Beal City High School
Algebra 2A Curriculum and Alignment

UNIT 1 Linear Functions (Chapters 1-3)

1. Combine like terms, solve equations, solve inequalities, evaluate expressions(1-2,3,4)
2. Solve an equation for a variable (1-3)
3. Absolute value equations and inequalities (1-5)
4. Functions (2-1, 7-6)
5. Linear functions (2-2)
6. Linear modeling and regression (2-4)
7. Absolute value functions (2-5)
8. Transforming graphs (2-6)
9. Linear systems (graphing, sub., elimination, matrices) and applications (3-1,2,6)

CCSS:

N-Q.1. Use units as a way to understand problems and to guide the solution of multi-step problems; choose and interpret units consistently in formulas; choose and interpret the scale and the origin in graphs and data displays.

- Interpret units in the context of the problem
- When solving a multi-step problem, use units to evaluate the appropriateness of the solution.
- Choose the appropriate units for a specific formula and interpret the meaning of the unit in that context.
- Choose and interpret both the scale and the origin in graphs and data displays

N-Q.2. Define appropriate quantities for the purpose of descriptive modeling.

- Determine and interpret appropriate quantities when using descriptive modeling.

N-Q.3. Choose a level of accuracy appropriate to limitations on measurement when reporting quantities.

- Determine the accuracy of values based on their limitations in the context of the situation.

A-SSE.1. Interpret expressions that represent a quantity in terms of its context.★

a. Interpret parts of an expression, such as terms, factors, and coefficients. (Identify the different parts of the expression and explain their meaning within the context of a problem.)
b. Interpret complicated expressions by viewing one or more of their parts as a single entity. *For example, interpret $P(1+r)^n$ as the product of P and a factor not depending on P.* (Decompose expressions and make sense of the multiple factors and terms by explaining the meaning of the individual parts.)

A-SSE.2. Use the structure of an expression to identify ways to rewrite it. *For example, see $x^4 - y^4$ as $(x^2)^2 - (y^2)^2$, thus recognizing it as a difference of squares that can be factored as $(x^2 - y^2)(x^2 + y^2)$.*

- Rewrite algebraic expressions in different equivalent forms such as factoring or combining like terms.
- Simplify expressions including combining like terms, using the distributive property and other operations with polynomials.

A-SSE.3. Choose and produce an equivalent form of an expression to reveal and explain properties of the quantity represented by the expression.

A-CED.1. Create equations and inequalities in one variable and use them to solve problems. *Include equations arising from linear and quadratic functions, and simple rational and exponential functions.*

- Create linear, quadratic, rational and exponential equations and inequalities in one variable and use them in a contextual situation to solve problems.

A-CED.2. Create equations in two or more variables to represent relationships between quantities; graph equations on coordinate axes with labels and scales.

- Create equations in two or more variables to represent relationships between quantities.
- Graph equations in two variables on a coordinate plane and label the axes and scales.

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. *For example, represent inequalities describing nutritional and cost constraints on combinations of different foods.*

- Write and use a system of equations and/or inequalities to solve a real world problem. Recognize that the equations and inequalities represent the constraints of the problem. Use the Objective Equation and the Corner Principle to determine the solution to the problem.

A-CED.4. Rearrange formulas to highlight a quantity of interest, using the same reasoning as in solving equations. *For example, rearrange Ohm's law V = IR to highlight resistance R.*

- Solve multi-variable formulas or literal equations, for a specific variable.

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.

- Assuming an equation has a solution, construct a convincing argument that justifies each step in the solution process. Justifications may include the associative, commutative, and division properties, combining like terms, multiplication by 1, etc.

A-REI.3. Solve linear equations and inequalities in one variable, including equations with coefficients represented by letters.

- Solve linear equations in one variable, including coefficients represented by letters.
- Solve linear inequalities in one variable, including coefficients represented by letters.

A-REI.5. Prove that, given a system of two equations in two variables, replacing one equation by the sum of that equation and a multiple of the other produces a system with the same solutions.

- Solve systems of equations using the elimination method (sometimes called linear combinations).
- Solve a system of equations by substitution (solving for one variable in the first equation and substitution it into the second equation).

