Algebra I Mathematics Curriculum Guide

Grade Level/Course Title: MS/HS Algebra I	**Quarter** 1	**Academic Year:** 2018-2019

Mathematics Focus for the Course:
For the Model Algebra I course, instructional time should focus on four critical areas: (1) deepen and extend understanding of linear and exponential relationships; (2) contrast linear and exponential relationships with each other and engage in methods for analyzing, solving, and using quadratic functions; (3) extend the laws of exponents to square and cube roots; and (4) apply linear models to data that exhibit a linear trend.

Essential Questions for this Unit:

1. How can students develop an understanding of the use of variable in mathematical expressions, write expressions and equations that correspond to given situations, evaluate expressions, and use expressions and formulas to solve problems?
2. How can students understand that expressions in different forms can be equivalent, and use the properties of operations to rewrite expressions in equivalent forms?

Unit (Time)	Standard	Standard Description	Content	Resources
Unit 1: Seeing Structure in Expressions (Aug-Sept) **Chapter 1: Foundations for Algebra** **(13 days)**	A-SSE 1a	Interpret parts of an expression, such as terms, factors, and coefficients.	Understanding: Decomposition Zero Pairs Bar Models Justifications Syntax Equivalency Distributing a Negative Equivalent Forms of One Side by Side Comparisons	**Foundations for Algebra** *Chapter 1 reviews 7th and 8th grade standards and is optional. It is recommended that these lessons be selectively taught according to your students' needs.* Lesson 1-1: Variables and Expressions (1 day) Lesson 1-2: Order of Operations and Evaluating Expressions (1 day) Lesson 1-3: Real Numbers and the Number Line (1 day) Lesson 1-4: Properties of Real Numbers (1 day) Mid-Chapter Quiz Lesson 1-5: Adding and Subtracting Real Numbers (1 day) Lesson 1-6: Multiplying and Dividing Real Numbers (1 day) Lesson 1-7: The Distributive Property (2 days) Lesson 1-8: An Introduction to Algebra (2 days *Optional)* Review: Graphing in the Coordinate Plane Lesson 1-9: Patterns, Equations, and Graphs (1 day) Review, Assessment, and Corrections (2 Days)
	A-CED 1	Create equations and inequalities in one variable including ones with absolute value and use them to solve problems. Include equations arising from linear and quadratic functions, and simple rational and exponential functions.		
	A.CED 2	Create equations and inequalities in two or more variables to represent relationships between quantities; graph equations on coordinate axes with labels and scales.		
	A-REI 10	Understand that the graph of an equation in two variables is the set of all it solutions plotted in the coordinate plane.		

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Essential Questions for this Unit:

3. How can students build on their previous learning about how to solve linear equations in one variable and having applied algebraic methods to analyze and solve multi-step equations?
4. How can students develop fluency writing, interpreting, and translating among various forms of linear equations and inequalities, and use them to solve problems?
5. How can students master the solution of linear equations and apply related solution techniques to linear equations with no solutions, and infinitely many solutions?

Unit (Time)	Standard	Standard Description	Content	Resources
Unit 2: Reasoning with Equations & Inequalities (Sept-Oct) **Chapter 2: Solving Equations** **(14 days)**	A-CED 1	Create equations and inequalities in one variable including ones with absolute value and use them to solve problems. Include equations arising from linear and quadratic functions, and simple rational and exponential functions.	Understanding: Decomposition Inverse Operations Zero Pairs Bar Models Justifications Syntax Equivalency Equivalent Forms of One Transforming Equations Side by Side Comparisons	*Lessons 2-1 and 2-2 review 6th and 7thgrade standards and are optional. It is recommended that these lessons be selectively taught according to your students' needs.* Lesson 2-1: One-step equations (2 days) Syntax-Expressions and Equations [L] One-Step Equations [L] Bar Models – Solving Equations [CP] Lesson 2-2: Two-step equations (2 days) Lesson 2-3: Multi-step equations (3 days) Solving Equations w/Two Column Proofs [L] Solving Equations – Multiple Methods [L] Lesson 2-4: Variables on both sides (3 days) Solving Equations w/Variables on Both Sides [L] Lesson 2-5: Literal Equations and Formulas (2 days) Review, Assessment, & Corrections (2 days) *Lessons 2-6 through 2-10 are recommended for 7th grade students enrolled in Algebra I for SBAC review, but are optional for everyone else.* *Lesson 2-6: Ratios, Rates, and Conversions* *Lesson 2-7: Solving Proportions* *Lesson 2-8: Proportions and Similar Figures* *Lesson 2-9: Percents* *Lesson 2-10: Percent of Change*
	A-REI 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		
	A-REI 3	Solve linear equations and inequalities in one variable, including equations with coefficients represented by letters		
	A-CED 4	Rearrange formulas to highlight a quantity of interest, using the same reasoning as in solving equations.		

