Functions

Weeks	CCSS	Learning Goals	Skills /Vocabulary	Formative/Summative Assessment	Resources
	F.IF.1 Understand that a function from one set to another set 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). Practices: 6. Attend to precision. 7. Look for and make use of structure.	I can define relation, domain, and range.	Domain, range, function, relation, input, output, element, function notation		Emaths: Function Family Posters (include a recursive category) Text: 1.6, 1.7 and Extension on pg 49 Nspire: math-npired.com: Function or Not a Function, Domain and Range, Function Notation
		I can define a function as a relation in which each input (domain) has exactly one output (range).			
		I can determine if stated rules represent a function.			
		I can explain that x represents the input and f(x) represents the output of a function.			
		I can explain that other letters can be used to represent functions.			
		I can explain that the graph of *f* if the graph of the equation y = f(x).			
	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. Practices: 7. Look for and make use of structure.	I can decode function notation and explain how the output of a function is matched to its input.	function, function notation, domain, order of operations, input, output		
		I can use order of operations to evaluate a function for a given domain value.			
	F.IF.3 Recognize that sequences are functions, sometimes defined recursively, whose domain is a subset of the integers.	I can convert a list of numbers (a sequence) into a function by making the whole numbers the inputs and the elements of the sequence the outputs.	function, domain, range, integers, sequence, explicity formula, recursive formula		

	Practices: 2. Reason abstractly and quantitatively. 7. Look for and make use of structure. 8. Look for and express regularity in repeated reasoning.	I can explain that a recursive formula tells me how a sequence starts and tells me how to use the previous value to generate the next element of the sequence.			
		I can explain that an explicit formula allows me to find any element of a sequence without knowing the element before it.			
		I can distinguish between explicit and recursive formulas for sequences.			
		I can explain how the domain of a function is represented in its graph.	function, domain		
		I can state the appropriate domain of a function that represents a problem situation, defend my choice, and explain why other numbers might be excluded from the domain.			

Statistics

Weeks	CCSS	Essential Questions	Skills /Vocabulary	Formative/Summative Assessment	Resources
	S.ID.1 Represent data with plots on the real number line (dot plots, histograms, and box plots). Practices: 1. Make sense of problems and persevere in solving them 5. Use appropriate tools strategically.	I can choose the best representation (dot plot, histogram, box plot) for a set of data.	dot plot, histogram, box plot, 5-number summary, median, lower quartile, upperquartile, minimum value, maximum value, data, frequency, interval, scale		CMP: Samples and Populations, Investigation 1
		I can decide if a representation preserves all the data values or presents only the general characteristics of a data set.			Text: 13.7, 13.8
		Dot plot: I can choose the appropriate scale to represent data on a number line. I can construct a dot plot for a set of data.			
		Histogram: I can construct a histogram for a set of data.			
		Box plot: I can calculate the 5 number summary for a set of data.			
		I can construct a box plot based on the 5 number summary.			
	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. Practices: 1. Make sense of problems	I can describe the center of the data distribution (mean or median).	Distribution, shape, center, spread, median, mean, interquartile range, standard deviation, data, data distribution, scale		http://dnet01.ode.state.oh.us/ims.itemdetails/lessondetail.aspx?id=0907f84c80530fc7 http://en.wikipedia.org/wiki/Frequency_distribution
		I can choose the histogram with the largest mean when shown several histograms.			
		I can describe the spread of the data distribution (interquartile range or standard deviation).			

	and persevere in solving them. 5. Use appropriate tools strategically.				Text 13.6
		I can choose the histogram with the greatest standard deviation when shown several histograms.			
		I can choose the box and whisker plot with the greatest interquartile range when shown several box-and-whisker plots.			
		I can compare the distributions of two or more data sets by examining their shapes, centers, and spreads when drawn on the same scale.			
	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). Practices: 1. Make sense of problems and persevere in solving them. 5. Use appropriate tools strategically.	I can interpret the differences in the shape, center, and spread of a data set in the context of a problem.	shape, enter, spread, data set, distribution, outlier		
		I can identify outliers for the data set.			
		I can predict the effect an outlier will have on the shape, center, and spread of a data set.			
		I can decide whether to include the outliers as part of the data set or to remove them.			