A-REI.6. Solve systems of linear equations exactly and approximately (e.g., with graphs), focusing on pairs of linear equations in two variables.

- Solve systems of equations using graphs.

A-REI.8. (+) Represent a system of linear equations as a single matrix equation in a vector variable.

- Write a system of linear equations as a single matrix equation.

A-REI.9. (+) Find the inverse of a matrix if it exists and use it to solve systems of linear equations (using technology for matrices of dimension 3×3 or greater).

- Find the inverse of the coefficient matrix in the equation, if it exits. Use the inverse of the coefficient matrix to solve the system. Use technology for matrices with dimensions 3 by 3 or greater.
- Find the dimension of matrices.

A-REI.10. Understand that the graph of an equation in two variables is the set of all its solutions plotted in the coordinate plane, often forming a curve (which could be a line).

- Understand that all solutions to an equation in two variables are contained on the graph of that equation.

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. Include cases where $f(x)$ and/or $g(x)$ are linear, polynomial, rational, absolute value, exponential, and logarithmic functions.

- Explain why the intersection of y = f(x) and y = g(x) is the solution of f(x) = g(x) for any combination of linear, polynomial, rational, absolute value, exponential, and logarithmic functions. Find the solution(s) by:
- Using technology to graph the equations and determine their point of intersection
- Using tables of values
- Using successive approximations that become closer and closer to the actual value

A-REI.12. Graph the solutions to a linear inequality in two variables as a half-plane (excluding the boundary in the case of a strict inequality), and graph the solution set to a system of linear inequalities in two variables as the intersection of the corresponding half-planes.

- Graph the solutions to a linear inequality in two variables as a half-plane, excluding the boundary for non-inclusive inequalities.
- Graph the solution set to a system of linear inequalities in two variables as the intersection of their corresponding half-planes.

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. If *f* is a function and *x* is an element of its domain, then *f*(*x*) denotes the output of *f* corresponding to the input *x*. The graph of *f* is the graph of the equation *y* = *f*(*x*).

- Use the definition of a function to determine whether a relationship is a function given a table, graph or words.
- Given the function f(x), identify x as an element of the domain, the input, and f(x) is an element in the range, the output.
- Know that the graph of the function, f, is the graph of the equation y=f(x).

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.

- When a relation is determined to be a function, use f(x) notation.
- Evaluate functions for inputs in their domain.
- Interpret statements that use function notation in terms of the context in which they are used.

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*.

- Given a function, identify key features in graphs and tables including: intercepts; intervals where the function is increasing, decreasing, positive, or negative; relative maximums and minimums; symmetries; end behavior; and periodicity.
- Given the key features of a function, sketch the graph.

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(n) gives the number of person-hours it takes to assemble n engines in a factory, then the positive integers would be an appropriate domain for the function.*

- Given the graph of a function, determine the practical domain of the function as it relates to the numerical relationship it describes.

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.

- Calculate the average rate of change over a specified interval of a function presented symbolically or in a table.
- Estimate the average rate of change over a specified interval of a function from the function's graph.
- Interpret, in context, the average rate of change of a function over a specified interval.

F-IF.7. Graph functions expressed symbolically and show key features of the graph, by hand in simple cases and using technology for more complicated cases.

a. Graph linear and quadratic functions and show intercepts, maxima, and minima.
b. Graph square root, cube root, and piecewise-defined functions, including step functions and absolute value functions.

F-IF.9. Compare properties of two functions each represented in a different way (algebraically, graphically, numerically in tables, or by verbal descriptions). *For example, given a graph of one quadratic function and an algebraic expression for another, say which has the larger maximum.*

- Compare the key features of two functions represented in different ways. For example, compare the end behavior of two functions, one of which is represented graphically and the other is represented symbolically.

F-BF.3. Identify the effect on the graph of replacing $f(x)$ by $f(x) + k$, $k\,f(x)$, $f(kx)$, and $f(x + k)$ for specific values of k (both positive and negative); find the value of k given the graphs. Experiment with cases and illustrate an explanation of the effects on the graph using technology. Include recognizing even and odd functions from their graphs and algebraic expressions for them.