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Essential Questions for this Unit:

6. How can students develop fluency writing, interpreting, and translating among various forms of linear equations and inequalities, and use them to solve problems?
7. How can students master the solution of inequalities and apply related solution techniques to inequalities with no solutions, and infinitely many solutions?
8. How can students explore inequalities, and they find and interpret their solutions?

Unit (Time)	Standard	Standard Description	Content	Resources
Unit 2: Reasoning with Equations & Inequalities (Oct) **Chapter 3: Solving Inequalities** **(12 days)**	A-REI 3	Solve linear equations and inequalities in one variable, including equations with coefficients represented by letters	Understanding: Decomposition Inverse Operations Zero Pairs Bar Models Justifications Syntax Equivalency Equivalent Forms of One Transforming Equations Side by Side Comparisons	**Solving Inequalities** Lesson 3-1: Inequalities and Their Graphs (1 day) Inequalities Sort [L] Lesson 3-2: Solving Inequalities Add/Sub (1 day) Lesson 3-3: Solving Inequalities Mult./Divi. (1 day) Lesson 3-4 Multi-step Inequalities (2 days) Solving Inequalities [L] Mid-Chapter Quiz Lesson 3-6 Compound Inequalities (2 days) Lesson 3-7 Absolute Value Equations & Inequalities (3 days) Absolute Value Equations and Inequalities [CP] Review, Assessment, & Corrections (2 days) **Quarterly Assessment #1**
	A-CED 1	Create equations and inequalities in one variable including ones with absolute value and use them to solve problems. Include equations arising from linear and quadratic functions, and simple rational and exponential functions.		
	A-SSE 1b	Interpret complicated expressions by viewing one or more of their parts as a single entity.		

Grade Level/Course Title: MS/HS Algebra I	**Quarter** 2	**Academic Year:** 2018-2019

Mathematics Focus for the Course:
For the Model Algebra I course, instructional time should focus on four critical areas: (1) deepen and extend understanding of linear and exponential relationships; (2) contrast linear and exponential relationships with each other and engage in methods for analyzing, solving, and using quadratic functions; (3) extend the laws of exponents to square and cube roots; and (4) apply linear models to data that exhibit a linear trend.

Essential Questions for this Unit:

1. How can students build on learning in earlier grades, when students learned to define, evaluate, and compare functions, and use them to model relationships between quantities?
2. How can students learn function notation and develop the concepts of domain and range?
3. How can students build upon their prior experiences with data, and explore a more formal means of assessing how a model fits data?
4. How can students use regression techniques to describe approximately linear relationships between quantities?
5. How can students use graphical representations and knowledge of context to make judgments about the appropriateness of linear models, and with linear models, look at residuals to analyze the goodness of fit?

Unit (Time)	Standard	Standard Description	Content	Resources
Unit 2: Reasoning with Equations & Inequalities (Oct-Nov) **Chapter 4: Introduction to Functions** **(13 days)**	A-REI 10	Understand that the graph of an equation in two variables is the set of all it solutions plotted in the coordinate plane, often forming a curve (which could be a line).	Understanding: Creating Equations Reasoning with Equations Interpreting Functions Multiple ways to present data (Equations, tables, graphs)	**Introduction to Functions** Lesson 4-1 Using Graphs to Relate Two Quantities (1 day) Lesson 4-2 Patterns and Linear Functions (1 day) Lesson 4-3 Patterns and Nonlinear Functions (1 day) Mid-Chapter Quiz Lesson 4-4 Graphing a Function Rule (2 days) Lesson 4-5 Writing a Function Rule (2 days) Lesson 4-6 Formalizing Relations and Function (2 days)
	F-IF 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.		
	F-IF 2	Use function notation, evaluate functions for inputs in their domains, and interpret statements that use function notation in terms of a context.		
	F-IF 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.		
	F-IF 5	Relate the domain of a function to its graph and, where applicable, to the quantitative relationship it describes.		

