Math Department Curriculum Map Template, 2018-19

Subject: Algebra I (Algebra Bs, Algebra B Core)
Textbook: Emathinstruction.com, McGraw Hill 2018 edition
CC Algebra 1 Regents Examination Breakdown:

- Statistics - 10%, Numbers, Operations, Properties - 6%, Rate - 3%, Powers - 2%
- Equations and Inequalities - 25%
- Functions - 25%
- Polynomials - 10%, Quadratics - 10%, Systems - 9%

Marking Periods	Unit Title (Big Idea/Major Focus)	Topics/Skills	Evidence of Learning (Assessments)	Resources (texts, online tools, etc.)
Marking Period 1	1 - Building blocks of Algebra Enduring Understanding: ● There is meaning to the structure of an expression. ● Different number sets may be more appropriate than others given the context of a situation. ● The product of two irrational numbers is NOT always irrational. Essential Questions: ● Is a number just a number? ● How do we use the properties of real numbers to manipulate expressions? ● How do we translate english into mathematics - and why would we do it?	*Real Numbers* ● Classifying Real Numbers (Rational vs. Irrational and the Real Number System) ● Properties of Real Numbers (commutative, associative, distributive, zero product, inverses, identities, properties of equality) *Variables and Expressions* (algebraic and verbal representations) ● Evaluating expressions ○ Order of operations ○ Substitution ○ Using the graphing calculator ● Simplifying expressions - combining like terms ● Translating English to Algebraic Expressions and vice versa **Rates* ● Conversions, speed, using rate ***Vocabulary:*** *Commutative, Associative, Distributive, Zero product, additive/multiplicative identity, additive/multiplicative inverse, simplify, evaluate, combine, variable, expression, equation, coefficient, exponent, PEMDAS, reciprocal, substitution, more than, less than, equivalence, structure, rate, proportion,*	❏ Pre-Assessment Check ❏ Performance Tasks ❏ Quizzes ❏ Castle Learning ❏ Exit Tickets ❏ Do Nows ❏ Class Discussion ❏ Daily Handouts ❏ Unit Review and Re-engagement Activities ❏ Unit Exam	EMathinstruction.com Unit #1 McGraw Hill 2018 - Chapter 0, Chapter 1 ● Jmap.org ● Mathbits.com ● Engageny.org ● Bigideasmath.com ● Problem Attic ● Kuta Software ● Castle Learning ● Delta Math
	2 - One Variable Equations and Inequalities Enduring Understanding: ● A solution set makes an equation or inequality true ● Equations or inequalities can be represented in multiple and equivalent ways Essential Questions: ● Is an equation always true? ● What are the similarities and differences of equations and inequalities? ● Can the solution to an equation be something other than a number? ● How can expressions, equations and inequalities by transformed to find solutions?	*Equations in one variable* (algebraic and verbal representations) ● Solving Equations in one variable ○ Two-step, multi-step (and checking solutions) ○ Fractions/Decimals (and checking solutions) ○ Variables on both sides (and checking solutions) ○ Alternative Solutions (infinite and no solution) ○ Literal Equations ○ Translating English to Algebraic equations and vice versa *Inequalities in one variable* ● Comparing equations to inequalities (one solution vs. infinite) ● Express solution set of inequalities AND compound inequalities ○ Algebraically, Verbally ○ Graphically/number line (open vs. closed circle) ○ set builder/**interval notation* ● Solving inequalities ○ Comparing solving equations to inequalities ○ Solving multi-step inequalities (and checking possible solution) ○ Variables on both sides (and checking possible solutions)	❏ Pre-Assessment Check ❏ Performance Tasks ❏ Quizzes ❏ Castle Learning ❏ Exit Tickets ❏ Do Nows ❏ Class Discussion ❏ Daily Handouts ❏ Unit Review and Re-engagement Activities ❏ Unit Exam	EMathinstruction.com Unit #2 McGraw Hill 2018 - Chapter 2, Chapter 5 Online Resources: ● Jmap.org ● Mathbits.com ● Engageny.org ● Bigideasmath.com ● Problem Attic ● Kuta Software ● Castle Learning ● Delta Math

