MVS Course Alignment Document

ALGEBRA 1 MMC

*Delineates Recommended Content

STRAND 1: QUANTITATIVE LITERACY AND LOGIC

L1 Reasoning About Numbers, Systems, And Quantitative Literacy

L1.1 Number Systems and Number Sense		Unit	Lesson	Resources
L1.1.1	Know the different properties that hold in different number systems, and recognize that the applicable properties change in the transition from the positive integers, to all integers, to the rational numbers, and to the real numbers.	1	1.5, 1.7,	**Holt E-text:** Section 1.5, 1.7, 3.3,
L1.1.2	Explain why the multiplicative inverse of a number has the same sign as the number, while the additive inverse of a number has the opposite sign.	1	1.2, 1.3	**Holt E-Text:** Section 1.2, 1.3
L1.1.3	Explain how the properties of associativity, commutativity, and distributivity, as well as identity and inverse elements, are used in arithmetic and algebraic calculations.	1	1.7	**Holt E-Text:** Section 1.7
L1.1.4	Describe the reasons for the different effects of multiplication by, or exponentiation of, a positive number by a number less than 0, a number between 0 and 1, and a number greater than 1.	1	1.3,	**Holt E-text:** Section 1.3,
L1.1.5	Justify numerical relationships (e.g., show that the sum of even integers is even; that every integer can be written as $3m+k$, where k is 0, 1, or 2, and m is an integer; or that the sum of the first n positive integers is $n(n+1)/2$).	1	1.2	**Holt E-Text:** Section 1.2
L1.2	**Representations and Relationships**	**Unit**	**Lesson**	**Resources**
L1.2.2	Interpret representations that reflect absolute value relationships (e.g. $\lvert x - a \rvert \leq b$, or $a \pm b$) in such contexts as error tolerance.	2	2.3, 2.10	**Holt E-text:** Chapter 2 Extension, Chapter 3 Extension
L1.2.4	Organize and summarize a data set in a table, plot, chart, or spreadsheet; find patterns in a display of data; understand and critique data displays in the media.	5	5.1	**Holt E-text:** Section 4.5; **GIZMOS**: Scatterplots - Activity A, Correlation, Solving Using Trend Lines, Lines of Best Fit Using Least Squares - Activity A

L2 Calculation, Algorithms, And Estimation

L2.1 Calculation Using Real and Complex Numbers		Unit	Lesson	Resources
L2.1.1	Explain the meaning and uses of weighted averages (e.g., GNP, consumer price index, grade point average).	4	4.4	**Holt E-text:** Section 6.4
L2.1.2	Calculate fluently with numerical expressions involving exponents; use the rules of exponents; evaluate numerical expressions involving rational and negative exponents; transition easily between roots and exponents.	6	6.1, 6.2, 6.3, 6.4,	**Holt E-text**: Sections 7.1, 7.2, 7.3, 7.4; **GIZMOS:** Exponents & Power Rules and Dividing Exponential Expressions
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.	9	9.3	**United Streaming Video:** Why are Logarithms Important, Exponents, Roots, & Logarithms; Logarithm PowerPoint;
L2.1.4	Know that the complex number i is one of two solutions to $x2 = -1$.	8	8.10	**United Streaming Video:** How are complex numbers used; Complex Numbers Notes; **SASinSchool Interactivity** 1244: Complex Numbers;
L2.1.5	Add, subtract, and multiply complex numbers. Use conjugates to simplify quotients of complex numbers.	8	8.10	**United Streaming Video:** How are complex numbers used; Complex Numbers Notes; **SASinSchool Interactivity** 1244: Complex Numbers;

L2.1.6	Recognize when exact answers aren't always possible or practical; use appropriate algorithms to approximate solutions to equations (e.g., to approximate square roots).	9	9.5	**Holt E-text:** Section 11.6

L3 Measurement And Precision

L3.1	Measurement Units, Calculations, and Scales	Unit	Lesson	Resources
L3.1.2	Describe and interpret logarithmic relationships in such contexts as the Richter scale, the pH scale, or decibel measurements (e.g., explain why a small change in the scale can represent a large change in intensity); solve applied problems.	9	9.3	**United Streaming Video:** Why are Logarithms Important, Exponents, Roots, & Logarithms; Logarithm PowerPoint;