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For the Model Algebra I course, instructional time should focus on four critical areas: (1) deepen and extend understanding of linear and exponential relationships; (2) contrast linear and exponential relationships with each other and engage in methods for analyzing, solving, and using quadratic functions; (3) extend the laws of exponents to square and cube roots; and (4) apply linear models to data that exhibit a linear trend.

Essential Questions for this Unit:

1. How can students build on learning in earlier grades, when students learned to define, evaluate, and compare functions, and use them to model relationships between quantities?
2. How can students learn function notation and develop the concepts of domain and range?
3. How can students build upon their prior experiences with data, and explore a more formal means of assessing how a model fits data?
4. How can students use regression techniques to describe approximately linear relationships between quantities?
5. How can students use graphical representations and knowledge of context to make judgments about the appropriateness of linear models, and with linear models, look at residuals to analyze the goodness of fit?
6. How can students interpret arithmetic sequences as linear functions?

Unit (Time)	Standard	Standard Description	Content	Resources
Unit 2: Reasoning with Equations and Inequalities (Oct-Nov) **Chapter 4: (cont)**	F-IF 3	Recognize that sequences are functions, sometimes defined recursively, whose domain is a subset of the integers.	Understanding: Creating Equations Reasoning with Equations Interpreting Functions Multiple ways to present data (Equations, tables, graphs)	**Introduction to Functions** Lesson 4-7: Arithmetic Sequences (2 days) Sequences – Arithmetic [L] Review, Assessment, & Corrections (2 days)
	F-BF 1a	Determine an explicit expression, a recursive process, or steps for calculation from a context.		
	F-BF 2	Write arithmetic and geometric sequences both recursively and with an explicit formula, use them to model situations, and translate between the two forms.		
	F-LE 2	Construct linear functions given a graph, a description of a relationship, or two input-output pairs (including reading these from a table.)		
	A-SSE 1a	Interpret parts of an expression, such as terms, factors, and coefficients.		

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Essential Questions for this Unit:

1. How can students build on learning in earlier grades, when students learned to define, evaluate, and compare functions, and use them to model relationships between quantities?
2. How can students learn function notation and develop the concepts of domain and range?
3. How can students build upon their prior experiences with data, and explore a more formal means of assessing how a model fits data?
4. How can students use regression techniques to describe approximately linear relationships between quantities?
5. How can students focus on linear, and explore absolute value, and interpret functions given graphically, numerically, symbolically, and verbally; translate between representations; and understand the limitations of various representations?

Unit (Time)	Standard	Standard Description	Content	Resources
Unit 3: Interpreting and Building Functions (Nov-Dec) **Chapter 5: Linear Functions** **(15 days)**	F-LE 1b	Recognize situations in which one quantity changes at a constant rate per unit interval relative to another.	Understanding: Creating Equations Interpreting Functions Multiple ways to present data (Equations, tables, graphs)	**Linear Functions** Lesson 5-1 Rate of Change and Slope (2 days) Discovering Slope [L] Lesson 5-3 Slope-Intercept Form (2 days) Slope-Intercept Sort [L] Lesson 5-4 Point-Slope Form (1 day) Lesson 5-5 Standard Form (2 days)
	F-IF 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.		
	F-IF 7a	Graph linear and quadratic functions and show intercepts, maxima, and minima.		
	F-LE 2	Construct linear functions given a graph, a description of a relationship, or two input-output pairs (including reading these from a table.)		
	F-BF 1	Write a function that describes a relationship between two quantities.		
	F-IF 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.		
	A.CED 2	Create equations and inequalities in two or more variables to represent relationships between quantities; graph equations on coordinate axes with labels and scales.		

