	Essential Questions	Content	Skills	Assessments	Standards/PIs	Resources/Notes
Unit 1	What are the alternate ways to perform long division? How is synthetic division relevant to the roots of an equation?	**Basic Concepts of Algebra** Algebra Review Factoring Polynomials **Vocabulary** domain, inequality, base, exponent, power, principal square root, special products, LCM, divisor, dividend, quotient, remainder, synthetic division	Evaluate Algebraic Expressions Determine the Domain of a Variable Graph Inequalities Find Distance on the Real Number Line Use the Law of Exponents Evaluate Square Roots Recognize Special Products Factor Polynomials Simplify Rational Expressions Use LCM to Add Rational Expressions Divide Polynomials Using Long Division Divide Polynomials Using Synthetic Division Explain how to use long division and synthetic division.		MST3-A2.A.7 MST3-A2.A.8 MST3-A2.A.16	
Unit 2	How is the quadratic formula connected to the graph of the function? How does interval notation help us? Why is dimensional analysis important?	**Equations and Inequalities** Quadratic Equations Linear Equations/Inequalities with Absolute Value Complex Numbers Proportion with applications to mixture problems, conversion, and dimensional analysis	Solve Linear Equations Solve Rational Equations Solve Quadratic Equations by Factoring Solve Quadratic Equations by Square Root Method Solve Quadratic Equations by Completing the Square Solve Quadratic Equations Using Quadratic Formula		MST3-A2.A.25 MST3-A2.A.26 MST3-A2.N.6 MST3-A2.N.7 MST3-A2.N.9	

Radical Equations

Vocabulary

Square Root Method, completing the square, quadratic in form, closed interval, open interval, half-open interval, complex numbers, conjugate, interest, principal, rate of interest, simple interest, mixture problems, uniform motion, constant rate, radical, index, radicand

Solve Equations Quadratic in Form

Solve Absolute Value Equations

Solve Eqations by Factoring

Use Interval Notation

Use Properties of Inequalities

Solve Linear Inequalities

Solve Combined Inequalities

Solve Absolute Value Inequalities

Add, Subtract, Multiply, and Divide Complex Numbers

Solve Quadratic Equations with a Negative Discriminant

Translate Verbal Descriptions into Mathematical Expressions

Solve Interest Problems

Solve Mixture Problems

Solve Uniform Motion Problems

Solve Constant Rate Job Problems

Work with nth Roots

Simplify Radicals

Rationalize Denominators

Solve Radical Equations

Simplify Expressions with Rational Exponents

Unit 3					
How can you determine what the graph of a function looks like based on its equation?	**Functions and Graphs**	Determine whether a relation is a function		MST3-A2.A.37	
				MST3-A2.A.38	
	Functions	Find the value of a function		MST3-A2.A.39	
	Basic Graphs			MST3-A2.A.40	
How can you identify a piece-wise function?	Properties of Functions	Find the domain of a function		MST3-A2.A.52	
	Polynomial Functions			MST3-A2.A.50	
	Rational Root Theorem			MST3-A2.A.51	
How do asymptotes affect the graphs of functions?		Identify the graph of a function			
	Vocabulary				
Why does the Rational Root Theorem help us when solving polynomial functions?	relation, function, domain, range, even function, odd function, local maxima, local minima, piecewise functions, polynomial functions, zero, root, asymptotes, rational zeros, real zeros	Determine Even and Odd functions from a graph			
		Determine Even and Odd function from the equation			
		Justify why a function is even or odd			
		Use a Graph to determine where a function is increasing, decreasing or constant			
		Use a Graph to locate local maxima and local minima			
		Graph Piecewise-defined functions			
		Identify polynomial functions and their degree			
		Identify zeros of polynomial functions			
		Analyze the graph of a polynomial function			
		Find the domain of a rational function			
		Find the vertical and horizontal asymptotes of a rational functions			