STRAND 2: ALGEBRA AND FUNCTIONS

A1 Expressions, Equations, And Inequalities

A1.1	Construction, Interpretation, and Manipulation of Expressions (linear, quadratic, polynomial, rational, power, exponential, and logarithmic)	Unit	Lesson	Resources
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.	1	1.1, 1.7	**Holt E-text:** Sections 1.1, 1.7; **GIZMOS:** Using Algebraic Expressions and Using Algebraic Equations
A1.1.2	Know the definitions and properties of exponents and roots, transition fluently between them, and apply them in algebraic expressions.	6	6.1, 6.2, 6.3, 6.4,	**Holt E-text**: Sections 7.1, 7.2, 7.3, 7.4; **GIZMOS:** Exponents & Power Rules and Dividing Exponential Expressions
A1.1.3	Factor algebraic expressions using, for example, greatest common factor, grouping, and the special product identities (e.g., differences of squares and cubes).	7	All of Unit 7	**Holt E-text:** Sections 8.1, 8.2, 8.3, 8.4, 8.5, 8.6; **GIZMOS:** Modeling the Factorization of $x^2 + bx + c$, Modeling the Factorization of ax2 + bx + c, Factoring Special Products
A1.1.6	Use the properties of exponents and logarithms, including the inverse relationship between exponents and logarithms, to transform exponential and logarithmic expressions into equivalent forms.	9	9.3	**United Streaming Video:** Why are Logarithms Important, Exponents, Roots, & Logarithms; Logarithm PowerPoint;

A1.2	Solutions of Equations and Inequalities (linear, exponential, logarithmic, quadratic, power, polynomial, and rational)	Unit	Lesson	Resources
A1.2.1	Write and solve equations and inequalities with one or two variables to represent mathematical or applied situations.	2	All of Unit 2	**Holt E-text:** Section 2.4, 2.5, Chapter 2 Extension, 3.1, 3.2, 3.3, 3.4, 3.5, 3.6, Chapter 3 Extension ; **GIZMOS:** Solving One Step Equations - Activity A, Modeling & Solving Two-Step Equations, Solving Two Step Equations, Solving Formulas for Any Variable, Solving Inequalities using addition and subtraction, Solving Inequalities by multiplication or division,
A1.2.2	Associate a given equation with a function whose zeros are the solutions of the equation.	8	8.2	**Holt E-text:** Section 9.2; **GIZMO:** Quadratic Functions
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 solutions, and apply the quadratic formula appropriately.	8	8.5, 8.6, 8.7, 8.9, 8.11	**United Streaming Video**: Why are Quadratics Important; **Holt E-text:** 9.5, 9.6, 9.7, 9.9; Quadratics Inequalities Notes & Problems; **SASinSchool Interactivity** 1244: Factoring & Quadratic Inequalities; **GIZMOS:** Quadratics in Factored Form, Roots of a Quadratic, Quadratic Inequalities - Activity A, Quadratic Inequalities- Activity B, System of Two Quadratic Inequalities;
A1.2.4	Solve absolute value equations and inequalities, (e.g. solve $\lvert x - 3 \rvert \leq 6$), and justify.	2	2.3, 2.10	**Holt E-text:** Chapter 2 Extension, Chapter 3 Extension
A1.2.6	Solve power equations (e.g., $(x + 1)^3 = 8$) and equations including radical expressions (e.g., $\sqrt{3x - 7} = 7$), ify steps in the solution, and explain how extraneous solutions may arise.	9	9.4, 9.5, 9.6, 9.7, 9.8	**Holt E-text:** Sections 11.5, 11.6, 11.7, 11.8, 11.9; **GIZMOS:** Functions Involving Square Roots & Operations with Radical Expressions

