GRADE and SUBJECT
11th Grade Algebra 2 Curriculum   **eMath Instruction**

Time/Month	Standard(s)	Content	Skills
September (week 2) - September (week 3) 10 Days	A - CED.1 N - RN.2 A - SSE.2	Unit 1: Algebraic Essentials Review	- Simplify expressions by combining like terms - Solve linear equations - Simplify expressions by applying properties of exponents - Multiply polynomials - Use tables on the calculator
September (week 4) - October (week 2) 12 Days	F - BF.4 F - IF.9 F - IF.4	Unit 2: Functions as the Cornerstones of Algebra	- Identify functions - Use function notation - Simplify functions composed within one another - Identify the domain and range of a function - Identify one to one functions - Derive the inverse function from the given function - Identify key features of a function
October (week 2) - October (week 4) 11 Days	F - IF.6 F - LE.2 F - LE.5 F - BF.4 A - REI.6	Unit 3: Linear Functions, Equations, and Their Algebra	- Determine if a function varies directly - Calculate and interpret the average rate of change - Forms of a line - slope intercept, point-slope - Model real world situations with linear equations - Find the inverse of a given function - Construct and apply piecewise functions - Solve a system of linear equations (3 variables, 3 equations)
October (week 5) - November (week 4) 19 Days	N - RN.2 N- RN.1 F - LE.5 F - LE.2 A - CED.2 A - CED.1 A - SSE.3 F - IF.4 F - IF.7(e) F - LE.4 F - IF.8 F - BF.1(a, b) A - SSE.3	Unit 4: Exponential and Logarithmic Functions	- Simplify expressions with exponents - Rewrite expressions involving radicals and rational exponents - identify graphs of exponential functions and their key components - Construct exponential equations - Use the "Method of Common Bases" to solve exponential equations - Model percent growth and decay situations with exponential equations - Use properties of exponents to transform expressions for exponential functions to reveal and explain the properties of the quantity represented by the expression - Understand the inverse of exponential functions are logarithms - Construct graphs and interpret key features of logarithm functions - Use logarithm laws to simplify and solve expressions - Solve exponential equations using logarithms

			- Understand the relationship between the number e and the natural logarithm, and use the relationship to solve equations - Apply exponential equations to represent compound interest and Newton's Law of Cooling
November (week 5) - December (week 2) 8 Days	F - IF.3 F - BF.2 F - LE.2 A - SSE.4	Unit 5: Sequences and Series	- Recognize sequences are functions with the domain consisting of the set of integers - Explain the difference between an arithmetic sequence and a geometric difference - Define arithmetic and geometric sequences recursively and with an explicit formula - Derive the formula for the sum of a finite geometric series or arithmetic series - Apply geometric series to calculate mortgage payments
December (week 2) - January (week 3) 17 days	F - IF.4 A - SSE.2 A - APR.3 A - REI.4 A - CED.1 F - BF.3 A - REI.7 G - GPE.2	Unit 6: Quadratic Functions and Their Algebra	- Interpret key features of the graph of a quadratic function: intercepts, intervals where increasing or decreasing, relative maximums and minimums - Factor a quadratic function using one of the following methods: "AMY" method, complete the square, grouping - Factor trinomials - Solve for the value of x of a quadratic function using Zero Product Law - Solve quadratic inequalities in one variable - Identify the shifts of a parabola from $y = x^2$ by completing the square to the given equation - Model real world situations with quadratic functions - Solve a system consisting of a linear equation and a quadratic equation in two variables algebraically and graphically - Derive the equation of a parabola given a focus and directrix
January (week 3) - January (week 5) 8 Days	F - BF.3	Unit 7: Transformations of Functions	- Identify horizontal and vertical shifts, reflections, and vertical and horizontal stretches of a given parabola equation based on the transformation from $y = x^2$ - Use the transformations of a given graph to write the equation of the parabola - Determine if a quadratic function is even or odd

