Course Name - Strategic Math - Algebra 2

Mon.	Content	Essential Skills	HSCE	Common Core	Assessment	Vocabulary
Sem. 1 Sept.	**Algebraic Language**	• Writing algebraic expression	L1.2.1 Use mathematical symbols to represent quantitative relationships and situations.	MA.9-12.A-SSE.1.a 1. Interpret expressions that represent a quantity in terms of its context.★ a. Interpret parts of an expression, such as terms, factors, and coefficients.	Homework, Quizzes, Tests	Recursive, Explicit, Sequence
		• Use formulas including explicit and recursive for sequences	L2.2.1 Find the nth term in arithmetic, geometric, or other simple sequences.	MA.9-12.A-SSE.4 4. Derive the formula for the sum of a finite geometric series (when the common ratio is not 1), and use the formula to solve problems. For example, calculate mortgage payments.★		
		• Solving equations and inequalities and justifications	A1.2 Solutions of Equations & Inequalities	MA.9-12.A-REI.3 3. Solve linear equations and inequalities in one variable, including equations with coefficients represented by letters. Graph the solution set of an inequality on a number line.		
Sept./ Oct.	**Variations and Graphs**	• Variations – direct, inverse, combined and joint	A2.1.7 Identify and interpret the key features of a function from its graph or its formula(e).	MA.9-12.F-IF.4 4. For a function that models a relationship between two quantities, interpret key features of graphs and tables in terms of the quantities, and sketch graphs showing key features given a verbal description of the relationship. Key features include: intercepts; intervals where the function is increasing, decreasing, positive, or negative; relative maximums and minimums; symmetries; end behavior; and periodicity.★	Homework, Quizzes, Tests	Direct/Inverse, Combined/Joint, Hyperbola/Parabola, Inverse Square, Linear

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Mon.	Content	Essential Skills	HSCE	Common Core	Assessment	Vocabulary
		• Graphing data of the form $y=kx$, $Y=kx^2$, $y=k/x$, $y=k/x^2$	A3.1.1 Write the symbolic forms of linear functions (standard, point-slope, and slope-intercept) given appropriate information, and convert between forms.	MA.9-12.A-CED.1 1. Create equations and inequalities in one variable and use them to solve problems. Include equations arising from linear and quadratic functions, and simple rational and exponential functions.		
		• Modeling data with equations	A3.1.3 Relate the coefficients in a linear function to the slope and x- and y intercepts of its graph.	MA.9-12.F-IF.7.a 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.		
			L1.1.5 Justify numerical relationships	MA.9-12.N-Q.2 2. Define appropriate quantities for the purpose of descriptive modeling.		
			A2.2.2 Apply given transformations to basic functions and represent symbolically.	MA.9-12.F-BF.3 3. Identify the effect on the graph of replacing f(x) by f(x) + k, kf(x), f(kx), and f(x + k) for specific values of k (both positive and negative); find the value of k given the graphs. Experiment with cases and illustrate an explanation of the effects on the graph using technology. Include recognizing even and odd functions from their graphs and algebraic expressions for them.		

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Mon.	Content	Essential Skills	HSCE	Common Core	Assessment	Vocabulary
			A2.3.1 Identify a function as a member of a family of functions based on its symbolic or graphical representation; recognize that different families of functions have different asymptotic behavior.	MA.9-12.F-IF.4 4. For a function that models a relationship between two quantities, interpret key features of graphs and tables in terms of the quantities, and sketch graphs showing key features given a verbal description of the relationship. Key features include: intercepts; intervals where the function is increasing, decreasing, positive, or negative; relative maximums and minimums; symmetries; end behavior; and periodicity.★		
			A1.1.4 Add, subtract, multiply, and simplify polynomials and rational expressions.	MA.9-12.A-APR.1 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.		
			A3.1.2 Graph lines (including those of the form x = h and y = k) given appropriate information.	MA.9-12.F-IF.7.a 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.		
			A2.3.3 Write the general symbolic forms that characterize each family of functions.	MA.9-12.A-CED.1 1. Create equations and inequalities in one variable and use them to solve problems. Include equations arising from linear and quadratic functions, and simple rational and exponential functions.		