	A1.2.8	Solve an equation involving several variables (with numerical or letter coefficients) for a designated variable. Justify steps in the solution.	2	2.1, 2.2	**Holt E-Text:** Section 2.4, 2.5; **GIZMOS:** Solving formulas for any variable
A2 Functions					
A2.1	**Definitions, Representations, and Attributes of Functions**		**Unit**	**Lesson**	**Resources**
	A2.1.1	Recognize whether a relationship (given in contextual, symbolic, tabular, or graphical form) is a function; and identify its domain and range.	3	3.1, 3.2, 3.3, 3.4	**United Streaming Video:** Recursive Functions, Swimming & Graphing Functions; **Holt E-text:** Section 4.2, 4.3, 4.4, 5.1; **GIZMO:** Linear Functions
	A2.1.2	Read, interpret, and use function notation, and evaluate a function at a value in its domain.	1	1.8	**Holt E-text :** Section 1.8
	A2.1.3	Represent functions in symbols, graphs, tables, diagrams, or words, and translate among representations.	3	3.3	**Holt E-text:** Section 4.4
	A2.1.4	Recognize that functions may be defined by different expressions over different intervals of their domains; such functions are piecewise-defined (e.g., absolute value and greatest integer functions).	2, 3	2.3, 3.1, 3.2, 3.13	**Holt E-text:** Chapter 2 Extension, Section 4.2, 4.3, Chapter 5 Extension
	A2.1.5	Recognize that functions may be defined recursively, and compute values of and graph simple recursively defined functions (e.g., $f(0) = 5$, and $f(n) = f(n\text{-}1) + 2$).	3	3.2	**United Streaming Video**: Recursive Functions; **Holt E-text:** Section 4.3
	A2.1.6	Identify the zeros of a function and the intervals where the values of a function are positive or negative, and describe the behavior of a function, as x approaches postive or negative infinity, given the symbolic and graphical representations.	3, 8	3.12, 8.2	**Holt E-text:** Section 5.9, 9.2; **GIZMO:** Quadratic Functions
	A2.1.7	Identify and interpret the key features of a function from its graph or its formula(e), (e.g. slope, intercept(s), asymptote(s), maximum and minimum value(s), symmetry, average rate of change over an interval).	3	3.4, 3.6	**Holt E-text:** Section 5.1, 5.3
A2.2	**Operations and Transformations**		**Unit**	**Lesson**	**Resources**
	A2.2.1	Combine functions by addition, subtraction, multiplication, and division.	6	6.5, 6.6	**Holt E-text:** Section 7.5, 7.6; **GIZMO:** Polynomials & Linear Factors
	A2.2.2	Apply given transformations (e.g., vertical or horizontal shifts, stretching or shrinking, or reflections about the x- and y-axes) to basic functions, and represent symbolically.	3	3.12	**Holt E-text:** Section 5.9
	A2.2.3	Recognize whether a function (given in tabular or graphical form) has an inverse and recognize simple inverse pairs (e.g., $f(x) = x^3$ and $g(x) = x^{1/3}$).	9	Exponential Functions in the Real World	**United Streaming Video:** Inverse Functions
A2.3	**Families of Functions (linear, quadratic, polynomial, power, exponential, and logarithmic)**		**Unit**	**Lesson**	**Resources**
	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 at infinity, and describe these behaviors.	3	3.12	**Holt E-text:** Section 5.9
	A2.3.2	Describe the tabular pattern associated with functions having constant rate of change (linear); or variable rates of change.	3	3.6	**Holt E-text:** Section 5.3

