

Resource Title: Algebra One Mathematics Student Edition

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Core Subject Area: Algebra I Mathematics

Mathematics, Algebra I

Standard	Designated Section
Domain: 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 Module 5 Task 5 All for One, One for All
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 Module 5 Task 2 Too Big or Not Too Big, That is the Question Module 5 Task 5 All for One, One for All
N.Q.3 Choose a level of accuracy appropriate to limitations on measurement when reporting quantities.	Throughout curriculum

Extend the properties of exponents to rational exponents.	
<p>N.RN.1 Explain how the definition of the meaning of rational exponents follows from extending the properties of integer exponents to those values, allowing for a notation for radicals in terms of rational exponents. <i>For example, we define $5^{1/3}$ to be the cube root of 5 because we want $(5^{1/3})^3 = 5^{(1/3)3}$ to hold, so $(5^{1/3})^3$ must equal 5.</i></p>	Module 2 Task 4 Experimenting with Exponents Module 2 Task 5 Half Interested Module 2 Task 6 More Interesting Module 2 Task 7 Radical Ideas
<p>N.RN.2 Rewrite expressions involving radicals and rational exponents using the properties of exponents.</p>	Module 2 Task 6 More Interesting Module 2 Task 7 Radical Ideas
Domain: Algebra	
Interpret the structure of expressions.	
<p>A.SSE.1 Interpret expressions that represent a quantity in terms of its context.*</p> <p>a. Interpret parts of an expression, such as terms, factors, and coefficients.</p> <p>b. Interpret complicated expressions by viewing one or more of their parts as a single entity. <i>For example, interpret $P(1+r)^n$ as the product of P and a factor not depending on P.</i></p>	Module 1 Task 1 Checkerboard Borders Module 2 Task 9 Making My Point Module 5 Task 6 More or Less Module 6 Task 1 Something to Talk About Module 6 Task 2 I Rule Module 6 Task 5 Tortoise and Hare
<p>A.SSE.2 Use the structure of an expression to identify ways to rewrite it. <i>For example, see $x^4 - y^4$ as $(x^2)^2 - (y^2)^2$, thus recognizing it as a difference of squares that can be factored as $(x^2 - y^2)(x^2 + y^2)$.</i></p>	Module 7 Task 3 Building The Perfect Square Module 7 Task 6 Factor Fixin' Module 7 Task 9 Lining Up Quadratics
Write expressions in equivalent forms to solve problems.	
<p>A.SSE.3 Choose and produce an equivalent form of an expression to reveal and explain properties of the quantity represented by the expression.</p> <p>a. Factor a quadratic expression to reveal the zeros of the function it defines.</p> <p>b. Complete the square in a quadratic expression to reveal the maximum or minimum value of the function it defines.</p> <p>a. Use the properties of exponents to transform expressions for exponential functions. <i>For example the expression 1.15^t can be rewritten as $(1.15^{1/12})^{12t}$</i></p>	Module 2 Task 6 More Interesting Module 2 Task 7 Radical Ideas Module 2 Task 9 Making My Point Module 6 Task 4 Rabbit Run Module 7 Task 6 Factor Fixin' Module 7 Task 7 The x Factor Module 7 Task 8H The Wow Factor