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		○ Translating English to Algebraic equations and vice versa ***Vocabulary:*** *sum, difference, product, quotient, total, is less than, is greater than, equal to, not equal to, maximum, minimum, at least, at most, included, excluded, solution, infinite solutions, set builder notation,interval, interval notation, manipulation, isolate*		
	3 - Functions Enduring Understanding: ● Functions can be represented in multiple, equivalent ways ● Function rules describe the quantitative relationship between variables Essential Questions: ● How do we measure change? ● Are all equations functions? Can you solve a function? ● Can an input have multiple outputs?	<u>*Relations*</u> ● Define a relation ● Identify and state Domain and Range from a graph, set, table, or mapping using set-builder notation (**interval notation*) ● Rate of Change ○ Calculate the rate of change given a rule, graph, table ○ Comparing rates given table, rule, or graph <u>*Functions*</u> ● Define a function ● Determine if a relation is a function from a table, rule (emphasize y= in graphing calculator), graph (vertical line test), set, mapping diagrams ● Matching and comparing between different representations. ● Function Notation and Evaluate a function algebraically, graphically and from a table or set (linear/absolute value/exponential/quadratic/square root). ● Interpreting a graph in context of a real world situation ○ Increasing, decreasing, rate of change ● Determine most appropriate domain from real number system given real word context. ***Vocabulary****: relation, functions, input, output, domain, range, vertical line test, coordinate plane, linear, absolute value, exponential, quadratic, square root, function notation, mapping diagram,*	❑ Pre-Assessment Check ❑ Performance Tasks ❑ Quizzes ❑ Castle Learning ❑ Exit Tickets ❑ Do Nows ❑ Class Discussion ❑ Daily Handouts ❑ Unit Review and Re-engagement Activities ❑ Unit Exam	EMathinstruction.com Unit #3 McGraw Hill 2018 - Chapter 1, Chapter 3 ● Jmap.org ● Mathbits.com ● Engageny.org ● Bigideasmath.com ● Problem Attic ● Kuta Software ● Castle Learning ● Delta Math
	Quarterly Exam #1 (Cumulative)			
Marking Period 2	4 - Linear Functions and Inequalities Enduring Understanding: ● A constant rate of change distinguishes a linear function from other functions. ● Linear functions can be used to make predictions in real world situations. Essential Questions: ● Why are lines straight? ● Where do lines begin? ● What real world situations can be modeled by linear functions?	<u>*Linear Functions*</u> ● Define linear function and identify the features of the function for standard and slope- intercept forms. ● Graph a linear function (emphasize y= in graphing calculator) ○ Given rule (slope-intercept form and standard form - converting to slope-intercept), table of values ○ Horizontal and Vertical Lines ● Determine the equation of a line in slope-intercept form ○ Given m and b, m and a point, two points, a graph, a table, equation in standard form, basic verbal representation ● Matching and comparing between different representations of linear functions. ● Create a linear function rule given a word problem. ○ interpret the meaning of the components in the context of the problem. ○ Solve for indicated inputs or outputs algebraically, graphically, or using a table. ● Linear Regression	❑ Pre-Assessment Check ❑ Performance Tasks ❑ Quizzes ❑ Castle Learning ❑ Exit Tickets ❑ Do Nows ❑ Class Discussion ❑ Daily Handouts ❑ Unit Review and Re-engagement Activities ❑ Unit Exam	EMathinstruction.com Unit #4 & Unit #10 McGraw Hill 2018 - Chapter 4, Chapter 5 ● Jmap.org ● Mathbits.com ● Engageny.org ● Bigideasmath.com ● Problem Attic ● Kuta Software ● Castle Learning ● Delta Math

