Illustrative Mathematics: Algebra I Pacing

Unit 1 – One-Variable Statistics (13 Days)

Date	*Lesson*	*Standards*
Getting to Know You		
___/___/___	L1: Getting to Know You	A1.SP.3
	Objectives: I can describe (orally and in writing) the difference between statistical and non-statistical questions. I can describe (orally and in writing) the distinctions between numerical and categorical data.	Vocabulary: categorical data, non-statistical question, numerical data, statistical question
___/___/___	L2: Data Representations*	A1.SP.1, A1.SP.2
	Objectives: I can create a dot plot, histogram, and box plot to represent numerical data. I can identify (in writing) the five-number summary that describes given statistical data. I can interpret a box plot that represents a data set.	Vocabulary: distribution, five-number summary
___/___/___	L3: A Gallery of Data	A1.SP.1, A1.SP.2
	Objective: I can create and critique graphical representations of student collected data.	
Distribution Shapes		
___/___/___	L4: The Shape of Distributions	A1.SP.1, A1.SP.2
	Objectives: I can describe the shape of a distribution using the terms "symmetric, skewed, uniform, bimodal, and bell-shaped." I can use a graphical representation of data to suggest a situation that produced the data pictured.	Vocabulary: bell-shaped distribution, bimodal distribution, skewed distribution, symmetric distribution, uniform distribution
___/___/___	L5: Calculating Measures of Center & Variability*	A1.SP.1, A1.SP.2
	Objective: I can calculate mean absolute deviation, interquartile range, mean, and median.	
Manipulating Data		
___/___/___	L10: The Effect of Extremes	A1.SP.1, A1.SP.2
	Objectives: I can see how statistics change with the data. I can describe how an extreme value will affect the mean and median.	

	I can use the shape of a distribution to compare the mean and median.	
___/___/___	L11: Comparing & Contrasting Data Distributions	A1.SP.1, A1.SP.2
	Objective: I can investigate variability using data displays and summary statistics. I can arrange data sets in order of variability given graphic representations.	
___/___/___	L14: Outliers	A1.SP.1, A1.SP.2
	Objectives: I can investigate outliers and how to deal with them. I can find values that are outliers, investigate their source, and figure out what to do with them. I can tell how an outlier will impact mean, median, IQR, or standard deviation.	Vocabulary: outlier
___/___/___	L15: Comparing Data Sets	A1.SP.1, A1.SP.2
	Objective I can compare statistics for data sets. I can compare and contrast situations using measures of center and measures of variability.	
___/___/___	**Summative**	

Unit 3 – Two Variable Statistics (12 Days)

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Date	*Lesson*	*Standards*
Two-way Tables		
___/___/___	L1: Two-way Tables	A1.SP.3
	Objective: I can calculate missing values in a two-way table. I can create a two-way table for categorical data given information in everyday language. I can describe what the values in a two-way table mean in everyday language.	Vocabulary: categorical variable, two-way table,
___/___/___	L2: Relative Frequency Tables	A1.SP.3
	Objective: I can calculate values in a relative frequency table and describe what the values mean in everyday language.	Vocabulary: categorical variable, relative frequency table, variable (statistics)
___/___/___	L3: Associations in Categorical Data	A1.SP.3
	Objective: I can look for patterns in two-way tables and relative frequency tables to see if there is a possible association between two variables.	Vocabulary: association
Scatterplots		
___/___/___	L4: Linear Models	A1.LFE.20
	Objectives: I can describe the rate of change and -intercept for a linear model in everyday language. I can draw a linear model that fits the data well and use the linear model to estimate values I want to find.	
___/___/___	L5: Fitting Lines	A1.LFE.20
	Objectives: I can describe the rate of change and -intercept for a linear model in everyday language. I can use technology to find the line of best fit.	
___/___/___	L6: Residuals	A1.LFE.21
	Objectives: I can plot and calculate residuals for a data set and use the information to judge whether a linear model is a good fit.	Vocabulary: residual
___/___/___	L7: The Correlation Coefficient	A1.LFE.21
	Objective:	Vocabulary: correlation coefficient

