Algebra 2 BIE Essential Standards

Interim 1		
Standard	Content	Instructional Days
M.BIE.HS.A2.SSE. A.2	Use the structure of an expression to identify ways to rewrite it. *For example, see $x^4 - y^4$ as $(x^2)^2 - (y^2)^2$, thus recognizing it as a difference of squares that can be factored as $(x^2 - y^2)(x^2 + y^2)$.*	5-6
M.BIE.HS.A2.APR. B.2	Know and apply the Remainder Theorem: For a polynomial $p(x)$ and a number a, the remainder on division by $x - a$ is $p(a)$, so $p(a) = 0$ if and only if $(x - a)$ is a factor of $p(x)$.	6-7
M.BIE.HS.A2.APR. B.3	Identify zeros of polynomials when suitable factorizations are available and use the zeros to construct a rough graph of the function defined by the polynomial.	6-7
M.BIE.HS.A2.APR. D.6	Rewrite simple rational expressions in different forms; write $a(x)/b(x)$ in the form $q(x) + r(x)/b(x)$, where $a(x)$, $b(x)$, $q(x)$, and $r(x)$ are polynomials with the degree of $r(x)$ less than the degree of $b(x)$, using inspection, long division, or, for the more complicated examples, a computer algebra system.	5-6
M.BIE.HS.A2.REI. A.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.	5-6
M.BIE.HS.A2.REI. D.2	Solve simple rational and radical equations in one variable and give examples showing how extraneous solutions may arise.	5-6
M.BIE.HS.A2.REI. B.4	Solve quadratic equations in one variable.	5-6
M.BIE.HS.A2.REI. C.6	Solve systems of linear equations exactly and approximately (e.g., with graphs), focusing on pairs of linear equations in two variables.	6-7
M.BIE.HS.A2.REI. C.7	Solve a simple system consisting of a linear equation and a quadratic equation in two variables algebraically and graphically. For example, find the points of intersection between the line $y = -3x$ and the circle $x^2 + y^2 = 3$.	5-6
M.BIE.HS. A2.F.IF.C.7c	Graph polynomial functions, identifying zeros when suitable factorizations are available, and showing end behavior.	6-7

Interim 2		
Standard	Content	Instructional Days
M.BIE.HS.A2.F.TF. A.1	Understand radian measure of an angle as the length of the arc on the unit circle subtended by the angle.	5-6
M.BIE.HS.A2.F.TF.A.2	Explain how the unit circle in the coordinate plane enables the extension of trigonometric functions to all real numbers, interpreted as radian measures of angles traversed counterclockwise around the unit circle.	6-7

M.BIE.HS.F.TF. B.5	Choose trigonometric functions to model periodic phenomena with specified amplitude, frequency, and midline.	6-7
M.BIE.HS.F.TF. C.8	Prove the Pythagorean identity $\sin^2(\theta) + \cos^2(\theta) = 1$ and use it to find $\sin(\theta)$, $\cos(\theta)$, or $\tan(\theta)$ given $\sin(\theta)$, $\cos(\theta)$, or $\tan(\theta)$ and the quadrant of the angle.	5-6
M.BIE.HS.S.ID. B.6a	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, quadratic, and exponential models.	6-7
M.BIE.HS.N.CN. A.1	Know there is a complex number i such that $i^2 = -1$, and every complex number has the form $a + bi$ with a and b real.	5-6
M.BIE.HS.N.CN. A.2	Use the relation $i^2 = -1$ and the commutative, associative, and distributive properties to add, subtract, and multiply complex numbers.	5-6
M.BIE.HS.N.CN. C.7	Solve quadratic equations with real coefficients that have complex solutions.	6-7
M.BIE.HS.A.REI. A.2	Solve simple rational and radical equations in one variable and give examples showing how extraneous solutions may arise.	6-7
M.BIE.HS.A.APR.B	Know and apply the Remainder Theorem: For a polynomial $p(x)$ and a number a, the remainder on division by $x - a$ is $p(a)$, so $p(a) = 0$ if and only if $(x - a)$ is a factor of $p(x)$. Identify zeros of polynomials when suitable factorizations are available and use the zeros to construct a rough graph of the function defined by the polynomial.	5-6

Interim 3		
Standard	Content	Instructional Days
M.BIE.HS.N.RN. A.2	Rewrite expressions involving radicals and rational exponents using the properties of exponents.	5-6
M.BIE.HS.A.REI.D.11	Explain why the x-coordinates of the points where the graphs of the equations $y = f(x)$ and $y = g(x)$ intersect are the solutions of the equation $f(x) = g(x)$; find the solutions approximately, e.g., using technology to graph the functions, make tables of values, or find successive approximations. Include cases where $f(x)$ and/or $g(x)$ are linear, polynomial, rational, absolute value, exponential, and logarithmic functions.*	5-6
M.BIE.HS. F.IF.A.3	Recognize that sequences are functions, sometimes defined recursively, whose domain is a subset of the integers. *For example, the Fibonacci sequence is defined recursively by f(0) = f(1) = 1, f(n+1) = f(n) + f(n-1) for n ≥ 1*.	5-6
M.BIE.HS. F.IF.B.04	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	6-7

	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*.*	
M.BIE.HS. F.IF.A.05	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.*	6-7
M.BIE.HS.F.BFA.1a	Determine an explicit expression, a recursive process, or steps for calculation from a context.	5-6
M.BIE.HS. F.IF.C.7E	Graph exponential and logarithmic functions, showing intercepts and end behavior, and trigonometric functions, showing period, midline, and amplitude.	5-6
M.BIE.HS.F.BF. B.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. Include recognizing even and odd functions from their graphs and algebraic expressions for them.	5-6
M.BIE.HS.F.BF. B.4a	Solve an equation of the form f(x) = c for a simple function f that has an inverse and write an expression for the inverse. *For example, $f(x) = 2x^3$ or $f(x) = (x+1)/(x-1)$ for $x \neq 1$*.	5-6
M.BIE.HS. F.LE.B.5	Interpret the parameters in a linear or exponential function in terms of a context.	5-6
M.BIE.HS. F.IF.B.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.	6-7