nonstandard units.	
Course Topics	**Activities**
Teacher directed	

Topics	Skill Quests
Teacher directed	

7.GSR.5.2 Measure angles in whole number degrees using a protractor.	
Course Topics	**Activities**
7.GSR.5 Angle relationships	Measuring Angles
	Estimating Angles
Topics	**Skill Quests**
Teacher directed	

7.GSR.5.3 Use facts about supplementary, complementary, vertical, and adjacent angles in a multi-step problem to write and solve equations for an unknown angle in a figure.	
Course Topics	**Activities**
7.GSR.5 Angle relationships	Equal, Complement, or Supplement?
	Vertically Opposite: Value of x
	Vertically Opposite Angles: Unknown Values
Topics	**Skill Quests**
Use angle facts to solve problems	Supplementary angles
	Complementary angles
	Adjacent angles
	Vertical angles

7.GSR.5.4 Explore and describe the relationship between pi, radius, diameter, circumference, and area of a circle to derive the formulas for the circumference and area of a circle.	
Course Topics	**Activities**
7.GSR.5 Circumference & area of circles	Circle Terms
Topics	**Skill Quests**
Teacher directed	

7.GSR.5.5 Given the formula for the area and circumference of a circle, solve problems that exist in everyday life.	
Course Topics	**Activities**
7.GSR.5 Circumference & area of circles	Calculate Circumference of Circles
	Area: Circles 1
	Area: Circles 2
	Perimeter and Circles
	Area: Annulus
Topics	**Skill Quests**
Circles: area & circumference	Finding the area of a circle
	Introducing the parts of a circle
	Finding the circumference of a circle

7.GSR.5.6 Solve realistic problems involving surface area of right prisms and cylinders.	
Course Topics	**Activities**
7.GSR.5 Surface area & volume including cylinders	Surface Area: Cylinders
Topics	**Skill Quests**
Surface area of right prisms	Surface area: rectangular & triangular prisms

7.GSR.5.7 Describe the two-dimensional figures (cross sections) that result from slicing three-dimensional figures, as in the plane sections of right rectangular prisms, right rectangular pyramids, cones, cylinders, and spheres.	
Course Topics	**Activities**
Teacher directed	
Topics	**Skill Quests**
Cross sections of 3-D figures	Describing cross sections of 3-D figures

7.GSR.5.8 Explore volume as a measurable attribute of cylinders and right prisms. Find the volume of these geometric figures using concrete problems.	
Course Topics	**Activities**
7.GSR.5 Surface area & volume including cylinders	Volume: Cuboid 2
	Volume: Rectangular Prisms 2
	Volume of Triangular prisms
	Volume: Prisms
	Volume: Cylinders
Topics	**Skill Quests**
Volume of right prisms	Volume: right prisms

Probability Reasoning

7.PR.6 Using mathematical reasoning, investigate chance processes and develop, evaluate, and use probability models to find probabilities of simple events presented in authentic situations.

7.PR.6.1 Represent the probability of a chance event as a number between 0 and 1 that expresses the likelihood of the event occurring. Describe that 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.	
Course Topics	**Activities**
7.PR.6 Probability	Chance Dial
	Probability Scale
Topics	**Skill Quests**
Introduction to probability	Introducing probability

7.PR.6.2 Approximate the probability of a chance event by collecting data on an event and observing its long-run relative frequency will approach the theoretical probability.	
Course Topics	**Activities**
7.PR.6 Probability	Relative Frequency
	Simple Probability
Topics	**Skill Quests**
Probability of chance events	Probability of chance events: relative frequency

7.PR.6.3 Develop a probability model and use it to find probabilities of simple events. Compare experimental and theoretical probabilities of events. If the probabilities are not close, explain possible sources of the discrepancy.	
Course Topics	**Activities**
7.PR.6 Probability	Find the Probability
	Introductory Probability
	Dice and Coins
Topics	**Skill Quests**
Teacher directed	