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January (week 5) - February (week 2) 11 Days	F - IF.4 A - REI.2 N- RN.2 N - RN.1 A - REI.4(b)	Unit 8: Radicals and the Quadratic Formula	- Identify key features of square root functions - Solve square root equations - Identify extraneous roots - Simplify expressions with exponents using exponent properties - Use the quadratic formula to solve quadratic functions
February (week 2) - March (week 1) 8 Days	N - CN.1 N - CN.2 A - REI.4 N - CN.7	Unit 9: Complex Numbers	- Define the complex number "i" such that $i^2 = -1$ - Use the relation $i^2 = -1$ and the commutative, associative, and distributive properties to add, subtract, and multiply complex numbers - Solve quadratic equations with complex solutions - Use the discriminant ($b^2 - 4ac$) from the quadratic formula to describe the roots of a given quadratic function
March (week 1) - April (week 1) 21 Days	F - IF.4 F - BF.3 A - APR.3 F - IF.7 A - APR.4 A - APR.6 A - APR.2 A - REI.2 A - CED.1 A - REI.1	Unit 10: Polynomial and Rational Functions	- Explain the effects on the graph as the power changes including the number of zeroes, where the zeroes are, and the end behavior - Draw sketches of power functions including the zeroes and end behavior - Determine the zeroes of a polynomial function, given the factored form - Create polynomial equations given the factored form or the graph - Expand and simplify expressions to determine if a given equation is a polynomial identity - Identify the domain and range of a given rational function - Simplify rational expressions by factoring - Multiply and divide rational expressions - Combine rational expressions using addition and subtraction - Simplify complex fractions - Rewrite simple rational expressions using long division in the form $q(x) + \frac{r(x)}{b(x)}$ - Apply the Remainder Theorem to determine if a given value is a zero or not - Solve rational equations and inequalities - Reasoning about radical and rational equations

Time	Standards	Unit	Objectives
April (week 1) - May (week 1) 16 Days	F - TF.1 F - TF.2 F - TF.8 F - TF.5 F - IF.7(e)	Unit 11: The Circular Functions	- Define terms associated with angles and their rotations - Convert degree measurements to radian measures and vice versa - Understand radian measure of an angle as the length of the arc on the unit circle subtended by the angle - Explain how the unit circle in the coordinate plane enables the extension of trigonometric functions to all real numbers - Prove the Pythagorean Identity $sin^2\theta + cos^2\theta = 1$ and use it to find the remaining trig functions when given $sin\theta, cos\theta, or\ tan\theta$ and the quadrant of the angle - Construct the basic graphs of Sine and Cosine - Recognize and apply a vertical shift of sinusoidal graphs - Determine the frequency and period of a sinusoidal graph - Interpret the amplitude, frequency, and period of a sinusoidal graph in context of a real world situation - Calculate the reciprocal function of a given trig function
May (week 2) - May (week 3) 9 Days	S - CP.1 S - CP.7 S - CP.3 S - CP.4 S - CP.5 S - CP.6 S - CP.2	Unit 12: Probability	- Define probability - Describe events as subsets of a sample space using characteristics of the outcomes or as unions, intersections, or complements of other events - Apply the addition rule $P(A\ or\ B) = P(A) + P(B) - P(A\ and\ B)$ and interpret in terms of the model - Understand the conditional probability of A given B and interpret independence of A and B - Construct and interpret two-way frequency tables of data - Use two-way frequency tables to determine if events are independent and the conditional probabilities - Recognize and explain the concepts of conditional probability and independence in everyday language and situations - Find the conditional probability of A given B
May (week 3) - June (week 1) 12 Days	S - IC.3 S - ID.4 S - IC.1 S - IC.2 S - IC.5 S - ID.6(a)	Unit 13: Statistics	- Describe sample surveys, experiments, and observational studies and explain the randomization that relates to each - Use the mean and standard deviation of a data set to fit it to a normal distribution - estimate population percentages using the normal distribution curve - Understand statistics as a process for making inferences about population parameters based on a random sample from that population

			- Decide if a specified model is consistent with results of a data-generating process - Use data from a randomized experiment to compare two treatments and use simulations to decide if differences between parameters are significant - Represent data on two quantitative variables on a scatter plot and describe how the variables are related
June (week 1) - June (week 3)		Regents Review	