<p>$\approx 1.012^{12t}$ to reveal the approximate equivalent monthly interest rate if the annual rate is 15%.</p> <p>c.</p>	<p>Module 7 Task 9 Lining Up Quadratics Module 7 Task 10 I've Got a Fill In</p>
<p>Perform arithmetic operations on polynomials.</p>	
<p>A.APR.1 Understand that polynomials form a system analogous to the integers, namely, they are closed under the operations of addition, subtraction, and multiplication; add, subtract, and multiply polynomials.</p>	<p>Module 3 Task 4 The Water Park Module 3 Task 5 Pooling It Together Module 3 Task 6 Interpreting Functions Module 3 Task 8 Match that Function Module 5 Task 7 Get to the Point!</p>
<p>Create equations that describe numbers or relationships.</p>	
<p>A.CED.1 Create equations and inequalities in one variable and use them to solve problems. <i>Include equations arising from linear and quadratic functions, and simple rational and exponential functions.</i></p>	<p>Module 2 Task 9 Making My Point Module 5 Task 3 Some of One, None of the Other Module 5 Task 4 Pampering and Feeding Time Module 7 Task 12 Curbside Rivalry</p>
<p>A.CED.2 Create equations in two or more variables to represent relationships between quantities; graph equations on coordinate axes with labels and scales.</p>	<p>Module 3 Task 4 The Water Park Module 3 Task 5 Pooling It Together 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 Module 5 Task 8 Shopping for Cats and Dogs Module 5 Task 9 Food For Fido and Fluffy Module 6 Task 1 Something to Talk About Module 6 Task 2 I Rule Module 6 Task 4 Rabbit Run Module 6 Task 5 Tortoise and Hare</p>

<p>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. <i>For example, represent inequalities describing nutritional and cost constraints on combinations of different foods.</i></p>	<p>Module 3 Task 4 The Water Park Module 3 Task 5 Pooling It Together Module 3 Task 6 Interpreting Functions Module 4 Task 2 Elvira’s Equations Module 4 Task 3 Solving Equations Literally 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 Module 5 Task 9 Food For Fido and Fluffy</p>
<p>A.CED.4 Rearrange formulas to highlight a quantity of interest, using the same reasoning as in solving equations. <i>For example, rearrange Ohm’s law $V = IR$ to highlight resistance R.</i></p>	<p>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 Module 7 Task 11 Throwing an Interception Module 7 Task 12 Curbside Rivalry</p>
<p>Understand solving equations as a process of reasoning and explain the reasoning.</p>	
<p>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.</p>	<p>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</p>
<p>Solve equations and inequalities in one variable.</p>	
<p>A.REI.3 Solve linear equations and inequalities in one variable, including equations with coefficients represented by letters.</p>	<p>Module 1 Task 9 What Does It Mean? Module 1 Task 10 Geometric Meanies 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</p>
<p>A.REI.4 Solve quadratic equations in one variable.</p>	<p>Module 7 Task 11 Throwing an Interception Module 7 Task 12 Curbside Rivalry</p>

<p>a. Use the method of completing the square to transform any quadratic equation in x into an equation of the form $(x - p)^2 = q$ that has the same solutions. Derive the quadratic formula from this form.</p> <p>b. Solve quadratic equations by inspection (e.g., for $x^2 = 49$) taking square roots, completing the square, the quadratic formula and factoring, as appropriate to the initial form of the equation. Recognize when the quadratic formula gives complex solutions and write them as $a \pm bi$ for the real numbers a and b.</p>	
<p>Solve systems of equations.</p>	
<p>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.</p>	<p>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</p>
<p>A.REI.6 Solve systems of linear equations exactly and approximately (e.g., with graphs), focusing on pairs of linear equations in two variables.</p>	<p>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</p>
<p>A.REI.7 Solve a simple system consisting of a linear equation and a quadratic equation in two variables algebraically and graphically. <i>For example, find the points of intersection between the line $y = -3x$ and the circle $x^2 + y^2 = 3$.</i></p>	<p>Module 7 Task 12 Curbside Rivalry</p> <p>Solving systems between different function types occur throughout rest of curriculum (after Module 5)</p>
<p>Represent and solve equations and inequalities graphically.</p>	
<p>A.REI.8 (+) Represent a system of linear equations as a single matrix equation in a vector variable.</p>	<p>Module 5 Task 11H To Market with Matrices Module 5 Task 12H Solving Systems with Matrices</p>
<p>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).</p>	<p>Module 2 Task 4 Experimenting with Exponents Module 2 Task 5 Half Interested Module 3 Task 4 The Water Park Module 3 Task 5 Pooling It Together Module 3 Task 6 Interpreting Functions Module 3 Task 8 Match that Function Module 5 Task 2 Too Big or Not Too Big, That is the Question</p>