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Essential Questions for this Unit:

6. How can students build on learning in earlier grades, when students learned to define, evaluate, and compare functions, and use them to model relationships between quantities?
7. How can students learn function notation and develop the concepts of domain and range?
8. How can students build upon their prior experiences with data, and explore a more formal means of assessing how a model fits data?
9. How can students use regression techniques to describe approximately linear relationships between quantities?
10. How can students focus on linear, and explore absolute value, and interpret functions given graphically, numerically, symbolically, and verbally; translate between representations; and understand the limitations of various representations?

Unit (Time)	Standard	Standard Description	Content	Resources
Unit 3: Interpreting and Building Functions (Nov-Dec) **Chapter 5: Linear Functions (cont.)**	S-ID 6	Represent data on two quantitative variables on a scatter plot, and describe how the variables are related	Understanding: Creating Equations Interpreting Functions Multiple ways to present data (Equations, tables, graphs)	**Linear Functions** *Lesson 5-6 Parallel and Perpendicular Lines (Optional; this is a Geometry topic.)* Lesson 5-7 Scatter Plots and Line Trends (2 days) Lesson 5-8 Graphing Absolute Value Functions (2 days) Review, Assessment, & Corrections (2 days)
	S-ID 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.*		
	S-ID 6c	Fit a linear function for a scatter plot that suggests a linear association.		
	S-ID 7	Interpret the slope (rate of change) and the intercept (constant term) of a linear model in the context of the data.		
	S-ID 8	Compute (using technology) and interpret the correlation coefficient of a linear fit.		
	F-IF 7b	Graph square root, cube root, and piecewise-defined functions including step functions and absolute value functions.		
	F-BF 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.		

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Essential Questions for this Unit:

1. How can students build on their previous learning about how to solve linear equations in one variable and having applied graphical and algebraic methods to analyze and solve systems of linear equations in two variables?
2. How can students analyze and explain the process of solving an equation and justify the process used in solving a system of equations?
3. How can students develop fluency writing, interpreting, and translating among various forms of linear equations and inequalities, and use them to solve problems?

Unit (Time)	Standard	Standard Description	Content	Resources
Unit 3 Interpreting and Building Functions (Jan) **Chapter 6 Systems of Equations & Inequalities** **(14 days)**	A-REI 6	Solve systems of linear equations exactly and approximately, focusing on pairs of linear equations in two variables.	Understanding: The solution is the point where the lines cross & is true for both equations. Intersecting, Parallel and Coinciding Lines Equivalent Equation Boundary Line Half Plane Test Point (0,0) and other test points. Solid lines, and shaded regions are solutions. Dashed lines, and unshaded regions are not solutions.	**Systems of Equations & Inequalities** Lesson 6-1 Solving Systems by Graphing (2 days) Graphing Systems [L] Lesson 6-2 Solve linear systems w/substitution (2 days) Solving a System by Substitution [L] Lesson 6-3 Solve Linear Systems Using Elimination (2 days) Systems of Equations – Multiple Methods [CP] Lesson 6-4 Applications of Linear Systems (3 days) Break-even Point Mixture Problems [L] Wind or Current Mid-Chapter Quiz Lesson 6-5 Linear Inequalities (1 day) Lesson 6-6 Systems of Linear Inequalities (2 days) Review, Assessment, & Corrections (2 days) **Quarterly Assessment #2**
	A-REI 5	Prove that, given a system of two equations in two variables, replacing one equation by the sum of that equations and a multiple of the other produces a system with the same solutions.		
	N-Q3	Choose a level of accuracy appropriate to limitations on measurement when reporting quantities		
	A-CED 3	Represent constraints by equations or inequalities, and by systems of equations and/or inequalities, and interpret solutions as viable or nonviable options in a modeling context.		
	A.REI 12	Graph the solutions to a linear inequality in two variables as a half-plane and graph the solution set to a system of linear inequalities in two variables as the intersection of the corresponding half-planes.		

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Essential Questions for this Unit:

1. How can students extend the laws of exponents to rational exponents involving square and cube roots and apply this new understanding of number; and strengthen their ability to see structure in and create quadratic and exponential expressions.
2. How can students become facile with algebraic manipulation, including rearranging and collecting terms, and factoring, identifying, and canceling common factors in rational expressions?
3. How can students build on and extend their understanding of integer exponents to consider exponential functions, and compare and contrast linear and exponential functions, distinguishing between additive and multiplicative change?
4. How can students interpret geometric sequences as exponential functions?