			Use the Remainder and Factor Theorems			
			Use the Rational Zeros Theorem			
			Explain why we use the Rational Zeros Theorem			
			Find the real zeros of a polynomial function			
			Solve polynomial equations			
			Find complex zeros of a polynomial			

	Essential Questions	Content	Skills	Assessments	Standards/PIs	Resources/Notes
Unit 4	How do exponential and logarithmic functions relate to the real world?	**Exponential and Logarithmic Functions and Equations** Exponential Functions Logarithmic Functions Growth and Decay Problems **Vocabulary** exponential function, e, natural logarithm function, common logarithm function, simple interest, compound interest formula, continuous compounding, present value	Evaluate exponential functions Graph exponential functions Define the number e Solve exponential equations Change exponential expressions to logarithmic expressions and logarithmic expressions to exponential expressions Evaluate logarithmic expressions Determine the domain of a logarithmic function Graph logarithmic functions Solve logarithmic equations Determine the future value of a lump sum of money Calculate effective rates of return Determine the present value of a lump sum of money Determine the time required to double or triple a lump sum of money Find equations of populations that obey the Law of Uninhibited Growth Find equations of populations that obey the Law of Decay	(	**MST3-A2.A.27** **MST3-A2.A.28** **MST3-A2.A.53** **MST3-A2.A.54**	

Unit 5	Why are matrices helpful in solving linear equations?	**System of Linear Equations**	Solve systems of equations by substitution			
	What is the purpose of a determinant?	Systems of Linear Equations: Substitution and Elimination	Solve systems of equations by elimination			
	How do matrices apply to business?	Matrices	Identify inconsistent systems of equations containing two variables			
		Determinants	Express the solution of a system of dependent equations containing two variables			
	Why do we decompose rational expressions into partial fractions?	Matrix Algebra				
		Partial Fraction Decomposition	Solve systems of three equations containing three variables			
		Vocabulary	Identify inconsistent systems of equations containing three variables			
		consistent, inconsistent, independent, dependent, method of substitution, method of elimination, matrix, row index, column index, augmented matrix, coefficient matrix, row operations, row echlelon form, determinant, Cramer's Rule, scalar, inverse, nonsingular, singular,	Express the solution of a system of dependent equations containing three variables			
			Write the augmented matrix of a system of linear equations			
			Write the system from the augmented matrix			
			Perform row operations on a matrix			
			Solve a system of linear equations using matrices			
			Evaluate 2 by 2 determinants			
			Use Cramer's Rule to solve a system of two equations containing two variables			

			Evaluate 3 by 3 determinants			
			Use Cramer's Rule to solve a system of three equations containing three variables			
			Know how to apply properties of determinants			
			Find the sum and difference of two matrices			
			Find scalar multiples of a matrix			
			Find the product of two matrices			
			Find the inverse of a matrix			
			Solve a system of linear equations using inverse matrices			
			Decompose P/Q, where Q has only nonrepeated linear factors			
			Decompose P/Q, where Q has repeated linear factors			
			Decompose P/Q, where Q has a nonrepeated irreducible quadratic factor			
			Decompose P/Q, where Q has repeated irreducible quadratic factor			
Unit 6	Why is polar graphing important? What are some applications of polar graphing?	**Polar Coordinates** Polar Coordinates Polar Equations and Graphs	Plot points using polar coordinates Convert from polar coordinates to rectangular coordinates	(		

		Vocabulary polar coordinates, rectangular coordinates, polar grids, cardiod, limacon, inner loop, rose, lemniscate, spiral	Convert from rectangular coordinates to polar coordinates Graph and identify polar equations by converting to rectangular equations Graph polar equations using a graphing utility Graph polar equations by plotting points			