A2.4	Lines and Linear Functions	Unit	Lesson	Resources
A2.4.1	Write the symbolic forms of linear functions (standard [i.e., $Ax + By = C$, where $B \neq 0$], point-slope, and slope-intercept) given appropriate information, and convert between forms.	3	3.9, 3.10	**Holt E-text:** Section 5.6, 5.7; **GIZMOS:** Point-Slope Form of a Line, Slope Intercept Form of a Line
A2.4.2	Graph lines (including those of the form $x = h$ and $y = k$) given appropriate information.	3	3.3, 3.4, 3.5	**United Streaming Video:** Using Intercepts to Launch Fireworks, Swimming & Graphing Functions; **Holt E-text:** Section 4.4, 5.1, 5.2; **GIZMO:** Linear Functions
A2.4.3	Relate the coefficients in a linear function to the slope and x- and y-intercepts of its graph.	3	3.5, 3.6, 3.7	**United Streaming Video:** Using Intercepts to Launch Fireworks; **Holt E-text:** Section 5.2, 5.3, 5.4; **GIZMO:** Slope - Activity A
A2.4.4	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.	3	3.11	**Holt E-text:** Section 5.8
A2.5	**Exponential and Logarithmic Functions**	**Unit**	**Lesson**	**Resources**
A2.5.1	Write the symbolic form and sketch the graph of an exponential function given appropriate information. (e.g., given an initial value of 4 and a rate of growth of 1.5, write $f(x) = 4\ (1.5)^x$).	9	9.1	**United Streaming Video:** Why are Exponents Important; **Holt E-text:** Section 11.2; **GIZMO:** Exponential Functions-Activity A
A2.5.4	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.	9	9.2	**United Streaming Video:** Why are Exponents Important; **Holt E-text:** Section 11.3; **GIZMO:** Exponential Growth & Decay - Activity B
A2.5.5	Relate exponential and logarithmic functions to real phenomena, including half-life and doubling time.	9	9.2, Exponential Functions in the Real World	**United Streaming Video:** Why are Exponents Important; **Holt E-text:** Section 11.3; **GIZMO:** Exponential Growth & Decay - Activity B, Half-Life, Simple & Compound Interest
A2.6	**Quadratic Functions**	**Unit**	**Lesson**	**Resources**
A2.6.1	Write the symbolic form and sketch the graph of a quadratic function given appropriate information (e.g., vertex, intercepts, etc.).	8	8.1, 8.2, 8.3, 8.4	**United Streaming Video:** Why are Quadratics Important; **Holt E-text:** Sections 9.1, 9.2, 9.3, 9.4; **GIZMOS:** Quadratic Functions, Quadratics in Vertex Form
A2.6.2	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	8	8.1, 8.2,	**United Streaming Video:** Why are Quadratics Important; **Holt E-text:** Sections 9.1, 9.2; **GIZMOS:** Quadratic Functions
A2.6.3	Convert quadratic functions from standard to vertex form by completing the square.	8	8.8	**United Streaming Video:** Why are Quadratics Important; **Holt E-text:** Section 9.8
A2.6.4	Relate the number of real solutions of a quadratic equation to the graph of the associated quadratic function.	8	8.1, 8.2, 8.3, 8.4, 8.5	**United Streaming Video:** Why are Quadratics Important; **Holt E-text:** Sections 9.1, 9.2, 9.3, 9.4, 9.5; **GIZMOS:** Quadratic Functions, Quadratics in Vertex Form
A2.6.5	Express quadratic functions in vertex form to identify their maxima or minima, and in factored form to identify their zeros.	8	8.6, 8.7	**United Streaming Video:** Why are Quadratics Important; **Holt E-text:** Sections 9.6, 9.7; **SASinSchool Interactivity** 1244: Factoring; **GIZMOS:** Quadratics in Factored Form
A2.7	**Power Functions (including roots, cubics, quartics, etc.)**	**Unit**	**Lesson**	**Resources**
A2.7.1	Write the symbolic form and sketch the graph of power functions.	9	9.4, 9.8	**Holt E-text:** Sections 11.5, 11.9; **GIZMOS:** Functions Involving Square Roots
A2.7.2	Express direct and inverse relationships as functions (e.g., $y = kx^n$ and $y = kx^n$, $n > 0$) and recognize their characteristics (e.g., in $y = x^3$, note that doubling x results in multiplying y by a factor of 8).	9	Exponential Functions in the Real World	**United Streaming Video:** Inverse Functions
A2.7.3	Analyze the graphs of power functions, noting reflectional or rotational symmetry.	9	9.4, 9.8	**Holt E-text:** Sections 11.5, 11.9; **GIZMOS:** Functions Involving Square Roots
A2.8	**Polynomial Functions**	**Unit**	**Lesson**	**Resources**

A2.8.1	Write the symbolic form and sketch the graph of simple polynomial functions.	9	9.9	**United Streaming Video:** Why are Polynomials Important; **SASinSchool Interactivity 1244:** Polynomial Functions; Polynomial Functions PowerPoint; Polynomial Functions Assignment (located at www.futureschannel.com)
A2.8.2	Understand the effects of degree, leading coefficient, and number of real zeros on the graphs of polynomial functions of degree greater than 2.	9	9.9	**United Streaming Video:** Why are Polynomials Important; **SASinSchool Interactivity 1244:** Polynomial Functions; Polynomial Functions PowerPoint; Polynomial Functions Assignment (located at www.futureschannel.com)
A2.8.3	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.	9	9.9	**United Streaming Video:** Why are Polynomials Important; **SASinSchool Interactivity 1244:** Polynomial Functions; Polynomial Functions PowerPoint; Polynomial Functions Assignment (located at www.futureschannel.com)