	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. Practices: 2. Reason abstractly and quantitatively.	I can read and interpret the data displayed in a two-way frequency table.	data, two-way frequency table, percentages, ratios, relative frequencies, joint relative frequency, marginal relative frequency, conditional relative frequncy, bar chart, pie chart, patterns, associations, variables		
		I can write clear summaries of data displayed in a two-way frequency table.			
		I can calculate percentages using the ratios in a two-way frequency table to yield relative frequencies.			
		I can calculate joint, marginal, and conditional relative frequencies.			
		I can interpret and explain the meaning of relative frequencies in the context of a problem			
		I can make appropriate displays of joint, marginal, and conditional distributions (eg, bar chart, pie chart).			
		I can describe patterns observed in the data.			
		I can recognize the association between two variables by comparing conditional and marginal percentages.			

Linear

Weeks	CCSS	Essential Questions	Skills /Vocabulary	Formative/Summative Assessment	Resources
	N.Q.1 Use units as a way to understand problems and to guide the solution of multi-step problems; choose and interpret units in formulas; choose and interpret the scale and the origin in graphs and data displays. Practices: 2. Reason abstractly and quantitatively. 3. Construct viable arguments and critique the reasoning of others.	I can label units through multiple steps of a problem.	scale, origin		Emaths: Filling a Swimming Pool, Cellular Telephones, Miles to Your Destination A4A: Marching in Place
		I can choose appropriate units for real world problems involving formulas.			
		I can choose an appropriate scale and origin for graphs and data displays.			
		I can interpret the scale and origin for graphs and data displays.			
	N.Q.2 Define appropriate quantities for the purpose of descriptive modeling. Practices: 2. Reason abstractly and quantitatively. 3. Construct viable arguments and critique the reasoning of others.	I can identify the variables or quantities of significance from the data provided.	descriptive model		
		I can identify or choose the appropriate unit of measure for each variable of quantity.			
	N.Q.3 Choose a level of accuracy appropriate to limitations on measurement when reporting quantities. Practices: 5. Use appropriate tools strategically. 6. Attend to precision.	I can report measured quantities in a way that is reasonable for the tool used to make the measurement.	accuracy		
		I can report calculated quantities using the same level of accuracy as used in the problem statement.			
	A.CED.1 Create equations and inequalities in one variable and use them to solve	I can identify the variables and quantities represented in a real-world problem.	Linear		

	problems. Include equations arising from linear and quadratic functions, and simple rational and exponential functions. Practices: 4. Model with mathematics.	I can determine the best model for the real-world problem (linear, quadratic, exponential, or rational)			
		I can write the equation that best models the problem.			
		I can solve the equation.			
		I can interpret the solution in the context of the problem.			
	A.CED.2 Create equations in two or more variables to represent relationships between quantities; graph equations on coordinate axes with labels and scales. Practices: 4. Model with mathematics.	I can identify the variables and quantities represented in a real-world problem.	Linear, coordinate axes, scale, labels		
		I can determine the best model for the real-world problem (linear, quadratic, exponential, or rational)			
		I can write the equation that best models the problem.			
		I can set up coordinate axes using an appropriate scale and label the axes.			
		I can graph equations on coordinate axes with appropriate labels and scales.			
	F.IF.5 Relate the domain of a function to its graph and, where applicable, to the quantitative relationship it describes. Practices: 4. Model with mathematics.	I can explain how the domain of a function is represented in its graph.	Function, domain		
		I can state the appropriate domain of a function that represents a problem situation, defend my choice, and explain why other numbers might be excluded from the domain.			
	A.CED.3 Represent constraints by equations or inequalities, and by systems of equations	I can identify the variables and quantities represented in a real-world problem.	constraints, linear, coordinate axes, labels, solutions		

	and/or inequalities, and interpret solutions as viable or non-viable options in a modeling context. Practices: 4. Model with mathematics.	I can interpret solutions in the context of the situation modeled and decide if they are reasonable.			
	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. Practices: 4. Model with mathematics.	I can apply order of operations and inverse operations to solve equations.			Text: 3.1-3.4 (Include story problems and solve using graphs and tables as well by solving equations)
		I can construct an argument to justify my solution process.			
	A.CED.4 Rearrange formulas to highlight a quantity of interest, using the same reasoning as in solving equations. Practices: 4. Model with mathematics.	I can solve formulas for a specified variable.			Text 3.8
	A.REI.3 Solve linear equations and inequalities in one variable, including equations	I can solve linear equation in one variable including equation with coefficients represented by letters.	coefficient, linear inequality, linear equation		Text 6.1-6.3 (make sure to include story problems)

	with coefficients represented by letters. Practices: 5. Use appropriate tools strategically. 7. Look for and make use of structure.	I can solve linear inequalities in one variable including inequalities with coefficients represented by letters.			