	I can describe the goodness of fit of a linear model using the correlation coefficient. I can match the correlation coefficient with a scatter plot and linear model.	
___/___/___	L8: Using the Correlation Coefficient	A1.LFE.21
	Objectives: I can describe the strength of a relationship between two variables. I can use technology to find the correlation coefficient and explain what the value tells me about a linear model in everyday language.	Vocabulary: negative relationship, positive relationship, strong relationship, weak relationship
___/___/___	L9: Casual Relationships	A1.LFE.22
	Objective: I can look for connections between two variables to analyze whether or not there is a causal relationship.	Vocabulary: causal relationship
___/___/___	**Summative Assessment**	

Linear Functions Unit (Added Unit) * New standards added to Algebra 1*

Date	*Lesson*	*Standards*
	Moved from 8th Grade 10 Days	
	Obejective: I can flexibly use different representations of a linear function, including graphs, tables and equations	A1.LFE.8
		Vocabulary: linear, function
___/___/___	Objective: I can calculate and Interpret rate of change of a linear function in a table, graph and equation in real world context and mathematical problems.	A1.LFE.9
		Vocabulary: rate of change
___/___/___	Objective: I can write linear equations that model the relationship between two quantities and produce a graph of the equation.	A1.LFE.15

___/___/___	Objective: I can graph linear functions expressed as an equation and show intercepts of the graph without technology	A1.LFE.16
	Objective: I can translate among equivalent forms of equations for linear functions, including standard, point-slope, and slope-intercept forms and recognize that each form reveals key features in a given context.	A1.LFE.10
		Vocabulary: standard, point-slope, slope intercept
___/___/___	Summative Assessment	

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Unit 2 – Linear Equations, Inequalities, and Systems

Date	*18 Days*	*Lesson*	*Standards*
___/___/___	Writing & Modeling with Equations	L2: Writing Equations to Model Relationships (Part 1)	A1.LFE.2
		Objectives: I can tell which quantities in a situation can vary and which ones cannot. I can use letters and numbers to write equations representing the relationships in a situation.	
___/___/___		L3: Writing Equations to Model Relationships (Part 2)	A1.LFE.2
		Objectives: I can use words and equations to describe the patterns I see in a table of values or in a set of calculations. When given a description of a situation, I can use representations like diagrams and tables to help make sense of the situation and write equations for it.	
___/___/___		L4: Equations & Their Solutions	A1.LFE.1, A1.LFE.2
		Objectives: I can explain what it means for a value or pair of values to be a solution to an equation. I can find solutions to equations by reasoning about a situation or by using algebra.	
___/___/___		L5: Equations & Their Graphs	A1.LFE.1, A1.LFE.2, A1.LFE.15
		Objectives: I can use graphing technology to graph linear equations and identify solutions to the equations. I understand how the coordinates of the points on the graph of a linear equation are related to the equation. When given the graph of a linear equation, I can explain the meaning of the points on the graph in terms of the situation it represents.	
___/___/___	Manipulating Equations & Understanding Their Structure	L6: Equivalent Equations	A1.LFE.3
		Objectives: I can tell whether two expressions are equivalent and explain why or why not.	Vocabulary: equivalent equations

		I know and can identify the moves that can be made to transform an equation into an equivalent one. I understand what it means for two equations to be equivalent and how equivalent equations can be used to describe the same situation in different ways.	
___/___/___		L7: Explaining Steps for Rewriting Equations	A1.LFE.3
		Objectives: I can explain why some algebraic moves create equivalent equations, but some do not. I know how equivalent equations are related to the steps of solving equations. I know what it means for an equation to have no solutions and can recognize such an equation.	
___/___/___		L8: Which Variable to Solve for? (Part 1)	A1.LFE.3
		Objectives: Given an equation, I can solve for a particular variable (like height, time, or length) when the equation would be more useful in that form. I know the meaning of the phrase “to solve for a variable.”	
___/___/___		L9: Which Variable to Solve for? (Part 2)	A1.LFE.3
		Objectives: I can write an equation to describe a situation that involves multiple quantities whose values are not known, and then solve the equation for a particular variable. I know how solving for a variable can be used to quickly calculate the values of that variable.	
___/___/___		L10: Connecting Equations to Graphs (Part 1)	A1.LFE.1,A1.LFE.16
		Objectives: I can describe the connections between an equation of the form , the features of its graph, and the rate of change in the situation. I can graph a linear equation of the form .	