A3 Mathematical Modeling

A3.1	**Models of Real-world Situations Using Families of Functions (linear, quadratic, exponential and power)** *Example: An initial population of 300 people grows at 2% per year. What will the population be in 10 years?*	**Unit**	**Lesson**	**Resources**
A3.1.1	Identify the family of function best suited for modeling a given real-world situation (e.g., quadratic functions for motion of an object under the force of gravity; exponential functions for compound interest. In the example above, recognize that the appropriate general function is exponential ($P=P_0a^1$).	9	9.2	**Holt E-text:** Section 11.3; **GIZMO:** Exponential Growth & Decay, Half-Life, Simple & Compound Interest
A3.1.2	Adapt the general symbolic form of a function to one that fits the specifications of a given situation by using the information to replace arbitrary constants with numbers. In the example above, substitute the given values P_0 = 300 and a = 1.02 to obtain $P = 300(1.02)^t$.	9	9.2	**Holt E-text:** Section 11.3; **GIZMO:** Exponential Growth & Decay, Half-Life, Simple & Compound Interest
A3.1.3	Using the adapted general symbolic form, draw reasonable conclusions about the situation being modeled. In the example above, the exact solution is 365.698, but for this problem an appropriate approximation is 365.	9	9.2	**Holt E-text:** Section 11.3; **GIZMO:** Exponential Growth & Decay, Half-Life, Simple & Compound Interest
***A3.1.4**	Use methods of linear programming to represent and solve simple real-life problems.			

STRAND 4: STATISTICS AND PROBABILITY

S2 Bivariate Data – Examining Relationships

S2.1	**Scatterplots and Correlation**	**Unit**	**Lesson**	**Resources**
S2.1.1	Construct a scatterplot for a bivariate data set with appropriate labels and scales.	5	5.1	**Holt E-text:** Section 4.5; **GIZMOS**: Scatterplots - Activity A, Correlation, Solving Using Trend Lines, Lines of Best Fit Using Least Squares - Activity A
S2.1.2	Given a scatterplot, identify patterns, clusters, and outliers; recognize no correlation, weak correlation, and strong correlation.	5	5.1	**Holt E-text:** Section 4.5; **GIZMOS**: Scatterplots - Activity A, Correlation, Solving Using Trend Lines, Lines of Best Fit Using Least Squares - Activity A
S2.1.3	Estimate and interpret Pearson's correlation coefficient for a scatterplot of a bivariate data set; recognize that correlation measures the strength of linear association.	5	5.1	**Holt E-text:** Section 4.5; **GIZMOS**: Scatterplots - Activity A, Correlation, Solving Using Trend Lines, Lines of Best Fit Using Least Squares - Activity A
S2.1.4	Differentiate between correlation and causation; know that a strong correlation does not imply a cause-and-effect relationship; recognize the role of lurking variables in correlation.	5	5.1	**Holt E-text:** Section 4.5; **GIZMOS**: Scatterplots - Activity A, Correlation, Solving Using Trend Lines, Lines of Best Fit Using Least Squares - Activity A

S2.2	Linear Regression		Unit	Lesson	Resources
	S2.2.1	For bivariate data which appear to form a linear pattern, find the least squares regression line by estimating visually and by calculating the equation of the regression line; interpret the slope of the equation for a regression line.	5	5.1	**Holt E-text:** Section 4.5; **GIZMOS**: Scatterplots - Activity A, Correlation, Solving Using Trend Lines, Lines of Best Fit Using Least Squares - Activity A
	S2.2.2	Use the equation of the least squares regression line to make appropriate predictions.	5	5.1	**Holt E-text:** Section 4.5; **GIZMOS**: Scatterplots - Activity A, Correlation, Solving Using Trend Lines, Lines of Best Fit Using Least Squares - Activity A