		○ Create and Interpret Scatter plots ■ Discuss causation vs. correlation ○ Use the graphing calculator to determine equation of the line of best fit using linear regression. Identify and interpret correlation coefficient(Stat-Diagnostics). ○ **Residual plots* ○ Use regression to determine equation of a line given two points or a table. ● ** Introduction to Sequences* ○ *Domain of sequences* ○ *Sequence notation (include a_n and f(n))* ○ *Recursive Sequences* ○ *Arithmetic Sequences* ■ *Comparing the equivalent linear function rule to an arithmetic sequence in explicit form.* ■ *Determine the indicated term using the arithmetic sequence.* *Linear Inequalities* ● Graph a linear inequality on the coordinate plane. ● Determine if a point is a solution to the inequality graphically and algebraically. ● Create a linear inequality from a word problem and state a possible solution. ***Vocabulary**: Line, Point, Slope, constant rate of change, initial value, y-intercept, x-intercept, dashed line, solid line, solution region, scatter plots, linear regression, correlation, correlation coefficient, strong, causal, Sequence, Recursive, Arithmetic, common difference, term,*		
	5 - Systems of Linear Equations and Inequalities Enduring Understanding: ● Systems of linear equations can be used to model problems when there are multiple variables. ● Systems of equations can be solved by graphing, substitution, or eliminating a variable. Essential Questions: ● What does the number of solutions (none, one or infinite) of a system of linear equations represent? ● What are the advantages and disadvantages of solving a system of linear equations graphically versus algebraically?	*Systems of Linear Equations* ● Define a system of equations and when we use them (solving for more than one unknown value) and interpreting the meaning of the solution. ● Identify types of linear systems: consistent (dependent -infinite solution vs. independent -unique solution) and inconsistent (no solution) ● Solve the system graphically and state the solution (intersection point) ● Solve the system from a table ● Solve the system algebraically (and checking) ○ Substitution ○ Elimination by addition ● Use the structure of the system to determine the best method for solving. ● Create a system of equations given a real world situation and solve. ○ Interpret the solution in the context of the problem. *Systems of Linear Inequalities* ● Solve a system of linear inequalities by graphing. Identify and indicate the solution region with an “S” or provided variable. ● Create a system of linear inequalities given a verbal situation and state a possible solution. ***Vocabulary**: System of equations, consistent, inconsistent, dependent, independent, Elimination, simultaneous, coincide, parallel lines, intersecting, at least, at most, the same as, viable*	❑ Pre-Assessment Check ❑ Performance Tasks ❑ Quizzes ❑ Castle Learning ❑ Exit Tickets ❑ Do Nows ❑ Class Discussion ❑ Daily Handouts ❑ Unit Review and Re-engagement Activities ❑ Unit Exam	EMathinstruction.com Unit #5 McGraw Hill 2018 - Chapter 6 ● Jmap.org ● Mathbits.com ● Engageny.org ● Bigideasmath.com ● Problem Attic ● Kuta Software ● Castle Learning ● Delta Math
	Quarterly Exam #2			

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<table>
<tr>
<td rowspan="2">Marking Period 3</td>
<td>6 - Exponents & Exponential Functions

Enduring Understanding:
● A constant multiplier distinguishes an exponential function from other functions.
● Exponential functions can be used to make predictions in real world situations.