		I understand that rewriting the equation for a line in different forms can make it easier to find certain kinds of information about the relationship and about the graph.	
___/___/___		L11: Connecting Equations to Graphs (Part 2)	A1.LFE.1,A1.LFE.16
		Objectives: I can find the slope and vertical intercept of a line with equation . I can take an equation of the form and rearrange it into the equivalent form . I can use a variety of strategies to find the slope and vertical intercept of the graph of a linear equation given in different forms.	
___/___/___	Systems of Linear Equations in Two Variables	L12: Writing & Graphing Systems of Linear Equations	A1.LFE.11
		Objectives: I can explain what we mean by "the solution to a system of linear equations" and can explain how the solution is represented graphically. I can explain what we mean when we refer to two equations as a system of equations. I can use tables and graphs to solve systems of equations.	Vocabulary: solution to a system of equations, system of equations
___/___/___		L13: Solving Systems by Substitution	A1.LFE.11
		Objectives: I can solve systems of equations by substituting a variable or an expression. I know more than one way to perform substitution and can decide which way or what to substitute based on how the given equations are written.	Vocabulary: substitution
___/___/___		L14: Solving Systems by Elimination (Part 1)	A1.LFE.11
		Objectives: I can solve systems of equations by adding or subtracting them to eliminate a variable. I know that adding or subtracting equations in a system creates a new equation, where one of the solutions to this equation is the solution to the system.	Vocabulary: elimination

___/___/___		L15: Solving Systems by Elimination (Part 2)	A1.LFE.11
		Objectives: I can explain why adding or subtracting two equations that share a solution results in a new equation that also shares the same solution.	
___/___/___		L16: Solving Systems by Elimination (Part 3)	A1.LFE.11
		Objectives: I can solve systems of equations by multiplying each side of one or both equations by a factor, then adding or subtracting the equations to eliminate a variable. I understand that multiplying each side of an equation by a factor creates an equivalent equation whose graph and solutions are the same as that of the original equation.	Vocabulary: equivalent systems
Date	*15 Days*	*Lesson*	*Standards*
___/___/___	Linear Inequalities in One Variable	L18: Representing Situations with Inequalities	A1.LFE.1
		Objectives: I can write inequalities that represent the constraints in a situation.	
___/___/___		L19: Solutions to Inequalities	A1.LFE.1, A1.LFE.4
		Objectives: I can graph the solution to an inequality in one variable. I can solve one-variable inequalities and interpret the solutions in terms of the situation. I understand that the solution to an inequality is a range of values (such as) that make the inequality true.	
___/___/___		L20: Writing & Solving Inequalities in One Variable	A1.LFE.1, A1.LFE.4
		Objectives: I can analyze the structure of an inequality in one variable to help determine if the solution is greater or less than the solution to the related equation.	