Graphing Linear

Weeks	CCSS	Essential Questions	Skills /Vocabulary	Formative/Summative Assessment	Resources
	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). Practices: 2. Reason abstractly and quantitatively.	I can explain that every point (x,y) on the graph of an equation represents values x and y that make the equation true.	None		Text: 4.1
		I can verify that any point on a graph will result in a true equation when their coordinates are substituted into the equation.			Text: 4.2
	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). Practices: 6. Attend to precision. 7. Look for and make use of structure.	I can define relation, domain, and range.	Domain, range, function, relation, input, output, element, function notation		4.1, 4.7
		I can define a function as a relation in which each input (domain) has exactly one output (range).			
		I can determine if stated rules represent a function.			
		I can explain that x represents the input and f(x) represents the output of a function.			
		I can explain that other letters can be used to represent functions.			
		I can explain that the graph of *f* if the graph of the equation y = f(x).			

	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. Practices: 1. Make sense of problems and persevere in solving them. 7. Look for and make use of structure. 8. Look for and express regularity in repeated reasoning.	For a function that models a relationship between two quantities, I can interpret key features of graphs and tables in terms of the quantities	x-intercept, y-intercept, slope		4.2-4.5
		I can sketch graphs showing key features given a verbal description of the relationship.			
	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. 4. Model with mathematics. 5. Use appropriate tools strategically.	I can define interval, rate of change, and average rate of change.			Text 4.4
		I can explain the connections between average rate of change and the slope formula.			
		I can calculate the average rate of change of a function, represented either by function notation, a graph, or a table, over a specific input interval.			
		I can compare the rates of change of two or more functions when they are represented with function notation, with a graph, or with a table.			
		I can interpret the meaning of the average rate of change (using units) as it relates to a ral-world problem.			

	F.IF.9 Compare properties of two functions each represented in a different way (algebraically, graphically, numerically in tables, or by verbal descriptions). Practices: 7. Look for and make use of structure.	I can compare properties of two functions when represented in different ways (algebraically, graphically, numerically in tables, or by verbal descriptions.)			
	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. Practices: 7. Look for and make use of structure. 8. Look for and express regularity in repeated reasoning.	I can identify that the parent function for lines is the line f(x) =x.	evaluate, function, domain, input, equation, parent function, transformation, slope, x-intercept, y-intercept, linear function, coordinate plane		Text: 4.2-4.5, 4.7 (continue doing story problems)
		I can identify the point-slope of a linear function as $y-y_1 = m(x - x_1)$.			
		I can graph a line in point-slope form of a linear function as $y - y_1=m(x-x_1)$.			
		I can graph a line in point-slope form and use the graph to show where the starting point (x_1, y_1).			
		I can identify the slope-intercept form and use the graph to show where the y-intercept (b) and the slope (m) are represented on the graph.			
		I can identify the standard form of a linear functions Ax +By = C.			
		I can use the definitions of x-intercept and y-intercept to find the intercepts of a standard form line and graph the line.			
	F.LE.5 Interpret the parameters in a linear or exponential function in terms	I can identify the names and definitions of the parameters *m* and *b* in the linear function f(x) = mx + b.			Text4.4-4.5

	of a context. Practices: 1. Reason abstractly and quantitatively. 4. Model with mathematics.	I can explain the meaning (using appropriate units) of the slope of a line when the line models a real-world relationship.			
		I can explain the meaning (using appropriate units) of the slope of a line when the line models a real-world relationship.			
		I can compose an original problem situation and construct a linear function to model it.			
		I can verify that any point of a graph will result in a true equation when their coordinates are substituted into the equation.			
	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. Practices: 7. Look for and make use of structure.	I can decode function notation (give a verbal description of the rule.)	Function, function notation, domain, order of operations, input, output		Text: 4.7
		I can convert a table, graph, set of ordered pairs, or verbal description into function notation by identifying the rule.			
		I can use order of operations to evaluate a function for a given input.			
		I can identify numbers that could not be included in a domain.			
		I can choose inputs that make sense based on a problem situation.			
		I can analyze the input and output values of a function based on a problem situation.			

