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Core Subject Area: Secondary I Mathematics

Mathematics, Secondary I

Number and Quantity	
Reason quantitatively and use units to solve problems.	
N.Q.1 Use units as a way to understand problems and to guide the solution of multi-step problems; choose and interpret units consistently in formulas; choose and interpret the scale and the origin in graphs and data displays.	Module 4 Task 2 Elvira's Equations
N.Q.2 Define appropriate quantities for the purpose of descriptive modeling.	Module 1 Task 1 Checkerboard Borders Module 4 Task 2 Elvira's Equations
N.Q.3 Choose a level of accuracy appropriate to limitations on measurement when reporting quantities.	Throughout curriculum
Algebra	

Interpret the structure of expressions.	
A.SSE.1 Interpret expressions that represent a quantity in terms of its context.* a. Interpret parts of an expression, such as terms, factors, and coefficients. b. Interpret complicated expressions by viewing one or more of their parts as a single entity. *For example, interpret $P(1+r)^n$ as the product of P and a factor not depending on P.*	Module 1 Task 1 Checkerboard Borders Module 2 Task 5 Making My Point
Create equations that describe numbers or relationships.	
A.CED.1 Create equations and inequalities in one variable and use them to solve problems. *Include equations arising from linear and quadratic functions, and simple rational and exponential functions.*	Module 2 Task 1 Piggies and Pools
A.CED.2 Create equations in two or more variables to represent relationships between quantities; graph equations on coordinate axes with labels and scales.	Module 2 Task 5 Making My Point Module 5 Task 2 Too Big or Not Too Big, That is the Question Module 5 Task 3 Some of One, None of the Other Module 5 Task 4 Pampering and Feeding Time
A.CED.3 Represent constraints by equations or inequalities, and by systems of equations and/or inequalities, and interpret solutions as viable or non-viable options in a modeling context. *For example, represent inequalities describing nutritional and cost constraints on combinations of different foods.*	Module 3 Task 4 The Water Park Module 3 Task 5 Pooling It Together Module 3 Task 6 Interpreting Functions Module 5 Task 1 Pet Sitters Module 5 Task 4 Pampering and Feeding Time Module 5 Task 5 All for One, One for All Module 5 Task 6 More or Less
A.CED.4 Rearrange formulas to highlight a quantity of interest, using the same reasoning as in solving equations. *For example, rearrange Ohm's law V = IR to highlight resistance R.*	Module 4 Task 2 Elvira's Equations Module 4 Task 3 Solving Equations Literally Module 5 Task 3 Some of One, None of the Other

Understand solving equations as a process of reasoning and explain the reasoning.	
A.REI.1 Explain each step in solving a simple equation as following from the equality of numbers asserted at the previous step, starting from the assumption that the original equation has a solution. Construct a viable argument to justify a solution method.	Module 4 Task 1 Cafeteria Actions and Reactions Module 4 Task 3 Solving Equations Literally Module 4 Task 4 Greater Than Module 4 Task 5 May I Have More, Please? Module 4 Task 6 Taking Sides
Solve equations and inequalities in one variable.	
A.REI.3 Solve linear equations and inequalities in one variable, including equations with coefficients represented by letters.	Module 1 Task 9 What Does It *Mean*? Module 1 Task 10 Geometric *Mean*ies Module 4 Task 2 Elvira's Equations Module 4 Task 3 Solving Equations Literally Module 4 Task 4 Greater Than Module 4 Task 5 May I Have More, Please? Module 4 Task 6 Taking Sides
Solve systems of equations.	
A.REI.5 Prove that, given a system of two equations in two variables, replacing one equation by the sum of that equation and a multiple of the other produces a system with the same solutions.	Module 5 Task 8 Shopping for Cats and Dogs Module 5 Task 9 Can You Get to the Point, Too?
A.REI.6 Solve systems of linear equations exactly and approximately (e.g., with graphs), focusing on pairs of linear equations in two variables.	Module 5 Task 7 Get to the Point Module 5 Task 8 Shopping for Cats and Dogs Module 5 Task 9 Can You Get to the Point, Too? Module 5 Task 10 Taken Out of Context
Represent and solve equations and inequalities graphically.	
A.REI.10 Understand that the graph of an equation in two variables is the set of all its solutions plotted in the coordinate plane, often forming a curve (which could be a line).	Module 5 Task 7 Get to the Point!
A.REI.11 Explain why the x-coordinates of the points where the graphs of the equations $y = f(x)$ and $y = g(x)$ intersect are the solutions of the equation $f(x) = g(x)$; find the solutions approximately, e.g., using technology to graph the functions, make tables of values, or find	Module 3 Task 4 The Water Park Module 3 Task 5 Pooling It Together Module 3 Task 6 Interpreting Functions