	Essential Questions	Content	Skills	Assessments	Standards/PIs	Resources/Notes
Unit 7	How can conic sections be applied in the real world?	**Conic Sections** The Circle The Ellipse The Hyperbola **Vocabulary** conic, ellipse, hyperbola, major axis, minor axis, vertices, foci, complete the square, asymptotes	Work with circles with center at origin Work with circles with center at (h, k) Convert from standard form to center-radius form Work with ellipses with center at the orgin Work with ellipses with center at (h, k) Solve applied problems involving ellipses Work with hyperbolas with center at the origin Find the asymptotes of a hyperbola Work with hyperbolas with center at (h, k) Solve applied problems involving hyperbolas	(	**MST3-G.G.74** **MST3-A2.A.47** **MST3-A2.A.24**	
Unit 8	How does the limit describe the nature of a function? What does the derivative tell us about the function?	**Intro to Calculus** Limits Derivatives **Vocabulary** limit, "as x approaches", derivative	Find the limit using a table Find the limit using a graph Find the one-sided limits of a function Determine whether a function is continuous Find the derivative using the limit definition			

			Apply the power rule Apply the chain rule Apply the product rule Apply the quotient rule Explain the difference between average rate change and instantaneous rate of change				

Key to Standards used in this Map

MST3-A2.N.6 [1 occurence] - MST Standard 3 - Number Sense and Operations Strand - Students will understand meanings of operations and procedures, and how they relate to one another. [Operations] - Performance Indicator A2.N.6 - write square roots of negative numbers in terms of i [Algebra 2 and Trigonometry]

MST3-A2.N.7 [1 occurence] - MST Standard 3 - Number Sense and Operations Strand - Students will understand meanings of operations and procedures, and how they relate to one another. [Operations] - Performance Indicator A2.N.7 - simplify powers of i [Algebra 2 and Trigonometry]

MST3-A2.N.9 [1 occurence] - MST Standard 3 - Number Sense and Operations Strand - Students will understand meanings of operations and procedures, and how they relate to one another. [Operations] - Performance Indicator A2.N.9 - perform arithmetic operations on complex numbers and write the answer in the form a + bi . [Algebra 2 and Trigonometry]

MST3-A2.A.7 [1 occurence] - MST Standard 3 - Algebra Strand - Students will perform algebraic procedures accurately. [Variables and Expressions] - Performance Indicator A2.A.7 - factor polynomial expressions completely, using any combination of the following techniques: common factor extraction, difference of two perfect squares, quadratic trinomials [Algebra 2 and Trigonometry]

MST3-A2.A.8 [1 occurence] - MST Standard 3 - Algebra Strand - Students will perform algebraic procedures accurately. [Variables and Expressions] - Performance Indicator A2.A.8 - apply the rules of exponents to simplify expressions involving negative and/or fractional exponents [Algebra 2 and Trigonometry]

MST3-A2.A.16 [1 occurence] - MST Standard 3 - Algebra Strand - Students will perform algebraic procedures accurately. [Variables and Expressions] - Performance Indicator A2.A.16 - perform arithmetic operations with rational expressions and rename to lowest terms [Algebra 2 and Trigonometry]

MST3-A2.A.24 [1 occurence] - MST Standard 3 - Algebra Strand - Students will perform algebraic procedures accurately. [Equations and Inequalities] - Performance Indicator A2.A.24 - know and apply the technique of completing the square [Algebra 2 and Trigonometry]

MST3-A2.A.25 [1 occurence] - MST Standard 3 - Algebra Strand - Students will perform algebraic procedures accurately. [Equations and Inequalities] - Performance Indicator A2.A.25 - solve quadratic equations, using the quadratic formula [Algebra 2 and Trigonometry]

MST3-A2.A.26 [1 occurence] - MST Standard 3 - Algebra Strand - Students will perform algebraic procedures accurately. [Equations and Inequalities] - Performance Indicator A2.A.26 - find the solution to polynomial equations of higher degree that can be solved using factoring and/or the quadratic formula [Algebra 2 and Trigonometry]