	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. Practices: 5. Use appropriate tools strategically. 7. Look for and make use of structure.	I can explain why f(x) + k translates the original graph of f(x) up k units and why f(x) – k translates the original graph of f(x) down k units.	function, translate		Text: 4.7
		I can explain why f(x+k) translates the original graph of f(x) left k units and why f(x-k) translates the original graph of f(x) right k units.			
		I can describe the transformation that changed a graph of f(x) into a different graph when given pictures of the pre-image and image.			
		I can determine the value of k given the graph of a transformed function.			
		I can graph the listed transformations when given a graph of f(x) and a value of k.			
		I can use a graphing calculator to generate examples of functions with different *k* values.			
		I can analyze the similarities and differences between functions with different *k* values.			

Writing Linear Equations

Weeks	CCSS	Essential Questions	Skills /Vocabulary	Formative/Summative Assessment	Resources
	F.BF.1 Write a function that describes a relationship between two quantities. Practices: 4. Model with mathematics. 7. Look for and make use of structure.	I can define explicit and recursive expressions of a function.	quantity, function, parent function, transformation, composition of functions		Story problems not yet used.
		I can identify the quantities being compared in a real-world problem.			
		I can write an explicit and/or recursive expression of a function to describe a real world problem.			
	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. Practices: 4. Model with mathematics. 5. Look for and make use of structure.	I can explain that a recursive formula tells me how a sequence starts and tells me how to use the previous value to generate the next element of the sequence.	arithmetic sequence, recursive formula, explicit formula, common difference, term		Extension after 5.3
		I can explain that an explicit formula allows me to find any element of a sequence without knowing the element before it.			
		I can distinguish between explicit and recursive formulas for sequences.			
		I can determine the common difference between two terms in an arithmetic sequence.			
		I can write a recursive formula for a sequence.			
		I can explain why the recursive formula for an arithmetic sequence uses addition and why the explicit formula uses multiplication.			
		I can translate between the recursie and explicit forms of arithmetic sequences.			

Writing Linear Equations

	F.LE.2 Construct linear functions, including arithmetic sequences, given a graph, a description of a relationship, or two input-output pairs (include reading these from a table). Practices: 2. Reason abstractly and quantitatively. 7. Look for and make use of structure. 8. Look for and express regularity in repeated reasoning.	I can construct a linear function from an arithmetic sequence, graph, table of values, or a description of the relationship.	linear function		Text: 5.1-5.4 and extension after 5.3
		I can describe the algebraic process used to construct the linear function that passes through two given points.			
	G.GPE.5 Prove the slope criteria for parallel and perpendicular lines and uses 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). Practices: 3. Construct viable arguments and critique the reasoning of others. 8. Look for and express regularity in repeated reasoning.	I can determine the slopes of two parallel lines and show they have the same slope using specific examples.	Slope, parallel, perpendicular, linear equation, slope-intercept form, point-slope form		Text 5.5
		I can state that parallel lines have the same slope.			
		I can determine if lines are parallel using their slopes.			
		I can write an equation for a line that is parallel to a given line that passes through a given point.			
		I can determine the slope of two perpendicular lines and show they have the opposite reciprocal slopes using specific examples.			
		I can state that perpendicular lines have the opposite reciprocal slopes.			
		I can determine If lines are perpendicular using their slopes.			

		I can write an equation for a line that is perpendicular to a given line that passes through a given point.			
	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. Emphasize linear and exponential models. b. Informally assess the fit of a function by plotting and analyzing residuals. c. Fit a linear function for a scatter plot that suggests a linear association. 2. Reason abstractly and quantitatively. 4. Model with mathematics.	I can explain that scatter plots can only be used to represent quantitative variables.	scatter plot, quantitative variable, independent variable, dependent variable, scale, direction, form, strength, outliers, linear, quadratic, exponential, models, data set, function of best fit, line of best fit, residuals, y=mx+b		EMATHS: Cricket Chirps Text: 5.6 and 5.7
		I can identify the independent variable and dependent variable and describe the relationship of the variables.			
		I can construct a scatter plot with an appropriate scale.			
		I can identify any outliers on the scatter plot.			
	S.ID.7 Interpret the slope (rate of change) and the intercept (constant term) of a linear	I can interpret the meaning of the slope in terms of the units stated in the data.	slope, y-int, linear equation, linear model, units, data		