successive approximations. Include cases where *f(x)* and/or *g(x)* are linear, polynomial, rational, absolute value, exponential, and logarithmic functions.*	Module 3 Task 8 It's A Match!
A.REI.12 Graph the solutions to a linear inequality in two variables as a half-plane (excluding the boundary in the case of a strict inequality), and graph the solution set to a system of linear inequalities in two variables as the intersection of the corresponding half-planes.	Module 5 Task 2 Too Big or Not Too Big, That is the Question Module 5 Task 3 Some of One, None of the Other Module 5 Task 4 Pampering and Feeding Time Module 5 Task 5 All for One, One for All Module 5 Task 6 More or Less
Function	
Understand the concept of a function and use function notation.	
F.IF.1 Understand that a function from one set (called the domain) to another set (called the range) assigns to each element of the domain exactly one element of the range. If *f* is a function and *x* is an element of its domain, then *f(x)* denotes the output of *f* corresponding to the input *x*. The graph of *f* is the graph of the equation *y = f(x)*.	Module 3 Task 7 To Function or Not to Function Throughout curriculum
F.IF.2 Use function notation, evaluate functions for inputs in their domains, and interpret statements that use function notation in terms of a context.	Module 3 Task 4 The Water Park Module 3 Task 5 Pooling It Together Module 3 Task 6 Interpreting Functions Module 3 Task 8 It's A Match!
F.IF.3 Recognize that sequences are functions, sometimes defined recursively, whose domain is a subset of the integers. *For example, the Fibonacci sequence is defined recursively by f(0) = f(1) = 1, f(n+1) = f(n) + f(n-1) for n ≥ 1.*	Module 2 Task 1 Piggies and Pools Module 2 Task 2 Shh! Please Be Discreet! (Discrete) Module 3 Task 7 To Function or Not to Function
Interpret functions that arise in applications in terms of a context.	
F.IF.4 For a function that models a relationship between two quantities, interpret key features of graphs and tables in terms of the quantities, and sketch graphs showing key features given a verbal description of the relationship. *Key features include: intercepts; intervals where the function is increasing, decreasing, positive, or negative; relative maximums and minimums; symmetries; end behavior; and periodicity.*	Module 3 Task 1 Getting Ready for a Pool Party Module 3 Task 2 Floating Down the River Module 3 Task 3 Features of Functions Module 3 Task 4 The Water Park Module 3 Task 5 Pooling It Together Module 3 Task 6 Interpreting Functions