	Module 5 Task 3 Some of One, None of the Other 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 successive approximations. Include cases where $f(x)$ and/or $g(x)$ are linear, polynomial, rational, absolute value, exponential, and logarithmic functions.*	Module 3 Task 4 The Water Park Module 3 Task 6 Interpreting Functions Module 5 Task 3 Some of One, None of the Other Module 5 Task 4 Pampering and Feeding Time
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
Domain: 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 5 Pooling It Together Module 3 Task 6 Interpreting Functions Module 3 Task 8 Match that Function 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 6 Interpreting Functions Module 6 Task 2 I Rule
F.IF.3 Recognize that sequences are functions, sometimes defined recursively, whose domain is a subset of the integers. <i>For example, the Fibonacci sequence is defined recursively by $f(0) = f(1) = 1$, $f(n+1) = f(n) + f(n-1)$ for $n \geq 1$.</i>	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.	

<p>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. <i>Key features include: intercepts; intervals where the function is increasing, decreasing, positive, or negative; relative maximums and minimums; symmetries; end behavior; and periodicity.</i></p>	<p>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 6 Interpreting Functions Module 3 Task 8 Match that Function Module 8 Task 7 More Features, More Functions</p>
<p>F.IF.5 Relate the domain of a function to its graph and, where applicable, to the quantitative relationship it describes. <i>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.</i></p>	<p>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 6 Interpreting Functions Module 8 Task 1 Some of This, Some of That Module 8 Task 2 Bike Lovers Module 8 Task 3 More Functions with Features Module 8 Task 4 Reflections of a Bike Lover</p>
<p>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.</p>	<p>Module 3 Task 1 Getting Ready for a Pool Party Module 3 Task 2 Floating Down the River Module 3 Task 6 Interpreting Functions Module 6 Task 5 Tortoise and Hare</p>
<p>Analyze functions using different representations.</p>	
<p>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.</p> <ul style="list-style-type: none"> a. Graph linear and quadratic functions and show intercepts, maxima, and minima. b. Graph square root, cube root, and piecewise-defined functions, including step functions and absolute value functions. e. Graph exponential and logarithmic functions, showing intercepts and end behavior, and trigonometric functions, showing period, midline, and amplitude. 	<p>Module 2 Task 8 Getting Down to Business Module 2 Task 10 Form Follows Function Module 3 Task 4 The Water Park Module 3 Task 6 Interpreting Functions Module 7 Task 1 Transformers: Shifty y's Module 7 Task 2 Transformer's: More Than Meets the y's Module 8 Task 1 Some of This, Some of That Module 8 Task 2 Bike Lovers Module 8 Task 3 More Functions with Features Module 8 Task 4 Reflections of a Bike Lover</p>
<p>F.IF.8 Write a function defined by an expression in different but equivalent forms to reveal and explain different properties of the function.</p>	<p>Module 2 Task 6 More Interesting Module 7 Task 3 Building the Perfect Square Module 7 Task 4 A Square Deal Module 2 Task 5 Lining Up Quadratics</p>