	model in the context of the data. Practices: 2. Reason abstractly and quantitatively. 4. Model with mathematics. 5. Use appropriate tools strategically.	I can interpret the meaning of the y-int in terms of the units stated in the data.			
	S.ID.8 Compute (using technology) and interpret the correlation coefficient of a linear fit. Practices: 4. Model with mathematics. 5. Use appropriate tools strategically.	I can explain that correlation coefficient applies only to quantitative variables and linear models of best fit.	correlation coefficient, quantitative variable, linear model of best fit, significance		
		I can explain that the correlation coefficient must be between -1 and 1 inclusive and explain what each of these values means.			
		I can explain the correlation coefficient as a measure of the "goodness of a linear fit."			
		I can compute the correlation coefficient (r) using technology.			
		I can use the correlation coefficient to interpret the linear model in terms of its sign and it magnitude.			
		I can use the correlation coefficient to determine if a linear model is a good fit for the data.			
	S.ID.9 Distinguish between correlation and causation. Practices: 2. Reason abstractly and	I can recognize that correlation does not imply causation and that causation is not illustrated on a scatter plot.	correlation, causation, scatter plot		

	quantitatively. 3. Construct viable arguments and critique the reasoning of others. 4. Model with mathematics.	I can choose two variables that could be correlated even though neither variable could reasonably be considered to be the cause of the other and defend my selection.			
		I can determine if statements of causation seem reasonable or unreasonable and defend my opinion.			

Solving Systems

Weeks	CCSS	Learning Goals	Skills /Vocabulary	Formative/Summative Assessment	Resources
	A.REI.6 Solve systems of linear equations exactly and approximately (e.g., with graphs), focusing on pairs of linear equations in two variables. Practices: 7. Look for and make use of structure.	I can define system of linear equations and solution of a system.	system of linear equations, solution of a system, substitution method, elimination method, intersection		Text: 7.1 - 7.5 EMATHS: School of Rock, Break Even Analysis for Small Business, Canoe Shop
		I can explain why some linear systems have no solutions and identify linear systems that have no solution.			
		I can explain why some linear systems have infinitely many solutions and identify linear systems that have infinitely many solutions.			
		I can solve a system of linear equations algebraically (by substitution or elimination) to find an exact solution.			
		I can graph a linear equation on the coordinate plane.			
		I can determine the approximate solution of a system of linear equations by graphing both equations and estimating the point of intersection.			
	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. Practices: 5. Use appropriate tools strategically.	I can define linear inequality, half-plane, and boundary.	system of linear inequalities, solution, half-plane, boundary, intersection, coordinate plane, linear inequality		Text: 7.6
		I can graph a linear inequality on a coordinate plane, resulting in a boundary line (solid or dashed) and a shaded half-plane.			
		I can graph a system of linear inequalities on a coordinate plane.			
		I can explain that the solution set for a system of linear inequalities is the intersection of the shaded region of both inequalities.			

		I can check points in the intersection of the half-planes to verify that they represent a solution to the system.			
	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. Practices: 3. Construct viable arguments and critique the reasoning of others.	I can define system of equations.	system of equations, equivalent equations, elimination method		Text: 7.3-7.4
		I can recall that equivalent equations result when an equation is multiplies by the same number on both sides of the equal sign.			
		I can solve a system of two equations in two variables by elimination.			