	Module 3 Task 8 It's A Match!
F.IF.5 Relate the domain of a function to its graph and, where applicable, to the quantitative relationship it describes. *For example, if the function h(n) gives the number of person-hours it takes to assemble n engines in a factory, then the positive integers would be an appropriate domain for the function.*	Module 3 Task 2 Floating Down the River Module 3 Task 3 Features of Functions Module 3 Task 4 The Water Park Module 3 Task 5 Pooling It Together Module 3 Task 6 Interpreting Functions Module 3 Task 8 It's A Match!
F.IF.6 Calculate and interpret the average rate of change of a function (presented symbolically or as a table) over a specified interval. Estimate the rate of change from a graph.	Module 2 Task 7H I Can See—Can't You?
Analyze functions using different representations.	
F.IF.7 Graph functions expressed symbolically and show key features of the graph, by hand in simple cases and using technology for more complicated cases. a. Graph linear and quadratic functions and show intercepts, maxima, and minima. e. Graph exponential and logarithmic functions, showing intercepts and end behavior, and trigonometric functions, showing period, midline, and amplitude.	Module 2 Task 4 Getting Down to Business Module 2 Task 6 Form Follows Function Module 3 Task 4 The Water Park Module 3 Task 5 Pooling It Together Module 3 Task 6 Interpreting Functions Module 3 Task 8 It's A Match!
F.IF.9 Compare properties of two functions each represented in a different way (algebraically, graphically, numerically in tables, or by verbal descriptions).	Module 8 Task 4 Training Day Module 8 Task 5 Training Day Part II Module 8 Task 6 Shifting Functions
Build a function that models a relationship between two quantities.	
F.BF.1 Write a function that describes a relationship between two quantities.* a. Determine an explicit expression, a recursive process, or steps for calculation from a context. b. Combine standard function types using arithmetic operations. *For example, build a function that models the temperature of a cooling body by adding a constant function to a decaying exponential, and relate these functions to the model.*	Module 1 Task 2 Growing Dots Module 1 Task 3 Growing, Growing Dots Module 1 Task 4 Scott's Workout Module 1 Task 5 Don't Break the Chain Module 1 Task 6 Something to Chew On Module 1 Task 7 Chew On This Module 1 Task 8 What Comes Next? What Comes Later? Module 2 Task 2 Shh! Please Be Discreet! (Discrete) Module 3 Task 5 Pooling It Together Module 3 Task 6 Interpreting Functions Module 8 Task 4 Training Day

	Module 8 Task 5 Training Day Part II Module 8 Task 6 Shifting Functions
F.BF.2 Write arithmetic and geometric sequences both recursively and with an explicit formula, use them to model situations, and translate between the two forms.	Module 1 Task 2 Growing Dots Module 1 Task 3 Growing, Growing Dots Module 1 Task 4 Scott's Workout Module 1 Task 5 Don't Break the Chain Module 1 Task 6 Something to Chew On Module 1 Task 7 Chew On This Module 1 Task 8 What Comes Next? What Comes Later? Module 1 Task 11 I Know . . .What Do You Know? Module 2 Task 4 Getting Down to Business
Build new functions from existing functions.	
F.BF.3 Identify the effect on the graph of replacing *f(x)* by *f(x) + k, k f(x), f(kx),* and *f(x + k)* for specific values of *k* (both positive and negative); find the value of *k* given the graphs. Experiment with cases and illustrate an explanation of the effects on the graph using technology. *Include recognizing even and odd functions from their graphs and algebraic expressions for them.*	Module 8 Task 4 Training Day Module 8 Task 5 Training Day Part II Module 8 Task 6 Shifting Functions
Construct and compare linear, quadratic, and exponential models and solve problems.	
F.LE.1 Distinguish between situations that can be modeled with linear functions and with exponential functions. a. Prove that linear functions grow by equal differences over equal intervals; exponential functions grow by equal factors over equal intervals. b. Recognize situations in which one quantity changes at a constant rate per unit interval relative to another. c. Recognize situations in which a quantity grows or decays by a constant percent rate per unit interval relative to another.	Module 1 Task 2 Growing Dots Module 1 Task 3 Growing, Growing Dots Module 1 Task 4 Scott's Workout Module 1 Task 5 Don't Break the Chain Module 1 Task 6 Something to Chew On Module 1 Task 7 Chew On This Module 1 Task 8 What Comes Next? What Comes Later? Module 2 Task 2 Shh! Please Be Discreet! (Discrete)
F.LE.2 Construct linear and exponential functions, including arithmetic and geometric sequences, given a graph, a description of a relationship, or two input-output pairs (include reading these from a table).	Module 1 Task 2 Growing Dots Module 1 Task 3 Growing, Growing Dots Module 1 Task 4 Scott's Workout Module 1 Task 5 Don't Break the Chain