Essential Questions:
● What is the difference between a linear and an exponential function? Is rate still constant?
● Is it all about the base?</td>
<td><u>Rules of Exponents</u>
● Simplify expressions involving exponents
● Include 0 and negative exponents
*Scientific Notation
<u>Exponential Functions</u>
● Define and identify the features of an exponential function (constant multiplier, varying rate of change, initial value/y-intercept, asymptote*)
● Compare Linear vs. Exponential functions given multiple representations. (focus on constant rate vs. constant multiplier)
● Graph an exponential function.
● Write an exponential function given an exponential graph or table of values.
● Interpret or create an exponential equation in the context of a real world situation (Starting amount/y-intercept and the base/multiplier).
○ Use the multiplier to identify if the function is increasing or decreasing.
● Evaluate the exponential function from a given situation with solutions that need to be rounded to nearest integer, tenth, hundredth, thousandth.
<u>Exponential Regression</u>
● Create and Interpret Scatter plots
● Use graphing calculator to determine equation of the exponential function that best fits the given data using exponential regression. Identify and interpret correlation coefficient.
● Use regression to determine the exponential equation of the given two points or a table.
● Compare Linear vs. Exponential correlation coefficients to determine the better fit for the data.
<u>*Percent increase vs. decrease review</u>
- Using the (1 +/- r) multiplier.
- Converting % to a decimal and vice versa.
<u>Exponential Growth and Decay</u>
● Interpret the meaning of the components of the exponential growth/decay equation in the context of the problem.
○ Distinguish between the multiplier/factor and the rate.
● Given the verbal situation create the exponential growth/decay equation (emphasis on calculating the base involving the percentage of increase or decrease (b = 1+/-r).
● Determine the percent increase/decrease given an exponential function rule
<u>*Geometric Sequences</u>
● Comparing the equivalent exponential function rule to an geometric sequence in explicit form.
● Determine the indicated term using the geometric sequence.
● Recursive geometric sequeces

Vocabulary: multiplier, base, exponent, power, Growth factor, growth rate, decay, percent increase, percent decrease, common ratio, geometric sequence, asymptote, rounding, decimal, geometric, recursive, principal, rate, regression, correlation</td>
<td>❏ Pre-Assessment Check
❏ Performance Tasks
❏ Quizzes
❏ Castle Learning
❏ Exit Tickets
❏ Do Nows
❏ Class Discussion
❏ Daily Handouts
❏ Unit Review and Re-engagement Activities
❏ Unit Exam</td>
<td>EMathinstruction.com Unit #6
McGraw Hill 2018 - Chapter 7

● Jmap.org
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● Engageny.org
● Bigideasmath.com
● Problem Attic
● Kuta Software
● Castle Learning
● Delta Math</td>
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<td>7- Polynomials

Enduring Understanding:
● The properties of real numbers apply to polynomials.
● Factoring is the undoing of distribution
● The structure of a quadratic expression influences the factoring pathway.</td>
<td><u>Polynomials</u>
● Introduction to Polynomials: identify monomials, polynomials, and degrees.
● Combining (add/subtract) polynomials.
○ Perimeter models
○ *Sum of consecutive integers</td>
<td>❏ Pre-Assessment Check
❏ Performance Tasks
❏ Quizzes
❏ Castle Learning
❏ Exit Tickets
❏ Do Nows
❏ Class Discussion
❏ Daily Handouts</td>
<td>EMathinstruction.com Unit #8
McGraw Hill 2018 - Chapter 8