		I can write and solve inequalities to answer questions about a situation.	
___/___/___	Linear Inequalities in Two Variables	L21: Graphing Linear Inequalities in Two Variables (Part 1)	A1.LFE.14
		Objectives: Given a two-variable inequality and the graph of the related equation, I can determine which side of the line the solutions to the inequality will fall. I can describe the graph that represents the solutions to a linear inequality in two variables.	
___/___/___		L22: Graphing Linear Inequalities in Two Variables (Part 2)	A1.LFE.14
		Objectives: Given a two-variable inequality that represents a situation, I can interpret points in the coordinate plane and decide if they are solutions to the inequality. I can find the solutions to a two-variable inequality by using the graph of a related two-variable equation. I can write inequalities to describe the constraints in a situation.	
___/___/___		L23: Solving Problems with Inequalities in Two Variables	A1.LFE.14
		Objectives: I can use graphing technology to find the solution to a two-variable inequality. When given inequalities, graphs, and descriptions that represent the constraints in a situation, I can connect the different representations and interpret them in terms of the situation.	
___/___/___	Systems of Linear Inequalities in Two Variables	L24: Solutions to Systems of Linear Inequalities in Two Variables	A1.LFE.14
		Objectives: I can write a system of inequalities to describe a situation, find the solution by graphing, and interpret points in the solution. I know what is meant by "the solutions to	Vocabulary: solutions to a system of inequalities

		a system of inequalities" and can describe the graphs that represent the solutions. When given descriptions and graphs that represent two different constraints, I can find values that satisfy each constraint individually, and values that satisfy both constraints at once.	
___/___/___		L25: Solving Problems with Systems of Linear Inequalities in Two Variables	A1.LFE.14
		Objectives: I can explain how to tell if a point on the boundary of the graph of the solutions to a system of inequalities is a solution or not.	
___/___/___		L26: Modeling with Systems of Inequalities in Two Variables	A1.LFE.14
		Objectives: I can interpret inequalities and graphs in a mathematical model. I know how to choose variables, specify the constraints, and write inequalities to create a mathematical model.	
___/___/___	Part B Summative Assessment		

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Unit 4 – Functions

Date	*16 Days*	*Lesson*	*Standards*
___/___/___	Functions & Their Representations	L2: Function Notation	A1.FN.1,A1.FN.2
		Objectives: I can use function notation to express functions that have specific inputs and outputs. I understand what function notation is and why it exists. When given a statement written in function notation, I can explain what it means in terms of a situation.	Vocabulary: function notation
___/___/___		L3: Interpreting & Using Function Notation	A1.FN.1,A1.FN.2
		Objectives: I can describe the connections between a statement in function notation and the graph of the function. I can use function notation to efficiently represent a relationship between two quantities in a situation. I can use statements in function notation to sketch a graph of a function.	
___/___/___		L4: Using Function Notation to Describe Rules (Part 1)	A1.FN.1,A1.FN.2
		Objectives: I can make sense of rules of functions when they are written in function notation, and create tables and graphs to represent the functions. I can write equations that represent the rules of functions.	
___/___/___		L5: Using Function Notation to Describe Rules (Part 2)*	A1.FN.1,A1.FN.2
		Objectives: I can use technology to graph a function given in function notation, and use the graph to find the values of the function. I know different ways to find the value of a function and to solve equations written in function notation. I know what makes a function a linear function.	Vocabulary: linear function
___/___/___	Analyzing & Creating Graphs	L6: Features of Graphs	A1.FN.3
		Objectives:	decreasing (function), horizontal intercept,

	of Functions	I can identify important features of graphs of functions and explain what they mean in the situations represented. I understand and can use the terms "horizontal intercept," "vertical intercept," "maximum," and "minimum" when talking about functions and their graphs.	increasing (function), maximum, minimum, vertical intercept
___/___/___		L7: Using Graphs to Find Average Rate of Change	A1.FN.3, A1.LFE.9
		Objective: I understand the meaning of the term "average rate of change." When given a graph of a function, I can estimate or calculate the average rate of change between two points.	Vocabulary: average rate of change
___/___/___		L8: Interpreting & Creating Graphs	A1.FN.3, A1.LFE.9
		Objective: I can explain the average rate of change of a function in terms of a situation. I can make sense of important features of a graph and explain what they mean in a situation. When given a description or a visual representation of a situation, I can sketch a graph that shows important features of the situation.	
___/___/___		L9: Comparing Graphs	A1.FN.3, A1.LFE.9
		Objective: I can compare the features of graphs of functions and explain what they mean in the situations represented. I can make sense of an equation of the form in terms of a situation and a graph, and know how to find the solutions. I can make sense of statements about two or more functions when they are written in function notation.	
___/___/___	A Closer Look at Inputs & Outputs	L10: Domain & Range (Part 1)	A1.LFE.5,A1.LFE.6
		Objective: I know what is meant by the "domain" and "range" of a function. When given a description of a function in a situation, I can determine reasonable domain and range for the function.	Vocabulary domain, range
___/___/___		L11: Domain & Range (Part 2)	A1.LIFE.5,A1.LFE.6
		Obejctive:	