Quadratics

Weeks	CCSS	Essential Questions	Skills /Vocabulary	Formative/Summative Assessment	Resources
	A.CED.1 Create equations and inequalities in one variable and use them to solve problems. Practices: 4. Model with mathematics.	I can identify the variables and quantities represented in a real world problem.	exponential		CMP 1. Frogs Fleas Investigations 1.1, 1.2, 1.3, 2.1, 2.2, 2.3 2. Algebra Book: Section 9.2, 9.3 3. Frogs Fleas Investigation: 2.4 4. Algebra Book: Section 9.5 5. Frogs Fleas Investigation: 2.5 6. Algebra Book: 10.3 7. Algebra Book: 10.4, 10,5, and 10.6 Optional: Emaths: Modeling Curves, Stopping Distance, Theater Problem, Looking at First and Second Differences of Quadratic Functions, Multiplying Binomials, Finding the Lines, TI: Fencing the
		I can determine the best model for the real-world problem.			
		I can write the equation or inequality that best models the problem.			
		I can solve the equation or inequality.			
		I can interpret the solution in the context of the problem.			
	A.CED.2 Create equations in two or more variables to represent relationships between quantities; graph equations on coordinate axes with labels and scales. Practices: 4. Model with mathematics.	I can identify the variables and quantities represented in a real world problem.	linear, quadratic, coordinate axes, scale, labels		
		I can determine the best model for the real-world problem.			
		I can write the equation that best models the problem.			
		I can set up coordinate axes using an appropriate scale and label the axes.			
		I can graph equations on coordinate axes with appropriate labels and scales.			
	F.BF.1 Write a function that describes a relationship between two quantities. a. Determine an explicit	I can define explicit and recursive expressions of a function.			
		I can identify the quantities being compared ina real-world problem.			

	expression, a recursive process, or steps for calculation from a context. Practices: 4. Model with mathematics. 7. Look for and make use of structure.	I can write explicit and/or recursive expressions of a function to describe a real-world problem.			Yard, Zeroes of a Quadratic Function A4A: Virtual Algebra Tiles
	A.SSE.3 Choose and produce an equivalent form of an expression to reveal and explain properties of the quantity represented by the expression. a. Factor a quadratic expression to reveal the zeros of the function it defines. Practices: 7. Look for and make use of structure.	I can factor a quadratic expression to find the zeroes of the function it represents.	quadratic expression, quadratic equation, zeros, perfect-square trinomials, complete the square, function, maximum, minimum		
		I can identify and factor perfect square trinomials.			
		I can complete the square to rewrite a quadratic expression from standard to vertex form.			
		I can predict whether a quadratic will have a minimum or a maximum.			
		I can identify the max or min of a quadratic.			
	F.IF.8 Write a function defined by an expression in different but equivalent forms to reveal and explain different properties of the function. 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. Practices:	I can give a quadratic function in its three forms: standard, vertex, and factored.	factor, polynomial, quadratic function, vertex form, complete the square, vertex, extreme value, axis of symmetry, intercept form, zero		
		I can find the x-intercepts given the equation.			
		I can explain that the graph of a quadratic function is a parabola.			
		I can use the x-intercepts fof a quadratic to find the axis of symmetry.			
		I can use the axis of symmetry to find the vertex of a parabola.			

	2. Reason abstractly and quantitatively. 7. Look for and make use of structure.	I can identify the line of symmetry and the vertex of a quadratic written in vertex form.			
		I can sketch a graph of a parabola written in vertex form.			
		I can tell if a quadratic written in vertex form has x-intercepts by looking at the equation.			
		I can use algebra to find the x-intercepts of a quadratic written in vertex form.			
		I can convert a standard form to factored form by factoring.			
		I can convert a standard form to vertex form by completing the square.			
		I can demonstrate that the standard, factored, and vertex forms of the same quadratic function produce the same graph.			
		I can write the function that describes a parabola in all three forms when I am given a graph with the x-intercepts, y-intercepts, and the vertex.			
	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. Practices: 7. Look for and make use of structure.	I can define expression, term, factor, and coefficient.	expression, term, factor, coefficient, equivalent		
		I can interpret the real-world meaning of the terms, factors, and coefficients of an expression in terms of their units.			

		I can group the parts of an expression differently in order to better interpret their meaning.			
	A.SSE.2 Use the structure of an expression to identify ways to rewrite it. Practices: 7. Look for and make use of structure.	I can look for and identify clues in the structure of expressions in order to rewrite it another way.			
		I can explain why equivalent expressions are equivalent.			
	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. Practices: 5. Use appropriate tools strategically. 7. Look for and make use of structure.	I can explain the effects of k on transforming quadratic graphs.			Text: 10.1 - 10.3 EMATHS: Exploring Vertex Form, Bouncing Ball
	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. Practices:	I can explain that the parent function for quadratic functions is the parabola f(x) = x^2.	evaluate, function, domain, input, equation, parent function, transformation, x-int, y-int, vertex, quadratic function, maximum, minimum		
		I can explain that the minimum or maximum of a quadratic is called the vertex.			
		I can identify the vertex by looking at the equation.			
		I can find the y-int of a quadratic by substituting 0 for x and evaluating.			