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Mon.	Content	Essential Skills	HSCE	Common Core	Assessment	Vocabulary
Sept./	**Variations and Graphs**		A2.4.1 Identify the family of function best suited for modeling a given real-world situation.	MA.9-12.F-IF.4 4. For a function that models a relationship between two quantities, interpret key features of graphs and tables in terms of the quantities, and sketch graphs showing key features given a verbal description of the relationship. Key features include: intercepts; intervals where the function is increasing, decreasing, positive, or negative; relative maximums and minimums; symmetries; end behavior; and periodicity.★		
			A2.4.2 Adapt the general symbolic form of a function to one that fits the specification of a given situation by using the information to replace arbitrary constants with numbers.	MA.9-12.A-CED.3 3. Represent constraints by equations or inequalities, and by systems of equations and/or inequalities, and interpret solutions as viable or non-viable options in a modeling context. For example, represent inequalities describing nutritional and cost constraints on combinations of different foods.		
			A2.4.3 Using the adapted general symbolic form, draw reasonable conclusions about the situation being modeled.	MA.9-12.A-CED.3 3. Represent constraints by equations or inequalities, and by systems of equations and/or inequalities, and interpret solutions as viable or non-viable options in a modeling context. For example, represent inequalities describing nutritional and cost constraints on combinations of different foods.		

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Mon.	Content	Essential Skills	HSCE	Common Core	Assessment	Vocabulary
Oct.	Linear Relation	• Types of graphs and algebra	A1.2.3 Solve linear and quadratic equations and inequalities including systems of up to three linear equations with three unknowns. Justify steps in the solution, and apply the quadratic formula appropriately.	MA.9-12.A-REI.3 3. Solve linear equations and inequalities in one variable, including equations with coefficients represented by letters. Graph the solutionset of an inequality on a number line.	Homework, Quizzes, Tests	Slope, Constant Rate of Change, Point Slope Formula, Index Number
		• Write and equation from data	A1.1.1 Give a verbal description of an expression that is presented in symbolic form, write an algebraic expression from a verbal description, and evaluate expressions given values of the variables.	MA.9-12.A-SSE.3 3. Choose and produce an equivalent form of an expression to reveal and explain properties of the quantity represented by the expression.		
		• Arithmetic sequences	A1.2.1 Write equations and inequalities with one or two variables to represent mathematical or applied situations, and solve.	MA.9-12.A-CED.2 2. Create equations in two or more variables to represent relationships between quantities; graph equations on coordinate axes with labels and scales.		
		• Linear inequalities	A2.1.4 Recognize that functions may be defined by different expressions over different intervals of their domains; such functions are piecewise-defined.	MA.9-12.F-IF. 5 5. Relate the domain of a function to its graph and, where applicable, to the quantitative relationship it describes. For example, if the function h(n) gives the number of person-hours it takes to assemble n engines in a factory, then the positive integers would be an appropriate domain for the function.★		

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Mon.	Content	Essential Skills	HSCE	Common Core	Assessment	Vocabulary
			A2.3.2 Describe the tabular pattern associated with functions having constant rate of change (linear); or variable rates of change. A3.1.2 Graph lines (including those of the form x = h and y = k) given appropriate information.	MA.9-12.F-LE.1 1. Distinguish between situations that can be modeled with linear functions and with exponential functions. a. Understand 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. MA.9-12.F-IF.7.a 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.		
Nov.	**Matrices**	• Introduction of matrices	G3.1.1 Define reflection, rotation, translation, and glide reflection and find the image of a figure under a given isometry.	MA.9-12.G-CO.4 4. Develop definitions of rotations, reflections, and translations in terms of angles, circles, perpendicular lines, parallel lines, and line segments.	Homework, Quizzes, Tests	Matrix, Matrix Inverse, Matrix Equation