7.PR.6.4 Develop a uniform probability model by assigning equal probability to all outcomes and use the model to determine probabilities of events.	
Course Topics	**Activities**
Teacher directed	
Topics	**Skill Quests**
Determine the probability of events	Theoretical probability
	Predicting outcomes of chance experiments
	Finding the complement of an event

7.PR.6.5 Develop a probability model (which may not be uniform) by observing frequencies in data generated from a chance process.	
Course Topics	**Activities**
7.PR.6 Probability	Probability Tables
	Probability With Replacement
	Probability Without Replacement
Topics	**Skill Quests**
Observe frequencies in data	Finding the approximate probability
	Comparing observed frequency & expected frequency

7.PR.6.6 Use appropriate graphical displays and numerical summaries from data distributions with categorical or quantitative (numerical) variables as probability models to draw informal inferences about two samples or populations.	
Course Topics	**Activities**
7.PR.6 Data analysis	Divided Bar Graphs

	Double Stem and Leaf Plots
	Box Plots 2
	Data Extremes and Range
	Which Measure of Central Tendency?
Topics	**Skill Quests**
Understand sampling	Understanding sampling
Draw inferences from samples	Drawing inferences from samples
Compare data distributions	Comparing data distributions
Draw comparative inferences	Drawing comparative inferences

Grade 8

Numerical Reasoning

8.NR.1 Solve problems involving irrational numbers and rational approximations of irrational numbers to explain realistic applications.

8.NR.1.1 Distinguish between rational and irrational numbers using decimal expansion. Convert a decimal expansion which repeats eventually into a rational number.	
Course Topics	**Activities**
8.NR.1 Rational numbers	Fraction to Terminating Decimal
	Repeating Decimals
	Irrational Numbers
Topics	**Skill Quests**
Rational & irrational numbers	Describing properties of irrational numbers
	Classifying real numbers

8.NR.1.2 Approximate irrational numbers to compare the size of irrational numbers, locate them approximately on a number line, and estimate the value of expressions.	
Course Topics	**Activities**
8.NR.1 Rational numbers	Estimating Square Roots
Topics	**Skill Quests**
Approximate irrational numbers	Comparing irrational numbers
	Locating irrational numbers on a number line
	Approximating the value of an irrational number
	Finding square roots of non-perfect squares

8.NR.2 Solve problems involving radicals and integer exponents including relevant application situations; apply place value understanding with scientific notation and use scientific notation to explain real phenomena.

8.NR.2.1 Apply the properties of integer exponents to generate equivalent numerical expressions.	
Course Topics	**Activities**
8.NR.2 Exponent rules	Exponent Notation
	Exponent Notation and Algebra
	Properties of Exponents
	Exponent Laws with Brackets
	The Zero Exponent
	Negative Exponents
	Integer Exponents
	Multiplication with Exponents
	Simplifying with Exponent Laws 1
	Exponent Laws and Algebra
	Exponent Form to Numbers
Topics	**Skill Quests**

Approximate irrational numbers	Comparing irrational numbers
	Locating irrational numbers on a number line
	Approximating the value of an irrational number
	Finding square roots of non-perfect squares

8.NR.2.2	
Use square root and cube root symbols to represent solutions to equations. Recognize that x2 = p (where p is a positive rational number and |x| ≤ 25) has two solutions and x3 = p (where p is a negative or positive rational number and |x| ≤ 10) has one solution. Evaluate square roots of perfect squares ≤ 625 and cube roots of perfect cubes ≥ -1000 and ≤ 1000.	
Course Topics	**Activities**
8.NR.2 Square/cube roots & scientific notation	Square Roots
	Square Roots 1
	Square and Cube Roots
Topics	**Skill Quests**
Square & cube roots	Investigating square roots & cube roots
	Squares & square roots
	Evaluating expressions with square & cube roots
	Square roots of fractions & decimals
	Cubes & cube roots