- Identify, through experimenting with technology, the effect on the graph of a function by replacing f(x) with f(x) + k, kf(x), f(kx), and f(x + k) for specific values of k (both positive and negative).
- Given the graphs of the original function and a transformation, determine the value of (k).

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.3. Observe using graphs and tables that a quantity increasing exponentially eventually exceeds a quantity increasing linearly, quadratically, or (more generally) as a polynomial function.

- Make the connection, using graphs and tables, that a quantity increasing exponentially eventually exceeds a quantity increasing linearly, quadratically, or any other polynomial function.

F-LE.5. Interpret the parameters in a linear or exponential function in terms of a context.

- Based on the context of a situation, explain the meaning of the coefficients, factors, exponents, and/or intercepts in a linear or exponential function.

G-GPE.5. Prove the slope criteria for parallel and perpendicular lines and use them to solve geometric problems (e.g., find the equation of a line parallel or perpendicular to a given line that passes through a given point).

- Using slope, prove lines are parallel or perpendicular
- Find equations of lines based on certain slope criteria such as; finding the equation of a line parallel or perpendicular to a given line that passes through a given point.

S-ID.6. Represent data on two quantitative variables on a scatter plot, and describe how the variables are related.

a. 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. (Categorize data as linear or not. Use algebraic methods and technology to fit a linear function to the data. Use the function to predict values. Explain the meaning of the slope and y-intercept in context. Categorize data as exponential. Use algebraic methods and technology to fit an exponential function to the data. Use the function to predict values. Explain the meaning of the growth rate and y-intercept in context. Categorize data as quadratic. Use algebraic methods and technology to fit a quadratic function to the data. Use the function to predict values. Explain the meaning of the constant and coefficients in context.)

b. Fit a linear function for a scatter plot that suggests a linear association. (Categorize data as linear or not. Use algebraic methods and technology to fit a linear function to the data. Use the function to predict values.)

S-ID.7. Interpret the slope (rate of change) and the intercept (constant term) of a linear model in the context of the data.

- Explain the meaning of the slope and y-intercept in context.

S-ID.8. Compute (using technology) and interpret the correlation coefficient of a linear fit.

UNIT 2 Quadratic Functions (Chapter 5)

1. Quadratic functions and modeling (5-1)
2. Parabolas—standard form (5-2)
3. Transforming parabolas—vertex form (5-3)
4. Factoring (5-4)
5. Solving quad. Equations (5-5)
6. Complex numbers (5-6)
7. Quadratic formula (5-8)

CCSS:

N-Q.1. Use units as a way to understand problems and to guide the solution of multi-step problems; choose and interpret units consistently in formulas; choose and interpret the scale and the origin in graphs and data displays.

- Interpret units in the context of the problem
- When solving a multi-step problem, use units to evaluate the appropriateness of the solution.
- Choose the appropriate units for a specific formula and interpret the meaning of the unit in that context.
- Choose and interpret both the scale and the origin in graphs and data displays

N-Q.2. Define appropriate quantities for the purpose of descriptive modeling.

- Determine and interpret appropriate quantities when using descriptive modeling.

N-Q.3. Choose a level of accuracy appropriate to limitations on measurement when reporting quantities.

- Determine the accuracy of values based on their limitations in the context of the situation.

N-CN.1. Know there is a complex number i such that $i^2 = -1$, and every complex number has the form $a + bi$ with a and b real.

- Know that every number is a complex number of the form a + bi, where a and b are real numbers.
- Know that the complex number $i^2 = -1$.

N-CN.2. Use the relation $i^2 = -1$ and the commutative, associative, and distributive properties to add, subtract, and multiply complex numbers.

- Apply the fact that the complex number $i^2 = -1$.
- Use the associative, commutative, and distributive properties, to add, subtract, and multiply complex numbers.

N-CN.7. Solve quadratic equations with real coefficients that have complex solutions.

- Solve quadratic equations with real coefficients that have solutions of the form a + bi and a – bi.

N-CN.9. (+) Know the Fundamental Theorem of Algebra; show that it is true for quadratic polynomials.