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Mon.	Content	Essential Skills	HSCE	Common Core	Assessment	Vocabulary
		• Application of matrices	G3.1.2 Given two figures that are images of each other under an isometry, find the isometry and describe it completely.	MA.9-12.G-CO.5 5. Given a geometric figure and a rotation, reflection, or translation, draw the transformed figure using, e.g., graph paper, tracing paper, or geometry software. Specify a sequence of transformations that will carry a given figure onto another.		
		• Operations of matrices	G3.1.3 Find the image of a figure under the composition of two or more isometries and determine whether the resulting figure is a reflection, rotation, translation, or glide reflection image of the original figure.	MA.9-12.G-CO.2 2. Represent transformations in the plane using, e.g., transparencies and geometry software; describe transformations as functions that take points in the plane as inputs and give other points as outputs. Compare transformations that preserve distance and angle to those that do not (e.g., translation versus horizontal stretch).		
Nov./ Dec.	**Systems**	• Methods for solving systems	A1.2.1 Write equations and inequalities with one or two variables to represent mathematical or applied situations, and solve.	MA.9-12.A-CED.2 2. Create equations in two or more variables to represent relationships between quantities; graph equations on coordinate axes with labels and scales.	Homework, Quizzes, Tests	Feasible Region, Linear Programming, Systems, Maximize/Minimize
		• Union and intersection of set	A1.2.2 Associate a given equation with a function whose zeros are the solutions of the equation.			
		• Determine feasible regions a	A1.2.3 Solve linear and quadratic equations and inequalities including systems of up to three linear equations with three unknowns. Justify steps in the solution, and apply the quadratic formula appropriately.	MA.9-12.A-REI.6 6. Solve systems of linear equations exactly and approximately (e.g., with graphs), focusing on pairs of linear equations in two variables.		

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Mon.	Content	Essential Skills	HSCE	Common Core	Assessment	Vocabulary
		• Linear programming	A1.2.8 Solve an equation involving several variables (with numerical or letter coefficients) for a designated variable. Justify steps in the solution.	MA.9-12.A-CED.4 4. Rearrange formulas to highlight a quantity of interest, using the same reasoning as in solving equations. For example, rearrange Ohm's law V = IR to highlight resistance R. MA.9-12.A-REI.1 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.		
			A3.1.4 Find an equation of the line parallel or perpendicular to given line, through a given point; understand and use the facts that non-vertical parallel lines have equal slopes, and that non-vertical perpendicular lines have slopes that multiply to give -1.	MA.9-12.F-LE.2 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).		
			L1.2.1 Use mathematical symbols to represent quantitative relationships and situations.	MA.9-12.A-CED.2 2. Create equations in two or more variables to represent relationships between quantities; graph equations on coordinate axes with labels and scales.		
Nov./ Dec.	**Systems**		A2.2.1 Combine functions by addition, subtraction, multiplication, and division.	MA.9-12.A-APR.1 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.		

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Mon.	Content	Essential Skills	HSCE	Common Core	Assessment	Vocabulary
Dec.	**Parabola and Quadratic Equations**	• Characteristics of parabolas	L2.1.4 Know that the complex number i is one of two solutions to x2 = -1.	MA.9-12.N-CN.1 1. Know there is a complex number i such that i2 = −1, and every complex number has the form a + bi with a and b real.	Homework, Quizzes, Tests	Discriminant, Vertex, Maximum/Minimum Value, x/y intercepts, Complex Numbers, Imaginary Numbers, Conjugate, Axis of Symmetry
		• Techniques for solving quad	L2.1.5 Add, subtract, and multiply complex numbers; use conjugates to simplify quotients of complex numbers.	MA.9-12.N-CN.2 2. Use the relation i2 = –1 and the commutative, associative, and distributive properties to add, subtract, and multiply complex numbers. MA.9-12.N-CN.3 3. (+) Find the conjugate of a complex number; use conjugates to find moduli and quotients of complex numbers.		
		• Complex numbers	A2.2.2 Apply given transformations to basic functions and represent symbolically.	MA.9-12.F-BF.3 3. Identify the effect on the graph of replacing f(x) by f(x) + k, kf(x), f(kx), and f(x + k) for specific values of k (both positive and negative); find the value of k given the graphs. Experiment with cases and illustrate an explanation of the effects on the graph using technology. Include recognizing even and odd functions from their graphs and algebraic expressions for them.		