		When given a description of a function in a situation, I can determine reasonable domain and range for the function.	
___/___/___		L13: Absolute Value Functions (part 1)	A1.LFE.5,A1.LFE.6, A1.LFE.7
		Objective: Given a set of numerical guesses and a target number, I can calculate absolute errors and create a scatter plot of the data. I can analyze and describe features of a scatter plot that shows absolute error data. I can describe the general relationship between guesses and absolute errors using words or equations.	Vocabulary: absolute value
___/___/___		L14: Absolute Value Functions (part 2)	A1.LFE.5,A1.LFE.6, A1.LFE.7
		Objective: I can describe the effects of adding a number to the expression that defines an absolute value function. I can explain the meaning of absolute value function in terms of distance. When given an absolute value function in words or in function notation, I can make sense of it, and can create a table of values and a graph to represent it.	
		Added- Graph absolute value functions expressed as an equation with and without technology, showing intercepts and end behavior	A1.LFE.17
___/___/___	Summative Assessment		

Polynomials, Roots, and Exponent Laws Unit (Added Unit)

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Date	*10 Days* *Lessons*	*Standards*
	Add, subtract, and multiply polynomials; compare the system of polynomials to the system of integers when performing operations.	A1.EX.1
		Vocabulary: polynomials, integers
___/___/___	Simplify and perform operations with radical expressions without variables; rationalizing denominators should not include conjugates	A1.EX.2
		Vocabulary: radical expressions, variables, denominators, conjugates
___/___/___	Simplify algebraic expressions using the laws of exponents.	A1.EX.3
		Vocabulary: Laws of Exponents
___/___/___	Interpret the parts of expressions such as terms, factors, and coefficients in terms of a real-world context.	A1.EX.4
		Vocabulary: terms, factors, coefficients
___/___/___	Summative Assessment	

Unit 5 – Introduction to Exponential Functions

Essential Standard: A1.EFE.2: Represent real-world problems (growth, decay, and compound interest), using exponential equations.
Supporting Standard: A1.FN.6: Compare the growth pattern of exponential to linear or quadratic functions using graphs and tables and recognize how exponential growth exceeds other functions. A1.EFE.1: Represent and solve real-world problems, using exponential equations in one variable.

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A1.EFE.3: Construct exponential equations from geometric sequences with and without contex.
A1.EFE.4: Determine the domain and range of exponential functions in mathematical problems.
A1.EFE.5: Determine reasonable domain and range values of exponential functions representing real-world situations, both continuous and discrete; interpret the solution as reasonable or unreasonable in context.
A1.EFE.7: Flexibly use different representations of an exponential function, including graphs, tables, and equations.
A1.EFE.8: Interpret the quantities in an exponential equation in the context of a real-world problem, including growth, decay, and compound interest.
A1.EFE.9: Graph exponential functions that model real-world problems (growth, decay, and compound interest), showing key attributes.
A1.EFE.10: Write exponential functions that provide a reasonable fit to data and use them to make predictions with technology

Date	*12 Days*	*Lesson*	*Standards*
		A1.EFE.1: Represent and solve real-world problems, using exponential equations in one variable.	Vocabulary: exponential equations
		A1.EFE.3: Construct exponential equations from geometric sequences with and without contex.	Vocabulary: Geometric Sequence
		A1.EFE.4: Determine the domain and range of exponential functions in mathematical problems.	
		A1.EFE.5: Determine reasonable domain and range values of exponential functions representing real-world situations, both continuous and discrete; interpret the solution as reasonable or unreasonable in context.	Vocabulary: discrete, reasonable, unreasonable
		A1.FN.6: Compare the growth pattern of exponential to linear or quadratic functions using graphs and tables and recognize how exponential growth exceeds other functions.	Vocabulary: Quadratic Functions, exponential growth