- Understand The Fundamental Theorem of Algebra, which says that the number of complex solutions to a polynomial equation is the same as the degree of the polynomial. Show that this is true for a quadratic polynomial.

A-SSE.1. Interpret expressions that represent a quantity in terms of its context.★

b. Interpret parts of an expression, such as terms, factors, and coefficients. (Identify the different parts of the expression and explain their meaning within the context of a problem.)

b. Interpret complicated expressions by viewing one or more of their parts as a single entity. *For example, interpret* $P(1+r)^n$ *as the product of P and a factor not depending on P.* (Decompose expressions and make sense of the multiple factors and terms by explaining the meaning of the individual parts.)

A-SSE.2. Use the structure of an expression to identify ways to rewrite it. *For example, see* $x^4 - y^4$ *as* $(x^2)^2 - (y^2)^2$, *thus recognizing it as a difference of squares that can be factored as* $(x^2 - y^2)(x^2 + y^2)$.

- Rewrite algebraic expressions in different equivalent forms such as factoring or combining like terms.

- Use factoring techniques such as common factors, grouping, the difference of two squares, the sum or difference of two cubes, or a combination of methods to factor completely.
- Simplify expressions including combining like terms, using the distributive property and other operations with polynomials.

A-SSE.3. Choose and produce an equivalent form of an expression to reveal and explain properties of the quantity represented by the expression.

a. Factor a quadratic expression to reveal the zeros of the function it defines. (Write expressions in equivalent forms by factoring to find the zeros of a quadratic function and explain the meaning of the zeros. Given a quadratic function explain the meaning of the zeros of the function. That is if f(x) = (x – c) (x – a) then f(a) = 0 and f(c) = 0. Given a quadratic expression, explain the meaning of the zeros graphically. That is for an expression (x – a) (x – c), a and c correspond to the x-intercepts (if a and c are real).)
b. Complete the square in a quadratic expression to reveal the maximum or minimum value of the function it defines. (Write expressions in equivalent forms by completing the square to convey the vertex form, to find the maximum or minimum value of a quadratic function, and to explain the meaning of the vertex.)

A-APR.3. Identify zeros of polynomials when suitable factorizations are available, and use the zeros to construct a rough graph of the function defined by the polynomial.

- Find the zeros of a polynomial when the polynomial is factored.
- Use the zeros of a function to sketch a graph of the function.

A-APR.4. Prove polynomial identities and use them to describe numerical relationships. *For example, the polynomial identity* $(x^2 + y^2)^2 = (x^2 – y^2)^2 + (2xy)^2$ *can be used to generate Pythagorean triples.*

- Understand that polynomial identities include but are not limited to the product of the sum and difference of two terms, the difference of two squares, the sum and difference of two cubes, the square of a binomial, etc .
- Prove polynomial identities by showing steps and providing reasons.
- Illustrate how polynomial identities are used to determine numerical relationships.

A-CED.1. Create equations and inequalities in one variable and use them to solve problems. *Include equations arising from linear and quadratic functions, and simple rational and exponential functions.*

- Create linear, quadratic, rational and exponential equations and inequalities in one variable and use them in a contextual situation to solve problems.

A-CED.2. Create equations in two or more variables to represent relationships between quantities; graph equations on coordinate axes with labels and scales.

- Create equations in two or more variables to represent relationships between quantities.
- Graph equations in two variables on a coordinate plane and label the axes and scales.

A-REI.3. Solve linear equations and inequalities in one variable, including equations with coefficients represented by letters.

- Solve linear equations in one variable, including coefficients represented by letters.
- Solve linear inequalities in one variable, including coefficients represented by letters.

A-REI.4. Solve quadratic equations in one variable.

- 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. (Transform a quadratic equation written in standard form to an equation in vertex form (x - p) = q 2 by completing the square. Derive the quadratic formula by completing the square on the standard form of a quadratic equation.)
- Solve quadratic equations by inspection (e.g., for $x^2 = 49$), 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. (Solve quadratic equations in one variable by simple inspection, taking the square root, factoring, and completing the square. Understand why taking the square root of both sides of an equation yields two solutions. Use the quadratic formula to solve any quadratic equation, recognizing the formula produces all complex solutions. Write the solutions in the form

$a \pm bi$, where a and b are real numbers. Explain how complex solutions affect the graph of a quadratic equation.)