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● Engageny.org
● Bigideasmath.com
● Problem Attic</td>
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	Essential Questions: ● What is the opposite of distribution? ● Is a factor always a number?	● Multiply/Divide a polynomial by a monomial. ● Multiply two polynomials (binomial by binomial, squaring binomial, binomial by trinomial) ○ Area models ○ **Product of consecutive Integers* ○ Manipulating quadratic expressions that mimic the forms of quadratic function. (vertex to standard, factored to standard) ● Recognize and factor monomials (GCF) out of a polynomial. *<u>Factoring Quadratic Expressions</u>* ● Define a quadratic expression as it related to the function in standard form (a, b and c). ● Factor Quadratic trinomials (a=1, a>1) → (Factoring by grouping, borrow/payback, guess and check) ○ Manipulating quadratic expressions that mimic the forms of quadratic function (standard to factored). ● Difference of perfect squares (factoring) ○ Apply to higher degree expressions. ● **Factor a polynomial with 4 terms using the grouping method.* ● Factor Polynomial expressions completely ***Vocabulary**: Polynomial, degree, standard form, monomial, binomial, trinomial, area, perimeter, quadratic,cubic, factoring, perfect squares, conjugate pairs, consecutive integers, perfect squares, greatest common factor, coefficient, variable, like terms, power, exponent, base, constant,*	❏ Unit Review and Re-engagement Activities ❏ Unit Exam	● Kuta Software ● Castle Learning ● Delta Math
	8 - Quadratic Functions - EVERYTHING Enduring Understanding: ● The Structure of a Quadratic Equation provides insights about its key characteristics and how to find its solutions. ● Applying Zero Product Property to higher order polynomials in factored form is essential to determining the roots. Essential Questions : ● How many solutions are there to a quadratic function? ● What does a solution represent? ● How do we determine the best method for obtaining a solution?	*<u>Quadratic Functions</u>* ● Define Quadratic Function and Identify the features of a parabola. (vertex/max/min/turning point, axis of symmetry, roots/solutions/zeros/x-intercepts, y - intercept, open upward/downward, intervals of increasing/decreasing). ○ **Identify the zeros of a cubic polynomial* ● Introduce the 3 major forms of a quadratic function (standard, factored, vertex) and the features that can be determined from each form ● Determine the axis of symmetry and vertex of a quadratic function when it is in standard form (Identify as a minimum or maximum) algebraically ● Graph a parabola when the equation is in standard form manually and using the graphing calculator to identify the critical points/features. ○ Solve graphically (one solution (double-root), two solutions, no solution) ● Quadratic Modeling ○ Projectile Examples	❏ Pre-Assessment Check ❏ Performance Tasks ❏ Quizzes ❏ Castle Learning ❏ Exit Tickets ❏ Do Nows ❏ Class Discussion ❏ Daily Handouts ❏ Unit Review and Re-engagement Activities ❏ Unit Exam	EMathinstruction.com Unit #8, 9 McGraw Hill 2018 - Chapter 9 ● Jmap.org ● Mathbits.com ● Engageny.org ● Bigideasmath.com ● Problem Attic ● Kuta Software ● Castle Learning ● Delta Math

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		• Graph a parabola in factored form to check that it is equivalent to the standard form (use table to confirm)
		• Solve quadratics algebraically
		  ○ Factoring (zero product property), square roots.
		  ○ Completing the square (standard to vertex).
		  ■ Express irrational radicals in simplest radical form
		  ■ Leave irrational solutions in simplest radical form AND as rounded decimal.
		  ○ Quadratic formula.
		  ■ Express irrational radicals in simplest radical form
		  ■ Leave irrational solutions in simplest radical form AND as rounded decimal.
		  ○ Determine best method to use based upon structure of given quadratic equation.
		  ■ **analyzing roots using the discriminant.*
		• ** Solve Linear/ Quadratic Systems algebraically and graphically.*
		
		***Vocabulary**: Quadratic, parabola, standard form, factored form, vertex form, degree, solutions, roots, x-intercepts,zeros, axis of symmetry, vertex, maximum, minimum, turning point, rational, irrational, cubic, projectile, discriminant, radical, upward, downward*		

	Quarterly Exam #3			

Marking Period 4	9 - Application of Functions
	
	Enduring Understanding:
	• Functions are not always consistent through the overall domain.
	• Properties of inequalities can be applied to graph piece-wise functions.
	• Regardless of function type, the transformations can be determined from the given structure.
		• Piecewise functions
		  ○ Evaluate a piecewise function for given input
		  ○ .Given an equation, graph the piecewise function.
		  ○ Given the piecewise function, create a corresponding equation.
		  ○ **Step-Functions*
		  ○ Real world application examples
		• Transformations on functions
		  ○ Graph a function after given transformation
		  ○ Determine the transformations of any function from its parent given the function rule and vice versa.
		  ■ For specific function types and in terms of just f(x)
		  ■ From an algebraic or graphical representations
		  ○ **Identify the vertex of a quadratic when written in vertex form (as a means of the transformation)*
		  ■ *Use completing the square to*
			❑ Pre-Assessment Check
			❑ Performance Tasks
			❑ Quizzes
			❑ Castle Learning
			❑ Exit Tickets
			❑ Do Nows
			❑ Class Discussion
			❑ Daily Handouts
			❑ Unit Review and Re-engagement Activities
			❑ Unit Exam
				EMathinstruction.com Unit #11
				McGraw Hill 2018 - Chapter 3, Chapter 9
				