	7. Look for and make use of structure. 8. Look for and express regularity in repeated reasoning.	I can graph a quadratic using evaluated points.			
		I can use technology to graph a quadratic and to find precise values for the x=-nt and the max or min.			
		I can group the parts of an expression differently in order to better interpret their meaning.			
	A.REI.4 Solve quadratic equations in one variable. 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. b. Solve quadratic equations by inspection (e.g., for x2 = 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 ± bi for real numbers a and b. Practices: 7. Look for and make use of structure. 8. Look for and express regularity in repeated reasoning.	I can identify a quadratic expression.			Text 10.4-10.7
		I can identify and factor a perfect square trinomial.			
		I can complete the square to rewrite a quadratic expression.			
		I can derive the quadratic formula by completing the square.			
		I can determine the best method to solve a quadratic equation.			
		I can solve quadratic equations, by inspection, by finding square roots, by completing the square, by using the quadratic formula, and by factoring.			
		I can find imaginary solutions for quadratic equations.			

	A.SSE.3 Choose and produce an equivalent form of an expression to reveal and explain properties of the quantity represented by the expression. A. Factor a quadratic expression to reveal the zeros of the function it defines. B. Complete the square in a quadratic expression to reveal the max or min value of the function it defines. Practices: 7. Look for and make use of structure.	I can factor a quadratic expression to find the zeroes of the function it represents. I can identify and factor perfect square trinomials. I can complete the square to rewrite the expression in vertex form. I can predict whether a quadratic will have a minimum or a maximum. I can identify the max or min of a quadratic.			
	F.LE.3 Observe using graphs and tables that a quantity increasing exponentially eventually exceeds a quantity increasing linearly, quadratically, or as a polynomial function. Practices: 2. Reason abstractly and quantitatively. 8. Look for and express regularity in repeated reasoning.	I can use graphs or tables to compare the output values and rates of change of linear, quadratic and exponential functions.	evaluate, function, linear function, quadratic function, rate		Text: 10.8 Emaths: Function Sort Linear or Quadratic Handshake Problem Tower of Hanoi Hooke's Law Ball Drop

Polynomials & Pythagorean Thrm

Weeks	CCSS	Learning Goals	Skills /Vocabulary	Formative/Summative Assessment	Resources
	8.G.6. Explain a proof of the Pythagorean Theorem and its converse. Math Practices: 4	1. I can use visual models to demonstrate the relationship of the three side lengths of any triangle. 2. I can use algebraic reasoning to related the visual model to the Pythagorean Theorem. 3. I can use the Pythagorean Theorem to determine if a given triangle is a right triangle.	Pythagorean Theorem, leg, hypotenuse, converse		Looking for Pythagoras
	8.G.7. Apply the Pythagorean Theorem to determine unknown side lengths in right triangles in real-world and mathematical problems in two and three dimensions. Math Practices: 4, 7	1. I can apply the Pythagorean theorem to find an unknown side length of a right triangle. 2. I can draw a diagram and use the Pythagorean theorem to solve real-world problems involving right triangles. 3. I can draw a diagram to find the right triangles in a three-dimensional figure and use the Pythagorean Theorem to calculate various dimensions.			

	8.G.8. Apply the Pythagorean Theorem to find the distance between two points in a coordinate system. Math Practices: 2	1. I can connect any two points on a coordinate grid to a 3rd point so that the three points form a right triangle. 2. I can use the right triangle and the Pythagorean theorem to find the distance between the original two points.			