8.NR.2.3	
Use numbers expressed in scientific notation to estimate very large or very small quantities, and to express how many times as much one is than the other.	
Course Topics	**Activities**
8.NR.2 Square/cube roots & scientific notation	Scientific Notation
	Scientific Notation 1
	Scientific Notation 2
	Scientific Notation to Decimal
	Ordering Scientific Notation
Topics	**Skill Quests**
Write numbers in scientific notation	Introducing scientific notation
	Converting scientific notation to standard form
	Converting standard form to scientific notation

8.NR.2.4	
Add, subtract, multiply and divide numbers expressed in scientific notation, including problems where both decimal and scientific notation are used. Interpret scientific notation that has been generated by technology (e.g., calculators or online technology tools).	
Course Topics	**Activities**
Teacher directed	
Topics	**Skill Quests**
Calculations in scientific notation	Calculations in scientific notation

2 Patterning & Algebraic Reasoning

8.PAR.3 Create and interpret expressions within relevant situations. Create, interpret, and solve linear equations and linear inequalities in one variable to model and explain real phenomena.

8.PAR.3.1 Interpret expressions and parts of an expression, in context, by utilizing formulas or expressions with multiple terms and/or factors.	
Course Topics	**Activities**
Teacher directed	
Topics	**Skill Quests**
Teacher directed	

8.PAR.3.2 Describe and solve linear equations in one variable with one solution (x = a), infinitely many solutions (a = a), or no solutions (a = b). 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).	
Course Topics	**Activities**
Teacher directed	
Topics	**Skill Quests**
Solution types of linear equations	Solution types of linear equations

8.PAR.3.3 Create and solve linear equations and inequalities in one variable within a relevant application.	
Course Topics	**Activities**
8.PAR.3 Equations & inequalities	Equations with Grouping Symbols
	Equations with Fractions
	Equations with Decimals
	Equations to Solve Problems
	Equations: Variables, Both Sides
	Solving More Equations
Topics	**Skill Quests**
Solve linear equations	Solving 3-step linear equations
	Solving linear equations, variables on both sides
	Solving linear equations, distributive property
	Using substitution to check solutions

8.PAR.3.4 Using algebraic properties and the properties of real numbers, justify the steps of a one-solution equation or inequality.	
Course Topics	**Activities**
Teacher directed	
Topics	**Skill Quests**
Teacher directed	

8.PAR.3.5 Solve linear equations and inequalities in one variable with coefficients represented by letters and explain the solution based on the contextual, mathematical situation.	
Course Topics	**Activities**
8.PAR.3 Equations & inequalities	Solve Two-Step Inequalities
	Solving Inequalities 3
	Graphing Inequalities 3
Topics	**Skill Quests**
Teacher directed	

8.PAR.3.6 Use algebraic reasoning to fluently manipulate linear and literal equations expressed in various forms to solve relevant mathematical problems.	
Course Topics	**Activities**
8.PAR.3 Equations & inequalities	Rearranging the Equation
Topics	**Skill Quests**
Teacher directed	

8.PAR.4 Show and explain the connections between proportional and non-proportional relationships, lines, and linear equations; create and interpret graphical mathematical models and use the graphical, mathematical model to explain real phenomena represented in the graph.

8.PAR.4.1 Use the equation y = mx (proportional) for a line through the origin to derive the equation y = mx + b (non-proportional) for a line intersecting the vertical axis at b.	
Course Topics	**Activities**
8.PAR.4 Linear relationships	Determining a Rule for a Line
Topics	**Skill Quests**
Find the y-intercept algebraically	Finding the y-intercept algebraically

8.PAR.4.2 Show and explain that the graph of an equation representing an applicable situation in two variables is the set of all its solutions plotted in the coordinate plane.	
Course Topics	**Activities**
8.PAR.4 Linear relationships	Which Straight Line?
	Equation from Point and Slope
	Modeling Linear Relationships
Topics	**Skill Quests**
Graph equations in slope-intercept form	Graphing equations in slope-intercept form
	Graphing equations not in slope-intercept form

Functional & Graphical Reasoning

8.FGR.5 Describe the properties of functions to define, evaluate, and compare relationships, and use functions and graphs of functions to model and explain real phenomena.