				• Jmap.org
				• Mathbits.com
				• Engageny.org
				• Bigideasmath.com
				• Problem Attic
				• Kuta Software
				• Castle Learning
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		write a quadratic in vertex form. ○ **Identify the transformations on the linear function y=x when written in point-slope form.* ***Vocabulary**: Transformation, Horizontal shift(right/left), Vertical shift(up/down), Horizontal stretch(wider), Vertical stretch (narrower), Piecewise Functions, Step- Functions*		
	10 - Statistics (3 weeks) Enduring Understanding: ● Measures of Center are used to interpret univariate data ● Visual models illustrate the correlation of bivariate data Essential Questions: ● How do we interpret evidence in order to support arguments?	Univariate Data: ● Construct and interpret dot plots and histograms ○ Discuss shape(skewed right/skewed left/ normal) ○ **Choose the best model to display data* ● Students will be able to calculate the measures of central tendency (mean, mode, median) and measures of spread (range and standard deviation) from a set of data using the calculator. ○ Compare measures of central tendency and measures of spread for two different sets of data. ○ Discuss how outliers affect measures ● Construct and interpret box plots - (5 point summary on the calculator) - Students will be able to calculate the lower extreme, upper extreme, lower quartile, and upper quartile, interquartile range from a set of data. Bi-Variate Data: ● Construct and interpret two-way frequency tables ○ **Discuss joint, marginal, conditional* ***Vocabulary**: Mean, Median, Mode, Range, Quartile, interquartile range, outlier, frequency, histogram, box-plot, spread, cumulative, univariate, bivariate,, standard deviation, two way frequency table*	❏ Pre-Assessment Check ❏ Performance Tasks ❏ Quizzes ❏ Castle Learning ❏ Exit Tickets ❏ Do Nows ❏ Class Discussion ❏ Daily Handouts ❏ Unit Review and Re-engagement Activities ❏ Unit Exam	EMathinstruction.com Unit #10 McGraw Hill 2018 - Chapter 10 ● Jmap.org ● Mathbits.com ● Engageny.org ● Bigideasmath.com ● Problem Attic ● Kuta Software ● Castle Learning ● Delta Math
	11- Calculator Strategies and Regents Review	● Calculator Techniques ○ Calculator reset, mode - stat-diagnostic ○ Storing values for x to evaluate an expression or find the solution to an equation (include irrational solutions from quadratic multiple choice questions) ○ Using “Y=” and the table of values to find equivalent expressions or functions ○ Finding intersection points on graphs (using the ZOOM feature) ○ Creating equations from a table or graph by using the regression feature ■ Store the given regression equation into the y= ○ Finding specific points on the table of values (TBLSET feature) ○ Use alpha Y= to represent a fraction ○ Alpha WINDOW for absolute value, ○ Checking factors using Y= and table of values ○ Reducing Fractions ○ Converting Decimals to equivalent	❏ Pre-Assessment Check ❏ Performance Tasks ❏ Quizzes ❏ Castle Learning ❏ Exit Tickets ❏ Do Nows ❏ Class Discussion ❏ Daily Handouts ❏ Unit Review and Re-engagement Activities ❏ Unit Exam	EMathinstruction.com McGraw Hill 2018 ● Jmap.org ● Mathbits.com ● Engageny.org ● Bigideasmath.com ● Problem Attic ● Kuta Software ● Castle Learning ● Delta Math

		fraction (if rational) ○ Checking solutions of equations/ inequalities ● Regents Test Prep		
	Final Assessment: Algebra I Regents (10% of overall grade)			
Summer	**Summer Assignment:**			