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Mon.	Content	Essential Skills	HSCE	Common Core	Assessment	Vocabulary
			A1.2.5 Solve polynomial equations and equations involving rational expressions, and justify steps in the solution.	MA.9-12.A-REI.1 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. MA.9-12.A-REI.2 2. Solve simple rational and radical equations in one variable, and give examples showing how extraneous solutions may arise.		
			A1.2.9 Know common formulas and apply appropriately in contextual situations.	MA.9-12.N-Q.1 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.		
			A1.2.3 Solve linear and quadratic equations and inequalities including systems of up to three linear equations with three unknowns. Justify steps in the solution, and apply the quadratic formula appropriately.	MA.9-12.A-REI.4 4. Solve quadratic equations in one variable. a. Use the method of completing the square that transforms any quadratic equation in x into an equation of the form (x – p)2 = q that has the same solutions. This leads to the quadratic formula. 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.		

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Mon.	Content	Essential Skills	HSCE	Common Core	Assessment	Vocabulary
			A3.3.1 Write the symbolic form and sketch the graph of a quadratic function given appropriate information.	MA.9-12.F-IF.c 7. Graph functions expressed symbolically and show key features of the graph, by hand in simple cases and using technology for more complicated cases.★ c. Graph polynomial functions, identifying zeros when suitable factorizations are available, and showing end behavior.		
			A3.3.2 Identify the elements of a parabola (vertex, axis of symmetry, direction of opening) given its symbolic form or its graph, and relate these elements to the coefficient(s) of the symbolic form of the function.	MA.9-12.F-IF.7.a 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.		
			A3.3.3 Convert quadratic functions from standard to vertex form by completing the square.	MA.9-12.F-IF.8.a 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.		

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Mon.	Content	Essential Skills	HSCE	Common Core	Assessment	Vocabulary
			A3.3.4 Relate the number of real solutions of a quadratic equation to the graph of the associated quadratic function.	MA.9-12.F-IF.8.a 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.		
Dec.	**Parabola and Quadratic Equations**		A3.3.5 Express quadratic functions in vertex form to identify their maxima or minima, and in factored form to identify their zeros.	MA.9-12.F-IF.8.a 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.		
Jan.	**Functions**	• Terminology and notation for	A2.1.4 Recognize that functions may be defined by different expressions over different intervals of their domains; such functions are piecewise-defined.	MA.9-12.F-IF. 5 5. Relate the domain of a function to its graph and, where applicable, to the quantitative relationship it describes. For example, if the function h(n) gives the number of person-hours it takes to assemble n engines in a factory, then the positive integers would be an appropriate domain for the function.★	Homework, Quizzes, Tests	Function Notation, Arrow/mappingnotation, Euler, Inverse, Composite, Domain/Range

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Mon.	Content	Essential Skills	HSCE	Common Core	Assessment	Vocabulary
		•	A1.1.4 Add, subtract, multiply, and simplify polynomials and rational expressions.	MA.9-12.F-BF.1.b 1. Write a function that describes a relationship between two quantities.★ b. Combine standard function types using arithmetic operations. For example, build a function that models the temperature of a cooling body by adding a constant function to a decaying exponential, and relate these functions to the model.		
		• Characteristics of different fu	A2.3.3 Write the general symbolic forms that characterize each family of functions.	MA.9-12.A-CED.1 1. Create equations and inequalities in one variable and use them to solve problems. Include equations arising from linear and quadratic functions, and simple rational and exponential functions.		
		•	A3.6.1 Write the symbolic form and sketch the graph of simple rational functions.	MA.9-12.A-CED.2 2. Create equations in two or more variables to represent relationships between quantities; graph equations on coordinate axes with labels and scales.		
		• Find values and graph functi	A3.6.2 Analyze graphs of simple rational functions and understand the relationship between the zeros of the numerator and denominator and the function's intercepts, asymptotes, and domain.	MA.9-12.F-IF.7.d 7. Graph functions expressed symbolically and show key features of the graph, by hand in simple cases and using technology for more complicated cases.★ d. (+) Graph rational functions, identifying zeros and asymptotes when suitable factorizations are available, and showing end behavior.		