Unit (Time)	Standard	Standard Description	Content	Resources
Unit 3 Interpreting and Building Functions (Jan-Feb) **Chapter 7: Exponents and Exponential Functions** **(18 days)**	N-RN 1	Explain how the definition of the meaning of rational exponents follows from extending the properties of integer exponents to those values, allowing for a notation for radicals in terms of rational exponents.	Understanding: Definition of an Exponent Decomposition Equivalent Forms of One Area Models Using Generic Rectangles Algebra Tiles	**Exponents and Exponential Functions** Lesson 7-1 Zero & Negative Exponents (2 days) Zero and Negative Exponents [L] Lesson 7-2 Multiplying Powers with the Same Base (2 days) Lesson 7-3 More Multiplication Properties of Exponents (2 days) Lesson 7-4 Division Properties of Exponents (2 days) Quotient of Powers [L] Mid-Chapter Quiz Lesson 7-5 Rational Exponents & Radicals (1 day) Lesson 7-6 Exponential Functions (2 days) Lesson 7-7 Exponential Growth & Decay (3 days) Lesson 7-8 Geometric Sequences (2 days) Review, Assessment, & Corrections (2 days)
	N-RN 2	Rewrite expressions involving radicals and rational exponents using the properties of exponents.		
	F-IF 7c	Graph exponential and logarithmic functions, showing intercepts and end behavior.		
	F-IF 8b	Use the properties of exponents to interpret expressions for exponential functions.		
	F-LE 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).		
	F-LE 1c	Recognize situations in which a quantity grows or decays by a constant percent rate per unit interval relative to another.		
	F-BF 1a	Determine an explicit expression, a recursive process, or steps for calculation from a context.		
	F-BF 2	Write arithmetic and geometric sequences both recursively and with an explicit formula, use them to model situations, and translate between the two forms.		

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Essential Questions for this Unit:

5. How can students extend the laws of exponents to rational exponents involving square and cube roots and apply this new understanding of number; and strengthen their ability to see structure in and create quadratic and exponential expressions.
6. How can students become facile with algebraic manipulation, including rearranging and collecting terms, and factoring, identifying, and canceling common factors in rational expressions?

Unit (Time)	Standard	Standard Description	Content	Resources
Unit 4 Arithmetic with Polynomials and Rational Expressions (Feb-Mar) **Chapter 8: Polynomials and Factoring** **(18 days)**	A-APR 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	Understanding: Definition of an Exponent Decomposition Equivalent Forms of One Area Models Using Generic Rectangles Algebra Tiles	**Polynomials & Factoring** Lesson 8-1 Add and Subtract Polynomials (2 days) Lesson 8-2 Multiplying & Factoring (2 days) Lesson 8-3 Multiply Binomials (2 days) Connecting Binomial Multiplication and Factoring Trinomials Using Algebra Tiles [L] Lesson 8-4 Multiplying Special Cases (2 days) Mid-Chapter Quiz Lesson 8-5 Factoring $x^2 + bx + c$ (2 days) Factoring Quadratics-Class Notes [L] Factoring-GCF, Trinomials, Difference of Squares, Flowchart [CP] Lesson 8-6 Factoring ax^2+bx+c (2 days) Lesson 8-7 Factoring Special Cases (2 days) Lesson 8-8 Factoring by Grouping (2 days) Review, Assessment, & Corrections (2 days)
	A-SSE 1a	Interpret parts of an expression, such as terms, factors, and coefficients.		
	A-SSE 1b	Interpret complicated expressions by viewing one or more of their parts as a single entity.		
	A-SSE 2	Use the structure of an expression to identify ways to rewrite it.		

Grade Level/Course Title: MS/HS Algebra I	**Quarter** 3/4	**Academic Year:** 2018-2019

Mathematics Focus for the Course:
For the Model Algebra I course, instructional time should focus on four critical areas: (1) deepen and extend understanding of linear and exponential relationships; (2) contrast linear and exponential relationships with each other and engage in methods for analyzing, solving, and using quadratic functions; (3) extend the laws of exponents to square and cube roots; and (4) apply linear models to data that exhibit a linear trend.