MST3-A2.A.27 [1 occurence] - MST Standard 3 - Algebra Strand - Students will perform algebraic procedures accurately. [Equations and Inequalities] - Performance Indicator A2.A.27 - solve exponential equations with and without common bases [Algebra 2 and Trigonometry]

MST3-A2.A.28 [1 occurence] - MST Standard 3 - Algebra Strand - Students will perform algebraic procedures accurately. [Equations and Inequalities] - Performance Indicator A2.A.28 - solve a logarithmic equation by rewriting as an exponential equation [Algebra 2 and Trigonometry]

MST3-A2.A.37 [1 occurence] - MST Standard 3 - Algebra Strand - Students will recognize, use, and represent algebraically patterns, relations, and functions. [Patterns, Relations and Functions] - Performance Indicator A2.A.37 - define a relation and function [Algebra 2 and Trigonometry]

MST3-A2.A.38 [1 occurence] - MST Standard 3 - Algebra Strand - Students will recognize, use, and represent algebraically patterns, relations, and functions. [Patterns, Relations and Functions] - Performance Indicator A2.A.38 - determine when a relation is a function [Algebra 2 and Trigonometry]

MST3-A2.A.39 [1 occurence] - MST Standard 3 - Algebra Strand - Students will recognize, use, and represent algebraically patterns, relations, and functions. [Patterns, Relations and Functions] - Performance Indicator A2.A.39 - determine the domain and range of a function from its equation [Algebra 2 and Trigonometry]

MST3-A2.A.40 [1 occurence] - MST Standard 3 - Algebra Strand - Students will recognize, use, and represent algebraically patterns, relations, and functions. [Patterns, Relations and Functions] - Performance Indicator A2.A.40 - write functions in functional notation [Algebra 2 and Trigonometry]

MST3-A2.A.47 [1 occurence] - MST Standard 3 - Algebra Strand - Students will recognize, use, and represent algebraically patterns, relations, and functions. [Coordinate Geometry] - Performance Indicator A2.A.47 - determine the center-radius form for the equation of a circle in standard form [Algebra 2 and Trigonometry]

MST3-A2.A.50 [1 occurence] - MST Standard 3 - Algebra Strand - Students will recognize, use, and represent algebraically patterns, relations, and functions. [Coordinate Geometry] - Performance Indicator A2.A.50 - approximate the solution to polynomial equations of higher degree by inspecting the graph [Algebra 2 and Trigonometry]

MST3-A2.A.51 [1 occurence] - MST Standard 3 - Algebra Strand - Students will recognize, use, and represent algebraically patterns, relations, and functions. [Coordinate Geometry] - Performance Indicator A2.A.51 - determine the domain and range of a function from its graph [Algebra 2 and Trigonometry]

MST3-A2.A.52 [1 occurence] - MST Standard 3 - Algebra Strand - Students will recognize, use, and represent algebraically patterns, relations, and functions. [Coordinate Geometry] - Performance Indicator A2.A.52 - identify relations and functions, using graphs [Algebra 2 and Trigonometry]

MST3-A2.A.53 [1 occurence] - MST Standard 3 - Algebra Strand - Students will recognize, use, and represent algebraically patterns, relations, and functions. [Coordinate Geometry] - Performance Indicator A2.A.53 - graph exponential functions of the form y=bx for positive values of b, including b=e [Algebra 2 and Trigonometry]

MST3-A2.A.54 [1 occurence] - MST Standard 3 - Algebra Strand - Students will recognize, use, and represent algebraically patterns, relations, and functions. [Coordinate Geometry] - Performance Indicator A2.A.54 - graph logarithmic functions, using the inverse of the related exponential function [Algebra 2 and Trigonometry]

MST3-G.G.74 [1 occurence] - MST Standard 3 - Geometry Strand - Students will apply coordinate geometry to analyze problem solving situations. [Coordinate Geometry] - Performance Indicator G.G.74 - graph circles of the form (x-h)2 + (j-k)2 = r2 [Geometry]