8.FGR.5.1 Show and explain that a function is a rule that assigns to each input exactly one output.	
Course Topics	**Activities**
8.FGR.5 Functions & graphs	Function Rules and Tables
	Find the Function Rule
Topics	**Skill Quests**
Identify functions	Identifying functions

8.FGR.5.2 Within realistic situations, identify and describe examples of functions that are linear or nonlinear. Sketch a graph that exhibits the qualitative features of a function that has been described verbally.	
Course Topics	**Activities**
8.FGR.5 Functions & graphs	Travel Graphs
	Identifying Graphs
	Vertical Line Test
Topics	**Skill Quests**
Distance-time graphs	Distance-time graphs

8.FGR.5.3 Relate the domain of a linear function to its graph and where applicable to the quantitative relationship it describes.	
Course Topics	**Activities**
8.FGR.5 Functions & graphs	Domain
Topics	**Skill Quests**
Teacher directed	

8.FGR.5.4 Compare properties (rate of change and initial value) of two functions used to model an authentic situation each represented in a different way (algebraically, graphically, numerically in tables, or by verbal descriptions).	
Course Topics	**Activities**
8.FGR.5 Functions & graphs	Intercepts
Topics	**Skill Quests**
Compare functions	Comparing functions represented in different ways

8.FGR.5.5 Write and explain the equations y = mx + b (slope-intercept form), Ax + By = C (standard form), and (y - y1) = m(x-x1) (point-slope form) as defining a linear function whose graph is a straight line to reveal and explain different properties of the function.	
Course Topics	**Activities**
Teacher directed	
Topics	**Skill Quests**

Interpret y= mx + b as linear	Represent linear relationships in different forms
	Equations of linear & non-linear relationships

8.FGR.5.6 Write a linear function defined by an expression in different but equivalent forms to reveal and explain different properties of the function.	
Course Topics	**Activities**
Teacher directed	
Topics	**Skill Quests**
Teacher directed	

8.FGR.5.7 Construct a function to model a linear relationship between two quantities. Determine the rate of change and initial value of the function from a description of a relationship or from two (x,y) values, including reading these from a table or from a graph.	
Course Topics	**Activities**
Teacher directed	
Topics	**Skill Quests**
Rate of change & initial value	Rate of change & initial value

8.FGR.5.8 Explain the meaning of the rate of change and initial value of a linear function in terms of the situation it models, and in terms of its graph or a table of values.	
Course Topics	**Activities**
Teacher directed	
Topics	**Skill Quests**
Teacher directed	

8.FGR.5.9 Graph and analyze linear functions expressed in various algebraic forms and show key characteristics of the graph to describe applicable situations.	
Course Topics	**Activities**
Teacher directed	
Topics	**Skill Quests**
Teacher directed	

8.FGR.6 Solve practical, linear problems involving situations using bivariate quantitative data.

8.FGR.6.1 Show that straight lines are widely used to model relationships between two quantitative variables. For scatter plots that suggest a linear association, visually fit a straight line, and informally assess the model fit by judging the closeness of the data points to the line of best fit.	
Course Topics	**Activities**
8.FGR.6 Bivariate data	Scatter Plots
Topics	**Skill Quests**
Use & interpret scatter plots	Using & interpreting scatter plots
Estimate the line of best fit	Estimating the line of best fit

8.FGR.6.2 Use the equation of a linear model to solve problems in the context of bivariate measurement data, interpreting the slope and intercepts.	
Course Topics	**Activities**
Teacher directed	
Topics	**Skill Quests**
Interpret the line of best fit	Interpreting the line of best fit

8.FGR.6.3 Explain the meaning of the predicted slope (rate of change) and the predicted intercept (constant term) of a linear model in the context of the data.	
Course Topics	**Activities**
Teacher directed	
Topics	**Skill Quests**
Teacher directed	

8.FGR.6.4 Use appropriate graphical displays from data distributions involving lines of best fit to draw informal inferences and answer the statistical investigative question posed in an unbiased statistical study.	
Course Topics	**Activities**
Teacher directed	
Topics	**Skill Quests**
Teacher directed	

8.FGR.7 Justify and use various strategies to solve systems of linear equations to model and explain realistic phenomena.