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*.

- Given a function, identify key features in graphs and tables including: intercepts; intervals where the function is increasing, decreasing, positive, or negative; relative maximums and minimums; symmetries; end behavior; and periodicity.
- Given the key features of a function, sketch the graph.

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.

- Calculate the average rate of change over a specified interval of a function presented symbolically or in a table.
- Estimate the average rate of change over a specified interval of a function from the function's graph.
- Interpret, in context, the average rate of change of a function over a specified interval.

F-IF.7. Graph functions expressed symbolically and show key features of the graph, by hand in simple cases and using technology for more complicated cases.

c. Graph linear and quadratic functions and show intercepts, maxima, and minima.

F-IF.8. Write a function defined by an expression in different but equivalent forms to reveal and explain different properties of the function.

a. Use the process of factoring and completing the square in a quadratic function to show zeros, extreme values, and symmetry of the graph, and interpret these in terms of a context.

F-IF.9. Compare properties of two functions each represented in a different way (algebraically, graphically, numerically in tables, or by verbal descriptions). *For example, given a graph of one quadratic function and an algebraic expression for another, say which has the larger maximum.*

- Compare the key features of two functions represented in different ways. For example, compare the end behavior of two functions, one of which is represented graphically and the other is represented symbolically.

F-LE.3. Observe using graphs and tables that a quantity increasing exponentially eventually exceeds a quantity increasing linearly, quadratically, or (more generally) as a polynomial function.

- Make the connection, using graphs and tables, that a quantity increasing exponentially eventually exceeds a quantity increasing linearly, quadratically, or any other polynomial function.

S-ID.6. Represent data on two quantitative variables on a scatter plot, and describe how the variables are related.

a. 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. (Categorize data as linear or not. Use algebraic methods and technology to fit a linear function to the data. Use the function to predict values. Explain the meaning of the slope and y-intercept in context. Categorize data as exponential. Use algebraic methods and technology to fit an exponential function to the data. Use the function to predict values. Explain the meaning of the growth rate and y-intercept in context. Categorize data as quadratic. Use algebraic methods and technology to fit a quadratic function to the data. Use the function to predict values. Explain the meaning of the constant and coefficients in context.)

b. Fit a linear function for a scatter plot that suggests a linear association. (Categorize data as linear or not. Use algebraic methods and technology to fit a linear function to the data. Use the function to predict values.

<u>UNIT 3 Exponential and Log Functions (Chapters 7 & 8)</u>

1. Exponential functions (8-1)
2. e and interest (8-2)
3. Exponent rules (pg 368)
4. Fractional exponents (7-4)
5. Operations and Composition of functions (7-6)
6. Inverse functions (7-7)
7. Logarithms (8-3)
8. Log properties (8-4)
9. Log and exponential equations (8-5)
10. Natural logs (8-6)

CCSS:

N-Q.1. Use units as a way to understand problems and to guide the solution of multi-step problems; choose and interpret units consistently in formulas; choose and interpret the scale and the origin in graphs and data displays.

- Interpret units in the context of the problem
- When solving a multi-step problem, use units to evaluate the appropriateness of the solution.
- Choose the appropriate units for a specific formula and interpret the meaning of the unit in that context.
- Choose and interpret both the scale and the origin in graphs and data displays

N-Q.2. Define appropriate quantities for the purpose of descriptive modeling.

- Determine and interpret appropriate quantities when using descriptive modeling.

N-Q.3. Choose a level of accuracy appropriate to limitations on measurement when reporting quantities.

- Determine the accuracy of values based on their limitations in the context of the situation.

A-SSE.1. Interpret expressions that represent a quantity in terms of its context.★

a. Interpret parts of an expression, such as terms, factors, and coefficients. (Identify the different parts of the expression and explain their meaning within the context of a problem.)
b. Interpret complicated expressions by viewing one or more of their parts as a single entity. *For example, interpret $P(1+r)^n$ as the product of P and a factor not depending on P.* (Decompose expressions and make sense of the multiple factors and terms by explaining the meaning of the individual parts.)