	Module 1 Task 6 Something to Chew On Module 1 Task 7 Chew On This Module 1 Task 8 What Comes Next? What Comes Later? Module 1 Task 9 What Does It *Mean*? Module 1 Task 10 Geometric *Mean*ies Module 1 Task 11 I Know . . .What Do You Know? Module 2 Task 2 Shh! Please Be Discreet! (Discrete) Module 2 Task 4 Getting Down to Business
F.LE.3 Observe using graphs and tables that a quantity increasing exponentially eventually exceeds a quantity increasing linearly, quadratically, or (more generally) as a polynomial function.	Module 2 Task 3 Linear, Exponential or Neither Module 2 Task 4 Getting Down to Business
Interpret expressions for functions in terms of the situation they model.	
F.LE.5 Interpret the parameters in a linear or exponential function in terms of a context.	Module 1 Task 2 Growing Dots Module 1 Task 3 Growing, Growing Dots Module 1 Task 4 Scott's Workout Module 1 Task 5 Don't Break the Chain Module 1 Task 6 Something to Chew On Module 1 Task 8 What Comes Next? What Comes Later? Module 2 Task 3 Linear, Exponential or Neither Module 2 Task 4 Getting Down to Business Module 2 Task 5 Making My Point Module 2 Task 6 Form Follows Function
Geometry	
Experiment with transformations in the plane.	
G.CO.1 Know precise definitions of angle, circle, perpendicular line, parallel line, and line segment, based on the undefined notions of point, line, distance along a line, and distance around a circular arc.	Module 6 Task 1 Leaping Lizards! Module 6 Task 2 Is It Right? Module 6 Task 4 Leap Year
G.CO.2 Represent transformations in the plane using, e.g., transparencies and geometry software; describe transformations as functions that take points in the plane as inputs and give other points as outputs. Compare transformations that preserve distance and angle to those that do not (e.g., translation versus horizontal stretch).	Module 6 Task 1 Leaping Lizards! Module 6 Task 4 Leap Year

G.CO.3 Given a rectangle, parallelogram, trapezoid, or regular polygon, describe the rotations and reflections that carry it onto itself.	Module 6 Task 5 Symmetries of Quadrilaterals Module 6 Task 6 Symmetries of Regular Polygons Module 6 Task 7 Quadrilaterals-Beyond Definition
G.CO.4 Develop definitions of rotations, reflections, and translations in terms of angles, circles, perpendicular lines, parallel lines, and line segments.	Module 6 Task 1 Leaping Lizards! Module 6 Task 3 Leap Frog Module 6 Task 4 Leap Year Module 6 Task 7 Quadrilaterals-Beyond Definition
G.CO.5 Given a geometric figure and a rotation, reflection, or translation, draw the transformed figure using, e.g., graph paper, tracing paper, or geometry software. Specify a sequence of transformations that will carry a given figure onto another.	Module 6 Task 1 Leaping Lizards! Module 6 Task 3 Leap Frog Module 7 Task 3 Can You Get There From Here?
Understand congruence in terms of rigid motions.	
G.CO.6 Use geometric descriptions of rigid motions to transform figures and to predict the effect of a given rigid motion on a given figure; given two figures, use the definition of congruence in terms of rigid motions to decide if they are congruent.	Module 6 Task 5 Symmetries of Quadrilaterals Module 6 Task 6 Symmetries of Regular Polygons Module 6 Task 7 Quadrilaterals-Beyond Definition Module 7 Task 4 Congruent Triangles
G.CO.7 Use the definition of congruence in terms of rigid motions to show that two triangles are congruent if and only if corresponding pairs of sides and corresponding pairs of angles are congruent.	Module 7 Task 4 Congruent Triangles Module 7 Task 5 Congruent Triangles to the Rescue
G.CO.8 Explain how the criteria for triangle congruence (ASA, SAS, and SSS) follow from the definition of congruence in terms of rigid motions.	Module 7 Task 4 Congruent Triangles Module 7 Task 5 Congruent Triangles to the Rescue
Make geometric constructions.	
G.CO.12 Make formal geometric constructions with a variety of tools and methods (compass and straightedge, string, reflective devices, paper folding, dynamic geometric software, etc.). *Copying a segment; copying an angle; bisecting a segment; bisecting an angle; constructing perpendicular lines, including the perpendicular bisector of a line segment; and constructing a line parallel to a given line through a point not on the line.*	Module 7 Task 1 Under Construction Module 7 Task 2 More Things Under Construction Module 7 Task 3 Can You Get There From Here? Module 7 Task 6 Justifying Constructions
G.CO.13 Construct an equilateral triangle, a square, and a regular hexagon inscribed in a circle.	Module 7 Task 1 Under Construction Module 7 Task 2 More Things Under Construction Module 7 Task 3 Can You Get There From Here? Module 7 Task 6 Justifying Constructions