8.FGR.7.1 Interpret and solve relevant mathematical problems leading to two linear equations in two variables.	
Course Topics	**Activities**
8.FGR.7 Simultaneous equations	Solve Systems by Graphing
	Simultaneous Linear Equations
	Linear Modeling
Topics	**Skill Quests**
Write & solve systems of equations	Writing & solving systems of equations

8.FGR.7.2 Show and explain that solutions to a system of two linear equations in two variables correspond to points of intersection of their graphs, because the points of intersection satisfy both equations simultaneously.	
Course Topics	**Activities**
Teacher directed	
Topics	**Skill Quests**
Identify solutions, systems of equations	Identifying solutions, systems of equations

8.FGR.7.3 Approximate solutions of two linear equations in two variables by graphing the equations and solving simple cases by inspection.	
Course Topics	**Activities**
Teacher directed	
Topics	**Skill Quests**
Teacher directed	

8.FGR.7.4 Analyze and solve systems of two linear equations in two variables algebraically to find exact solutions.	
Course Topics	**Activities**
8.FGR.7 Simultaneous equations	Simultaneous Equations 1
	Simultaneous Equations 2
Topics	**Skill Quests**
Solve systems of equations	Solving systems of equations graphically
	Solving systems of equations using elimination
	Solving systems of equations using substitution
	Checking the solution of a system of equations

8.FGR.7.5 Create and compare the equations of two lines that are either parallel to each other, perpendicular to each other, or neither parallel nor perpendicular.	
Course Topics	**Activities**
8.FGR.7 Simultaneous equations	Are they Parallel?
Topics	**Skill Quests**
Teacher directed	

Geometric & Spatial Reasoning

8.GSR.8 Solve geometric problems involving the Pythagorean Theorem and the volume of geometric figures to explain real phenomena.

8.GSR.8.1 Explain a proof of the Pythagorean Theorem and its converse using visual models.	
Course Topics	**Activities**
8.GSR.8 Pythagoras	Pythagorean Triads
Topics	**Skill Quests**
The Pythagorean theorem & its converse	Identifying the hypotenuse, right triangles
	Identifying right triangles, Pythagorean theorem
	Pythagorean triples

8.GSR.8.2 Apply the Pythagorean Theorem to determine unknown side lengths in right triangles within authentic, mathematical problems in two and three dimensions.	
Course Topics	**Activities**

8.GSR.8 Pythagorean	Pythagorean Theorem
	Pythagorean: Find a Short Side (integers only)
	Pythagorean: Find a Short Side (decimal values)
	Pythagorean: Find a Short Side (rounding needed)
	Pythagorean Theorem
	Find Slant Height
Topics	**Skill Quests**
Apply the Pythagorean theorem	Pythagorean theorem: missing short side
	Pythagorean theorem: missing hypotenuse
	Pythagorean theorem: missing side
	Pythagorean theorem in 2-D & 3-D

8.GSR.8.3 Apply the Pythagorean Theorem to find the distance between two points in a coordinate system in practical, mathematical problems.	
Course Topics	**Activities**
8.GSR.8 Pythagoras	Distance Between Two Points
Topics	**Skill Quests**
Distance between two points	Finding the distance between two points

8.GSR.8.4 Apply the formulas for the volume of cones, cylinders, and spheres and use them to solve in relevant problems.	
Course Topics	**Activities**
8.GSR.8 Volume	Volume: Cylinders
	Volume: Cones
	Volume: Spheres
Topics	**Skill Quests**
Volume: cones, cylinders & spheres	Volume: cones
	Volume: cylinders
	Volume: spheres

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