A-SSE.2. Use the structure of an expression to identify ways to rewrite it. *For example, see $x^4 - y^4$ as $(x^2)^2 - (y^2)^2$, thus recognizing it as a difference of squares that can be factored as $(x^2 - y^2)(x^2 + y^2)$.*

- Rewrite algebraic expressions in different equivalent forms such as factoring or combining like terms.
- Use factoring techniques such as common factors, grouping, the difference of two squares, the sum or difference of two cubes, or a combination of methods to factor completely.
- Simplify expressions including combining like terms, using the distributive property and other operations with polynomials.

A-SSE.3. Choose and produce an equivalent form of an expression to reveal and explain properties of the quantity represented by the expression.

a. Use the properties of exponents to transform expressions for exponential functions. *For example the expression 1.15^t can be rewritten as $(1.15^{1/12})^{12t} \approx 1.012^{12t}$ to reveal the approximate equivalent monthly interest rate if the annual rate is 15%.* (Use properties of exponents (such as power of a power, product of powers, power of a product, and rational exponents, etc.) to write an equivalent form of an exponential function to reveal and explain specific information about its approximate rate of growth or decay.)

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.

- Understand the definition of a polynomial.
- Understand the concepts of combining like terms and closure.
- Add, subtract, and multiply polynomials and understand how closure applies under these operations.

A-CED.1. Create equations and inequalities in one variable and use them to solve problems. *Include equations arising from linear and quadratic functions, and simple rational and exponential functions.*

- Create linear, quadratic, rational and exponential equations and inequalities in one variable and use them in a contextual situation to solve problems.

A-REI.3. Solve linear equations and inequalities in one variable, including equations with coefficients represented by letters.

- Solve linear equations in one variable, including coefficients represented by letters.
- Solve linear inequalities in one variable, including coefficients represented by letters.

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.

- Calculate the average rate of change over a specified interval of a function presented symbolically or in a table.
- Estimate the average rate of change over a specified interval of a function from the function's graph.
- Interpret, in context, the average rate of change of a function over a specified interval.

F-IF.7. Graph functions expressed symbolically and show key features of the graph, by hand in simple cases and using technology for more complicated cases.

a. Graph exponential and logarithmic functions, showing intercepts and end behavior, and trigonometric functions, showing period, midline, and amplitude.

F-IF.8. Write a function defined by an expression in different but equivalent forms to reveal and explain different properties of the function.

a. Use the properties of exponents to interpret expressions for exponential functions. For example, identify percent rate of change in functions such as y = (1.02)t, y = (0.97)t, y = (1.01)12t, y = (1.2)t/10, and classify them as representing exponential growth or decay.

F-BF.1. Write a function that describes a relationship between two quantities.

a. Determine an explicit expression, a recursive process, or steps for calculation from a context. (From context, write an explicit expression, define a recursive process, or describe the calculations needed to model a function between two quantities.)
b. Combine standard function types using arithmetic operations. *For example, build a function that models the temperature of a cooling body by adding a constant function to a decaying exponential, and relate these functions to the model.* (Combine standard function types, such as linear and exponential, using arithmetic operations.)
c. (+) Compose functions. *For example, if T(y) is the temperature in the atmosphere as a function of height, and h(t) is the height of a weather balloon as a function of time, then T(h(t)) is the temperature at the location of the weather balloon as a function of time.*

F-BF.4. Find inverse functions.

a. Solve an equation of the form f(x) = c for a simple function f that has an inverse and write an expression for the inverse. *For example,* $f(x) = 2x^3$ *or* $f(x) = (x+1)/(x–1)$ *for* $x \neq 1$. (Solve a function for the dependent variable and write the inverse of a function by interchanging the values of the dependent and independent variables.)
b. (+) Read values of an inverse function from a graph or a table, given that the function has an inverse.
c. (+) Produce an invertible function from a non-invertible function by restricting the domain. (Find the inverse of a function that is not one-to-one by restricting the domain.)

F-BF.5. (+) Understand the inverse relationship between exponents and logarithms and use this relationship to solve problems involving logarithms and exponents.