Use coordinates to prove simple geometric theorems algebraically.	
G.GPE.4 Use coordinates to prove simple geometric theorems algebraically. *For example, prove or disprove that a figure defined by four given points in the coordinate plane is a rectangle; prove or disprove that the point (1, √3) lies on the circle centered at the origin and containing the point (0, 2).*	Module 8 Task 3 Prove It!
G.GPE.5 Prove the slope criteria for parallel and perpendicular lines; use them to solve geometric problems (e.g., find the equation of a line parallel or perpendicular to a given line that passes through a given point).	Module 6 Task 2 Is It Right? Module 6 Task 4 Leap Year Module 8 Task 2 Slippery Slopes
G.GPE.7 Use coordinates to compute perimeters of polygons and areas of triangles and rectangles, e.g., using the distance formula.	Module 8 Task 1 Go the Distance
Statistics	
Summarize, represent, and interpret data on a single count or measurement variable.	
S.ID.1 Represent data with plots on the real number line (dot plots, histograms, and box plots).	Module 9 Task 1 Texting By the Numbers Module 9 Task 2 Data Distribution
S.ID.2 Use statistics appropriate to the shape of the data distribution to compare center (median, mean) and spread (interquartile range, standard deviation) of two or more different data sets.	Module 9 Task 1 Texting By the Numbers Module 9 Task 2 Data Distribution
S.ID.3 Interpret differences in shape, center, and spread in the context of the data sets, accounting for possible effects of extreme data points (outliers).	Module 9 Task 1 Texting By the Numbers Module 9 Task 2 Data Distribution
Summarize, represent, and interpret data on two categorical and quantitative variables.	
S.ID.5 Summarize categorical data for two categories in two-way frequency tables. Interpret relative frequencies in the context of the data (including joint, marginal, and conditional relative frequencies). Recognize possible associations and trends in the data.	Module 9 Task 3 After School Activity Module 9 Task 4 Relative Frequency
S.ID.6 Represent data on two quantitative variables on a scatter plot, and describe how the variables are related. a. Fit a function to the data; use functions fitted to data to solve problems in the context of the data. *Use given functions or*	Module 9 Task 7 Getting Schooled Module 9 Task 8 Rocking the Residuals Module 9 Task 8 Lies and Statistics

choose a function suggested by the context. Emphasize linear and exponential models. b. Informally assess the fit of a function by plotting and analyzing residuals. c. c. Fit a linear function for scatter plots that suggest a linear association.	
Interpret linear models	
S.ID.7 Interpret the slope (rate of change) and the intercept (constant term) of a linear model in the context of the data.	Module 9 Task 6 Making More $ Module 9 Task 7 Getting Schooled Module 9 Task 8 Lies and Statistics
S.ID.8 Compute (using technology) and interpret the correlation coefficient of a linear fit.	Module 9 Task 5 Connect the Dots Module 9 Task 6 Making More $ Module 9 Task 7 Getting Schooled Module 9 Task 8 Lies and Statistics
S.ID.9 Distinguish between correlation and causation.	Module 9 Task 6 Making More Money