Essential Questions for this Unit:

1. How can students create and solve equations, inequalities, and systems of equations involving quadratic expressions?
2. How can students consider quadratic functions, comparing the key characteristics of quadratic functions to those of linear and exponential functions, and select from among these functions to model phenomena?
3. How can students learn to anticipate the graph of a quadratic function by interpreting various forms of quadratic expressions, and in particular, identify the real solutions of a quadratic equation as the zeros of a related quadratic function?

Unit (Time)	Standard	Standard Description	Content	Resources
Unit 4 Arithmetic with Polynomials and Rational Expressions (Mar-Apr) **Chapter 9: Quadratic Equations and Functions** **(16 days)**	F-IF 7a	Graph linear and quadratic functions and show intercepts, maxima, and minima.	Understanding: Axis of Symmetry Maximum or Minimum Roots Zeros Concavity Critical Points (x-intercept, y-intercept, Vertex)	**Quadratic Functions & Equations** Lesson 9-1 Quadratic Graphs & Their Properties (2 days) Lesson 9-2 Quadratic Functions (1 day) Lesson 9-3 Solving Quadratic Equations (2 days) Graphing Family of Functions [L] Families of Functions Sort [L] Family of Functions – Graphing Calculator Lesson [L] Family of Functions Graphing Worksheet [L] Lesson 9-4 Factoring to Solve Quadratic Equations (1 day) Quadratics – Matching Game [L] Family of Functions and their Graphs [CP] Quadratic Equations – What We Know [L] Mid-Chapter Quiz Lesson 9-5 Completing the Square (2 days) Quadratics – Solving by Completing the Square, Factoring, Formula [CP] Lesson 9-6 The Quadratic Formula & the Discriminant (2 days) Lesson 9-7 Linear, Quadratic, & Exponential Models (2 days) Lesson 9-8 Systems of Linear & Quadratic Equations (2 days) Review, Assessment, & Corrections (2 days) **Quarterly Assessment #3**
	A-REI 4b	Solve quadratic equations by inspection, 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 $a \pm bi$ for real numbers a and b.		
	A-REI 4a	Use the method of completing the square to transform any quadratic equation in x into an equation of the form $(x – p)^2 = q$ that has the same solutions. Derive the quadratic formula from this form		
	F-LE 1a	Prove that linear functions grow by equal differences over equal intervals, and that exponential functions grow by equal factors over equal intervals.		
	A-REI 7	Solve a simple system consisting of a linear equation and a quadratic equation in two variables algebraically and graphically.		
	A-REI 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: $f(x)$ and/or $g(x)$ are linear, polynomial, rational, absolute value, exponential, and logarithmic functions.		

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Essential Questions for this Unit:
1. Building on their work with linear and quadratic functions, how can students extend their repertoire of functions to include radical functions?
2. How can students synthesize and generalize what they have learned about a variety of function families?

Unit (Time)	Standard	Standard Description	Content	Resources
Unit 4 Arithmetic with Polynomials and Rational Expressions (Apr-May) **Chapter 10: Radical Expressions and Equations** **(13 days)**	G-SRT 8	Use trigonometric ratios and the Pythagorean Theorem to solve right triangles in applied problems.	Understanding: The Pythagorean Theorem Decomposing Square and Cube Roots Applications of Radical Functions Simplifying Radicals Solving Radical Equations	**Radical Expressions & Equations** Lesson 10-1 The Pythagorean Theorem (2 days) Lesson 10-2 Simplifying Radicals (2 days) Lesson 10-3 Operations with Radical Expressions (2 days) Mid-Chapter Quiz Lesson 10-4 Solving Radical Equations (2 days) Lesson 10-5 Graphing Square Root Functions (1 day) *Lesson 10-6 Trig Ratios (2 days) optional* Review, Assessment, & Corrections (2 days) Connecting Graphing and Solving Absolute Value Equations and Functions [L] Functions – Families of Functions [CP] Introduction to Logarithms [L] Functions [CP]
	A-REI 2	Solve simple rational and radical equations in one variable, and give examples showing how extraneous solutions may arise.		
	F-IF 7b	Graph square root, cube root, and piecewise defined functions, including step functions and absolute value functions.		
	F-BF 4a	Solve an equation in the form $f(x) = c$ for a simple function f that has an inverse and write an expression for the inverse.		