- Understand the inverse relationship between exponents and logarithms and use this relationship to solve problems involving logarithms and exponents.

F-LE.1. Distinguish between situations that can be modeled with linear functions and with exponential functions. (Given a contextual situation, describe whether the situation in question has a linear pattern of change or an exponential pattern of change.)

a. Prove that linear functions grow by equal differences over equal intervals, and that exponential functions grow by equal factors over equal intervals. (Show that linear functions change at the same rate over time and that exponential functions change by equal factors over time.)
b. Recognize situations in which one quantity changes at a constant rate per unit interval relative to another. (Describe situations where one quantity changes at a constant rate per unit interval as compared to another.)
c. Recognize situations in which a quantity grows or decays by a constant percent rate per unit interval relative to another. (Describe situations where a quantity grows or decays at a constant percent rate per unit interval as compared to another.)

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.3. Observe using graphs and tables that a quantity increasing exponentially eventually exceeds a quantity increasing linearly, quadratically, or (more generally) as a polynomial function.

- Make the connection, using graphs and tables, that a quantity increasing exponentially eventually exceeds a quantity increasing linearly, quadratically, or any other polynomial function.

F-LE.4. For exponential models, express as a logarithm the solution to ab^{ct} = d where a, c, and d are numbers and the base b is 2, 10, or e; evaluate the logarithm using technology.

- Express logarithms as solutions to exponential functions using bases 2, 10, and e.
- Use technology to evaluate a logarithm.

F-LE.5. Interpret the parameters in a linear or exponential function in terms of a context.

- Based on the context of a situation, explain the meaning of the coefficients, factors, exponents, and/or intercepts in a linear or exponential function.

S-ID.6. Represent data on two quantitative variables on a scatter plot, and describe how the variables are related.

a. 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. (Categorize data as linear or not. Use algebraic methods and technology to fit a linear function to the data. Use the function to predict values. Explain the meaning of the slope and y-intercept in context. Categorize data as exponential. Use algebraic methods and technology to fit an exponential function to the data. Use the function to predict values. Explain the meaning of the growth rate and y-intercept in context. Categorize data as quadratic. Use algebraic methods and technology to fit a quadratic function to the data. Use the function to predict values. Explain the meaning of the constant and coefficients in context.)

UNIT 4 Polynomial/Radical/Rational Functions (Chapters 6, 7, 9)

1. Polynomial functions and modeling (6-1)
2. Zeros and graphs (6-2)
3. Dividing Polynomials (6-3)
4. Radical Operations (7-2, 7-3)
5. Radical Equations (7-5)
6. Rationals (simplify, multiply, divide, add, subtract) (9-4, 9-5)
7. Solving Rational Equations (9-6)
8. Rational Function Graphs (9-3)

CCSS:

N-Q.1. Use units as a way to understand problems and to guide the solution of multi-step problems; choose and interpret units consistently in formulas; choose and interpret the scale and the origin in graphs and data displays.

- Interpret units in the context of the problem
- When solving a multi-step problem, use units to evaluate the appropriateness of the solution.
- Choose the appropriate units for a specific formula and interpret the meaning of the unit in that context.
- Choose and interpret both the scale and the origin in graphs and data displays

N-Q.2. Define appropriate quantities for the purpose of descriptive modeling.

- Determine and interpret appropriate quantities when using descriptive modeling.

N-Q.3. Choose a level of accuracy appropriate to limitations on measurement when reporting quantities.

- Determine the accuracy of values based on their limitations in the context of the situation.

A-SSE.1. Interpret expressions that represent a quantity in terms of its context.★

a. Interpret parts of an expression, such as terms, factors, and coefficients. (Identify the different parts of the expression and explain their meaning within the context of a problem.)
b. Interpret complicated expressions by viewing one or more of their parts as a single entity. *For example, interpret* $P(1+r)^n$ *as the product of P and a factor not depending on P.* (Decompose expressions and make sense of the multiple factors and terms by explaining the meaning of the individual parts.)

A-SSE.2. Use the structure of an expression to identify ways to rewrite it. *For example, see* $x^4 – y^4$ *as* $(x^2)^2 – (y^2)^2$*, thus recognizing it as a difference of squares that can be factored as* $(x^2 – y^2)(x^2 + y^2)$.