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Mon.	Content	Essential Skills	HSCE	Common Core	Assessment	Vocabulary
			A3.1.1 Write the symbolic forms of linear functions (standard, point-slope, and slope-intercept) given appropriate information, and convert between forms.	MA.9-12.A-CED.1 1. Create equations and inequalities in one variable and use them to solve problems. Include equations arising from linear and quadratic functions, and simple rational and exponential functions.		
			A2.3.1 Identify a function as a member of a family of functions based on its symbolic or graphical representation; recognize that different families of functions have different asymptotic behavior.	MA.9-12.F-IF.4 4. For a function that models a relationship between two quantities, interpret key features of graphs and tables in terms of the quantities, and sketch graphs showing key features given a verbal description of the relationship. Key features include: intercepts; intervals where the function is increasing, decreasing, positive, or negative; relative maximums and minimums; symmetries; end behavior; and periodicity.★		
			A2.3.3 Write the general symbolic forms that characterize each family of functions.	MA.9-12.A-CED.1 1. Create equations and inequalities in one variable and use them to solve problems. Include equations arising from linear and quadratic functions, and simple rational and exponential functions.		

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Mon.	Content	Essential Skills	HSCE	Common Core	Assessment	Vocabulary
Jan.	**Functions**		A2.1.1 Determine whether a relationship (given in contextual, symbolic, tabular, or graphical form) is a function and identify its domain and range. A2.1.2 Read, interpret, and use function notation and evaluate a function at a value in its domain. A2.1.3 Represent functions in symbols, graphs, tables, diagrams, or words and translate among representations.	MA.9-12.F-IF.1 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). MA.9-12.F-IF.2 2. Use function notation, evaluate functions for inputs in their domains, and interpret statements that use function notation in terms of a context. MI.9-12.F-IF.4 4. For a function that models a relationship between two quantities, interpret key features of graphs and tables in terms of the quantities, and sketch graphs showing key features given a verbal description of the relationship. Key features include: intercepts; intervals where the function is increasing, decreasing, positive, or negative; relative maximums and minimums; symmetries; end behavior; and periodicity.★		
Sem. 2 Feb.	**Powers and Roots**	• Properties of exponents	A1.2.6 Solve power equations and equations including radical expressions, justify steps in the solution, and explain how extraneous solutions may arise.	MA.9-12.A-REI.2 2. Solve simple rational and radical equations in one variable, and give examples showing how extraneous solutions may arise.	Homework, Quizzes, Tests	nth root, Rational Exponents, Geometric Sequence

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Mon.	Content	Essential Skills	HSCE	Common Core	Assessment	Vocabulary
		• Formulas for geometric sequences (explicit and recursive)	A3.2.1 Write the symbolic form and sketch the graph of an exponential function given appropriate information.	MA.9-12.F-IF.7.e 7. Graph functions expressed symbolically and show key features of the graph, by hand in simple cases and using technology for more complicated cases.★ e. Graph exponential and logarithmic functions, showing intercepts and end behavior, and trigonometric functions, showing period, midline, and amplitude.		
		• Solving equations with expor	A3.2.2 Interpret the symbolic forms and recognize the graphs of exponential and logarithmic functions; recognize the logarithmic function as the inverse of the exponential function.	MA.9-12.F-LE.2 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 MA.9-12.F-LE.3 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.		