Exponentials

Weeks	CCSS	Learning Goals	Skills /Vocabulary	Formative/Summative Assessment	Resources
	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.	I can add, subtract, and multiply polynomials.	polynomial		Text: 9.1
	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 can apply the properties of exponents to simplify algebraic expressions with rational exponents.	exponent, laws of exponents, simplify, expression, integer, rational		Emaths: Exploring Exponential Rules, Text: 8.1-8.3 + Extension Looking for Pythagorus
		I can apply the definition of an nth root to demonstrate that the nth root to the nth power of an integer is that integer.			
	N.RN.2 Rewrite expressions involving radicals and rational exponents using the properties of exponents.	I can apply the properties of exponents to simplify algebraic expressions with integer exponents.	exponent, laws of exponents, simplify, expression, integer, rational		Not in Alg 1 text. Should we save this for Alg 2?? Looking for Pythagorus
		I can apply the properties of exponents to simplify algebraic expressions with rational exponents.			
		I can write expressions with rational exponents as radical expressions.			
		I can write radical expressions as expressions with rational exponents.			
	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.	I can use function notation.	function, function notation, domain, order of operations, input, output		Text: 8.5, 8.6, and Extension A4A: Paper Folding, Black Rhino Population, M&M
		I can evaluate functions for inputs in their domains			
		I can interpret statements that use function notation 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.	I can interpret key features of graphs and tables in terms of the quantities being modeled.	increasing, decreasing, end behavior		Emaths: Paper Folding, Exponential Situations (could be used as assessment), Let's Make a A Deal (challenging: uses cumulative sums), Water Hyacynths, Light Intensity, Exponential Functions TInspire: Characteristics of Exp Functions, Comparing Exponential Functions, Spreading Doom, Comparing Linear and Exponential Functions, Linear and Exponential Data, NCAA tournaments: Discovering Exponential Functions (decay)
		I can sketch a graph showing key features given a verbal description of the relationship.			
	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.	I can explain that the parent function for exponentials if f(x) = b^x where b is a positive number.	evaluate, function, domain, input, equation, parent function, transformation, horizontal asymptote, exponential function		
		I can determine the domain, range, and end behavior of an exponential function when looking at its graph.			
		I can classify exponential functions in function notation as growth or decay.			
		I can substitute convenient values for x to generate a table and graph of an exponential function.			
		I can explain how a simple geometric transformation changes a growth graph to a decay graph.			
	F.IF.9 Compare properties of two functions each represented in a different way (algebraically, graphically, numerically in tables, or by verbal descriptions).	I can compare properties of two functions when represented in different ways (algebraically, graphically, numerically in tables, or by verbal descriptions).	evaluate, function, coordinate plane, algebraically, graphically, numerically, verbally		
	F.BF.2 Write arithmetic and geometric sequences both recursively and with an explicit formula, use them to model situations, and	I can define a geometric sequence as a sequence of numbers that is formed so that the ratio of consecutive terms is always the same, known as a common ratio.	geometric sequence, recursive formula, explicit formula, common ration		

	translate between the two forms.	I can distinguish between geometric and arithmetic sequences.			
		I can determine the common ratio between two terms in a geometric sequence.			
		I can explain how to change a term of a geometric sequence into the next term and write a recursive formula for the sequence, $a_{} = r a_{}$.			
		I can write an explicit formula for a geometric sequence, $a_{} = a_{} r_{}$.			
		I can explain why the recursive formula for a geometric sequence uses multiplication and why the explicit formula uses exponentiation.			
		I can translate between the recursive and explicit forms of geometric sequences.			
		I can decide when a real world problem models a geometric sequence and write an equation to model the situation.			
	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.	See F.BF.3 in Linear functions for learning goals.	function, translate, stretch, shrink		
	F.LE.1 Distinguish between situations that can be	I can define linear and exponential functions.	linear function, exponential		

	modeled with linear functions and with exponential functions.	I can demonstrate that a linear function has a constant rate of change and an exponential function has a constant multiplier.	function, evaluate, rate of change, slope, common ratio		
		I can distinguish between situations modeled with linear functions and with exponential functions when presented with a real-world problem.			
	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).	I can determine if a function is linear or exponential given a sequence a graph, a verbal description, or a table.	exponential function, geometric sequence		
		I can construct an exponential function from a geometric sequence, graph, table of values, or a description of the relationship.			
		I can describe the algebraic process used to construct the exponential function that passes through two given points.			
	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.	I can use graphs or tables to compare the output values of linear and exponential functions.	evaluate, function, linear function, exponential function, rate		
		I can use technology to find the point at which the graphs of two functions intersect.			
		I can use graphs or tables to compare the rates of change of linear and exponential functions.			
		I can explain why exponential functions eventually have greater output values than linear functions.			
	F.LE.5 Interpret the parameters in a linear or exponential function in terms	I can identify the names and definitions of the parameters, a, b, and c in the exponential function.	exponential function, domain, range, y-int,		

	of a context.	I can explain the meaning of the y-int, b, and c on an exponential function when it models a real world relationship.	asymptote, growth rate		
		I can compose an original problem situation and construct an exponential function to model it.			