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Essential Questions for this Unit:
1. How can students use the languages of set theory to expand their ability to compute and interpret theoretical and experimental probabilities for compound events, attending to mutually exclusive events, independent events, and conditional probability?
2. How can students make use of geometric probability models wherever possible?
3. How can students use probability to make informed decisions?

Unit (Time)	Standard	Standard Description	Content	Resources
Unit 5 Interpreting Categorical and Quantitative Data (May) **Chapter 12: Data Analysis and Probability** **(6 days)**	S-ID 1	Represent data with plots on the real number line (dot plots, histograms, and box plots).	Understanding: Histograms Box and Whisker Samples and Surveys Permutations Combinations Probability	**Data Analysis and Probability** Lesson 12-2 Frequency and Histograms (1 day) Lesson 12-3 Measures of Central Tendency & Dispersion (1 day) Lesson 12-4 Box-and-Whisker Plots (1 day) Lesson 12-5 Samples and Surveys (1 day) Mid-Chapter Quiz Lesson 12-6 Permutations and Combinations (1 day) Lesson 12-7 Theoretical and Experimental Probability (optional) Lesson 12-8 Probability of Compound Events (optional) Review, Assessment, & Corrections (2 days)
	S-ID 2	Use statistics appropriate to the shape of the data distribution to compare center (median, mean) and spread (interquartile range, standard deviation) of two or more different data sets.		
	S-IC 3	Recognize the purposes of and differences among sample surveys, experiments, and observational studies; explain how randomization relates to each.		
	S-CP 9	Use permutations and combinations to compute probabilities of compound events and solve problems.		
	S-CP 1	Describe events as subsets of a sample space (the set of outcomes) using characteristics (or categories) of the outcomes, or as unions, intersections, or complements of other events (“or,” “and,” “not”).		
	S-CP 7	Apply the Addition Rule, P(A or B) = P(A) + P(B) – P(A and B), and interpret the answer in terms of the model.		

Grade Level/Course Title: MS/HS Algebra I	**Quarter** 4	**Academic Year:** 2018-2019

Mathematics Focus for the Course:
For the Model Algebra I course, instructional time should focus on four critical areas: (1) deepen and extend understanding of linear and exponential relationships; (2) contrast linear and exponential relationships with each other and engage in methods for analyzing, solving, and using quadratic functions; (3) extend the laws of exponents to square and cube roots; and (4) apply linear models to data that exhibit a linear trend.

Essential Questions for this Unit:
4. How can students become facile with algebraic manipulation, including rearranging and collecting terms, and factoring, identifying, and canceling common factors in rational expressions?

Unit (Time)	Standard	Standard Description	Content	Resources
Unit 4 Arithmetic with Polynomials and Rational Expressions (May-Jun) **Chapter 11: Rational Expressions and Functions** **(16 days)**	A-CED 1	Create equations and inequalities in one variable including ones with absolute value and use them to solve problems. Include equations arising from linear and quadratic functions, and simple rational and exponential functions.	Understanding: Definition of an Exponent Decomposition Equivalent Forms of One Area Models Using Generic Rectangles Algebra Tiles Factoring Polynomials	**Rational Expressions and Functions** *Note: Lessons 11-1 through 11-5 cover Algebra II standards and are optional.* *Lesson 11-1 Simplifying Rational Expressions (2 days)* *Lesson 11-2 Multiplying and Dividing Rational Expressions (2 days)* *Lesson 11-3 Dividing Polynomials (2 days)* *Lesson 11-4 Adding and Subtracting Rational Expressions (2 days)* Mid Chapter Quiz *Lesson 11-5 Solving Rational Equations (2 days)* Lesson 11-6 Inverse Variation (2 days) Lesson 11-7 Graphing Rational Functions (2 days) Review, Assessment, & Corrections (2 days) **Quarterly Assessment #4**
	F-IF 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.*		
	F-IF 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 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*		