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Mon.	Content	Essential Skills	HSCE	Common Core	Assessment	Vocabulary
			A3.2.3 Apply properties of exponential and logarithmic functions.	MA.9-12.F-BF.5 5. (+) Understand the inverse relationship between exponents and logarithms and use this relationship to solve problems involving logarithms and exponents. MA.9-12.F-IF.8.b 8. Write a function defined by an expression in different but equivalent forms to reveal and explain different properties of the function. b. Use the properties of exponents to interpret expressions for exponential functions. 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.		
			A3.2.4 Understand and use the fact that the base of an exponential function determines whether the function increases or decreases and understand how the base affects the rate of growth or decay.	MA.9-12.F-LE.1.c 1. Distinguish between situations that can be modeled with linear functions and with exponential functions. c. Recognize situations in which a quantity grows or decays by a constant percent rate per unit interval relative to another.		
			A.3.2.5 Relate exponential and logarithmic functions to real phenomena, including half-life and doubling time.			
			A3.4.1 Write the symbolic form and sketch the graph of power functions.			

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Mon.	Content	Essential Skills	HSCE	Common Core	Assessment	Vocabulary
			A3.4.2 Express direct and inverse relationships as functions and recognize their characteristics.			
Feb.	**Exponents and Logarithms**	• Exponential growth and deca	A1.2.7 Solve exponential and logarithmic equations, and justify steps in the solution.	MA.9-12.F-BF.5 5. (+) Understand the inverse relationship between exponents and logarithms and use this relationship to solve problems involving logarithms and exponents.	Homework, Quizzes, Tests	Logarithms, Exponential form, Asymptotes, Logarithmic form, Ph Scale, exponential growth, Decibels, exponential decay, Richter Scale, e, Natural Logs, Logarithmic Functions
		• Properties of logarithms	A3.2.2 Interpret the symbolic forms and recognize the graphs of exponential and logarithmic functions; recognize the logarithmic function as the inverse of the exponential function.			
Feb.	**Exponents and Logarithms**	• Applications of logarithms	A3.2.3 Apply properties of exponential and logarithmic functions.	MA.9-12.F-BF.5 5. (+) Understand the inverse relationship between exponents and logarithms and use this relationship to solve problems involving logarithms and exponents. MA.9-12.F-IF.8.b 8. Write a function defined by an expression in different but equivalent forms to reveal and explain different properties of the function. b. Use the properties of exponents to interpret expressions for exponential functions. 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.		

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Mon.	Content	Essential Skills	HSCE	Common Core	Assessment	Vocabulary
		• Exponential equations	A3.2.4 Understand and use the fact that the base of an exponential function determines whether the function increases or decreases and understand how the base affects the rate of growth or decay. A.3.2.5 Relate exponential and logarithmic functions to real phenomena, including half-life and doubling time. A3.1.2 Graph lines (including those of the form x = h and y = k) given appropriate information. L2.1.3 Explain the exponential relationship between a number and its base 10 logarithm and use it to relate rules of logarithms to those of exponents in expressions involving numbers. A1.1.6 Transform exponential and logarithmic expressions into equivalent forms using the properties of exponents and logarithms, including the inverse relationship between exponents and logarithms. L2.2.3 Use iterative processes in such examples as computing compound interest or applying approximation procedures. L2.3.2 Describe and interpret logarithmic relationships in such contexts as the Richter scale, the pH scale, or decibel measurements; solve applied problems.	MA.9-12.F-BF.5 5. (+) Understand the inverse relationship between exponents and logarithms and use this relationship to solve problems involving logarithms and exponents.		