		A1.EFE.7: Flexibly use different representations of an exponential function, including graphs, tables, and equations.	
		A1.EFE.2: Represent real-world problems (growth, decay, and compound interest), using exponential equations.	Vocabulary: growth, decay, compound interest, exponential equations
		A1.EFE.8: Interpret the quantities in an exponential equation in the context of a real-world problem, including growth, decay, and compound interest.	
		A1.EFE.9: Graph exponential functions that model real-world problems (growth, decay, and compound interest), showing key attributes.	Vocabulary: Key attributes
		A1.EFE.10: Write exponential functions that provide a reasonable fit to data and use them to make predictions with technology	
		Review for Summative	
___/___/___	Summative Assessment		

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Unit 6 – Quadratics

Essential Standard: A1.QFE.3: Solve quadratic equations with real number solutions, containing one variable, including those with variables on both sides of the equal sign. Equations should be solved by: • Graphing, • Factoring (including perfect square trinomials and difference of squares binomials), • Using the quadratic formula, • Completing the square, or • Taking the square root.
Supporting Standards: A1.QFE.1: Represent and solve real-world problems using quadratic expressions and equations in one variable. A1.QFE.2: Write quadratic equations with real number solutions that model the relationship between two quantities and produce a graph of the equation. A1.QFE.4: Determine the domain and range of quadratic functions in mathematical problems. A1.QFE.5: Determine reasonable domain and range values of quadratic functions representing real-world situations, both continuous and discrete; interpret the solution as reasonable or unreasonable in context. A1.QFE.6: Interpret the key features of a quadratic function that models a relationship between two quantities in a given context. A1.QFE.7: Flexibly use different representations of a quadratic function, including graphs, tables, and equations. A1.QFE.8: Explain how each form of a quadratic expression (standard, factored, and vertex form) identifies different key attributes, using the different forms to interpret quantities in context. A1.QFE.9: Use factoring and completing the square to create equivalent forms of quadratic functions to reveal key attributes.

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A1.QFE.10: Graph quadratic functions given as an equation or in function notation, labeling key attributes, without technology. A1.QFE.11: Graph and describe the effect of transformations on quadratic functions. • Transformations include: stretches, compressions, vertical, and horizontal A1.QFE.12: Given the graph of a quadratic function, explain the effects of the transformation from the parent function, $y = x\ 2$.
A1.QFE.13: Write quadratic functions that provide a reasonable fit to data and use them to make predictions with technology.

Date	*18 Days*	*Lesson*	*Vocabulary*
		I can represent and solve real world problems using a quadratic expressions and equation.	
		I can identify key features of a quadratic expression (standard, factored and vertex) using the various forms.	Vocabulary: standard, factored, vertex
		I can solve quadratic equations using the various methods: graphing	
		I can solve quadratic equations using the various methods: graphing	
		I can solve quadratic equations using the various methods: factoring	Vocabulary: factoring
		I can solve quadratic equations using the various methods: factoring	
		I can solve quadratic equations using the various methods: factoring	
		I can solve quadratic equations using the various methods: completing the square	Vocabulary: completing the square
		I can solve quadratic equations using the various methods: completing the square	
		I can solve quadratic equations using the various methods: completing the square	

		I can solve quadratic equations using the various methods: taking the square root.	Vocabulary: square root
		I can solve quadratic equations using the various methods: taking the square root.	
		I can solve quadratic equations using the various methods: taking the square root.	
		I can solve quadratic equations using the various methods: quadratic formula	Vocabulary: quadratic formula
		I can solve quadratic equations using the various methods: quadratic formula	
		I can solve quadratic equations using the various methods: quadratic formula	
		Review for Summative	
___/___/___	Summative Assessment		