<p>a. Use the process of factoring and completing the square in a quadratic function to show zeros, extreme values, and symmetry of the graph, and interpret these in terms of a context.</p> <p>b. Use the properties of exponents to interpret expressions for exponential functions. <i>For example, identify percent rate of change in functions such as $y = (1.02)^t$, $y = (0.97)^t$, $y = (1.01)^{12t}$, $y = (1.2)^t/10$, and classify them as representing exponential growth or decay</i></p>	<p>Module 2 Task 6 I've Got a Fill-in Module 3 Task 3 More Interesting Module 7 Task 5 Be There or Be Square Module 7 Task 6 Factor Fixin' Module 7 Task 7 The x Factor Module 7 Task 8H The Wow Factor Module 7 Task 9 Lining Up Quadratics Module 7 Task 10 I've Got a Fill In</p>
<p>F.IF.9 Compare properties of two functions each represented in a different way (algebraically, graphically, numerically in tables, or by verbal descriptions). <i>For example, given a graph of one quadratic function and an algebraic expression for another, say which has the larger maximum.</i></p>	<p>Module 2 Task 8 Getting Down to Business Module 3 Task 5 Pooling It Together Module 3 Task 6 Interpreting Functions Module 3 Task 8 Match that Function Module 8 Task 4 Training Day Module 8 Task 5 Training Day Part II Module 8 Task 6 Shifting Functions</p>
<p>Build a function that models a relationship between two quantities.</p>	
<p>F.BF.1 Write a function that describes a relationship between two quantities.*</p> <p>a. Determine an explicit expression, a recursive process, or steps for calculation from a context.</p> <p>b. Combine standard function types using arithmetic operations. <i>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.</i></p>	<p>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 2 Shh! Please be Discreet (Discrete) Module 3 Task 6 Interpreting Functions Module 6 Task 1 Something to Talk About Module 6 Task 2 I Rule Module 6 Task 3 Scott's Macho March Module 6 Task 4 Rabbit Run Module 6 Task 5 Tortoise and Hare Module 7 Task 6 Factor Fixin' Module 7 Task 7 The x Factor Module 7 Task 9 Lining Up Quadratics</p>

	Module 7 Task 10 I've Got a Fill In Module 7 Task 8H The Wow Factor
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 2 Task 8 Getting Down to Business Module 6 Task 3 Scott's Macho March Throughout Modules 1, 2 and 6
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. <i>Include recognizing even and odd functions from their graphs and algebraic expressions for them.</i>	Module 6 Task 3 Scott's Macho March Module 7 Task 1 Transformers: Shifty y's Module 7 Task 2 Transformer's: More Than Meets the y's Module 8 Task 4 Training Day Module 8 Task 5 Training Day Part II Module 8 Task 6 Shifting Functions
F.BF.4 Find inverse functions. a. Solve an equation of the form $f(x)=c$ for a simple function f that has an inverse and write an expression for the inverse. <i>For example, $f(x) = 2x^3$ or $f(x) = \frac{x+1}{x-1}$ for $x \neq 1$.</i>	Module 8 Task 5 What's Your Pace? Module 8 Task 6 Bernie's Bikes
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 1 Task 11 I Know . . .What Do You Know? Module 1 Task 9 What Does It Mean? Module 1 Task 10 Geometric Meanies Module 1 Task 11 I Know . . .What Do You Know? Module 2 Task 2 Shh! Please be Discreet (Discrete) Module 6 Task 3 Scott's Macho March

	Module 6 Task 6 How does it Grow?
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 11 I Know . . .What Do You Know?Linear, Module 2 Task 2 Shh! Please be Discreet (Discrete) Module 2 Task 8 Getting Down to Business Module 2 Task 10 Form Follows Function Module 6 Task 3 Scott's Macho March Module 6 Task 6 How does it Grow?
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 8 Getting Down to Business Module 6 Task 3 Scott's Macho March Module 6 Task 5 Tortoise and Hare Module 6 Task 6 How does it Grow?
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 2 Task 3 Linear, Exponential or Neither Module 2 Task 8 Getting Down to Business Module 2 Task 9 Making My Point Module 2 Task 10 Form Follows Function Module 6 Task 3 Scott's Macho March
Domain: 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 Distributions
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 Distributions
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 Distributions
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 Activities 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 choose a function suggested by the context. <i>Emphasize linear and exponential models.</i> b. Informally assess the fit of a function by plotting and analyzing residuals.	Module 2 Task 4 Experimenting with Exponents Module 2 Task 5 Half Interested Module 9 Task 6 Making More \$ Module 9 Task 7 Getting Schooled Module 9 Task 8 Rocking the Residuals Module 9 Task 9 Lies and Statistics
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 9 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 9 Lies and Statistics
S.ID.9 Distinguish between correlation and causation.	Module 9 Task 5 Connect the Dots