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Mon.	Content	Essential Skills	HSCE	Common Core	Assessment	Vocabulary
Mar.	**Trigonometry**	• Right triangle trigonometry ra	A3.7.1 Use the unit circle to define sine and cosine; approximate values of sine and cosine; use sine and cosine to define the remaining trigonometric functions; explain why the trigonometric functions are periodic.		Homework, Quizzes, Tests	Radian, Degree, Unit Circle, Rotation, Reference Angle
Mar.	**Trigonometry**	• Unit circle	A3.7.2 Use the relationship between degree and radian measures to solve problems.			
		• Law of Sine and Cosine	A3.7.3 Use the unit circle to determine the exact values of sine and cosine, for integer multiples of /6 and /4.			
		• Graphing Sine and Cosine	A3.7.4 Graph the sine and cosine functions; analyze graphs by noting domain, range, period, amplitude, and location of maxima and minima.			
		• Radian measure	A2.3.3 Write the general symbolic forms that characterize each family of functions.			
			A2.3.1 Identify a function as a member of a family of functions based on its symbolic or graphical representation; recognize that different families of functions have different asymptotic behavior.			
			G1.3.2 Know and use the Law of Sines and the Law of Cosines and use them to solve problems. Find the area of a triangle with sides a and b and included angle q using the formula Area = (1/2) absin q.	MA.9-12.G-SRT.11 11. Understand and apply the Law of Sines and the Law of Cosines to find unknown measurements in right and non-right triangles (e.g., surveying problems, resultant forces).		
Mar./ Apr.	**Polynomials**	• Models for polynomials	A1.2.5 Solve polynomial equations and equations involving rational expressions, and justify steps in the solution.		Homework, Quizzes, Tests	Polynomial Degree, Factor, Roots, Difference
		• Factoring polynomials	A1.1.5 Divide a polynomial by a monomial.			

Course Name - Strategic Math - Algebra 2

Mon.	Content	Essential Skills	HSCE	Common Core	Assessment	Vocabulary
Mar./ Apr.	**Polynomials**	• Solving polynomials • Writing polynomials from dat	A2.1.6 Identify the zeros of a function, the intervals where the values of a function are positive or negative, and describe the behavior of a function as x approaches positive or negative infinity, given the symbolic and graphical representations. A3.5.1 Write the symbolic form and sketch the graph of simple polynomial functions. A3.5.2 Understand the effects of degree, leading coefficient, and number of real zeros on the graphs of polynomial functions of degree greater than 2. A3.5.3 Determine the maximum possible number of zeros of a polynomial function, and understand the relationship between the x-intercepts of the graph and the factored form of the function.			
Apr./ May	**Quadratic Relations**	• Conic sections • Equations of conic sections • Quadratic systems	G1.7.1 Find an equation of a circle given its center and radius; given the equation of a circle, find its center and G1.7.2 Identify and distinguish among geometric representations of parabolas, circles, ellipses, and hyperbolas; describe their symmetries, and explain how they are related to cones. G1.7.3 Graph ellipses and hyperbolas with axes parallel to the x- and y-axes, given equations.		Homework, Quizzes, Tests	Circles, Parabolas, Ellipses, Hyperbola, Directix, Focus/Foci, Degenerate

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		• Applications	G1.7.4 Know and use the relationship between the vertices and foci in and ecllipse, the vertices and foci in a hyperboia, and the directix and focus in a parabola, interpret these relationships in applied contexts.			
May/ June	**Series, Combinations, and Statistics**	• Types of series • Binomial expansion • Combinations	S1.2.2 Estimate the position of the mean, median, and mode in both symmetrical and skewed distributions, and from a frequency distribution or histogram. S1.2.3 Compute and interpret measures of variation, including percentiles, quartiles, interquartile range, variance, and standard deviation. S4.2.1 Compute probabilities of events using tree diagrams, formulas for combinations and permutations, Venn diagrams, or other counting techniques.		Homework, Quizzes, Tests	Binomial Expansion Series, Infinite Series (geopmetric), Pascal's Triangle, Factorial, Permutation, Combination
May/ June	**Series, Combinations, and Statistics**	• Statistics	L1.3.1 Describe, explain, and apply various counting techniques; relate combinations to Pascal's triangle; know when to use each technique. L1.3.2 Define and interpret commonly used expressions of probability. L2.2.2 Compute sums of finite arithmetic and geometric sequences.			