- Rewrite algebraic expressions in different equivalent forms such as factoring or combining like terms.
- Use factoring techniques such as common factors, grouping, the difference of two squares, the sum or difference of two cubes, or a combination of methods to factor completely.
- Simplify expressions including combining like terms, using the distributive property and other operations with polynomials.

A-SSE.3. Choose and produce an equivalent form of an expression to reveal and explain properties of the quantity represented by the expression.

a. Factor a quadratic expression to reveal the zeros of the function it defines. (Write expressions in equivalent forms by factoring to find the zeros of a quadratic function and explain the meaning of the zeros. Given a quadratic function explain the meaning of the zeros of the function. That is if $f(x) = (x – c) (x – a)$ then $f(a) = 0$ and $f(c) = 0$. Given a quadratic expression, explain the meaning of the zeros graphically. That is for an expression $(x – a) (x – c)$, a and c correspond to the x-intercepts (if a and c are real).)

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.

- Understand the definition of a polynomial.
- Understand the concepts of combining like terms and closure.

- Add, subtract, and multiply polynomials and understand how closure applies under these operations.

A-APR.2. Know and apply the Remainder Theorem: For a polynomial p(x) and a number a, the remainder on division by x – a is p(a), so p(a) = 0 if and only if (x – a) is a factor of p(x).

- Understand and apply the Remainder Theorem.
- Understand how this standard relates to A.SSE.3a.
- Understand that a is a root of a polynomial function if and only if x-a is a factor of the function.

A-APR.3. Identify zeros of polynomials when suitable factorizations are available, and use the zeros to construct a rough graph of the function defined by the polynomial.

- Find the zeros of a polynomial when the polynomial is factored.
- Use the zeros of a function to sketch a graph of the function.

A-APR.6. Rewrite simple rational expressions in different forms; write a(x)/b(x) in the form q(x) + r(x)/b(x), where a(x), b(x), q(x), and r(x) are polynomials with the degree of r(x) less than the degree of b(x), using inspection, long division, or, for the more complicated examples, a computer algebra system.

- Rewrite rational expressions by using factoring, long division, or synthetic division. Use a computer algebra system for complicated examples to assist with building a broader conceptual understanding.

A-APR.7. (+) Understand that rational expressions form a system analogous to the rational numbers, closed under addition, subtraction, multiplication, and division by a nonzero rational expression; add, subtract, multiply, and divide rational expressions.

- Simplify rational expressions by adding, subtracting, multiplying, or dividing.
- Understand that rational expressions are closed under addition, subtraction, multiplication, and division (by a nonzero expression).

A-CED.1. Create equations and inequalities in one variable and use them to solve problems. *Include equations arising from linear and quadratic functions, and simple rational and exponential functions.*

- Create linear, quadratic, rational and exponential equations and inequalities in one variable and use them in a contextual situation to solve problems.

A-CED.2. Create equations in two or more variables to represent relationships between quantities; graph equations on coordinate axes with labels and scales.

- Create equations in two or more variables to represent relationships between quantities.
- Graph equations in two variables on a coordinate plane and label the axes and scales.

A-REI.2. Solve simple rational and radical equations in one variable, and give examples showing how extraneous solutions may arise.

- Solve simple rational and radical equations in one variable and provide examples of how extraneous solutions arise.

A-REI.3. Solve linear equations and inequalities in one variable, including equations with coefficients represented by letters.

- Solve linear equations in one variable, including coefficients represented by letters.
- Solve linear inequalities in one variable, including coefficients represented by letters.

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*.

- Given a function, identify key features in graphs and tables including: intercepts; intervals where the function is increasing, decreasing, positive, or negative; relative maximums and minimums; symmetries; end behavior; and periodicity.
- Given the key features of a function, sketch the graph.

F-IF.7. Graph functions expressed symbolically and show key features of the graph, by hand in simple cases and using technology for more complicated cases.

a. Graph polynomial functions, identifying zeros when suitable factorizations are available, and showing end behavior.
b. (+) Graph rational functions, identifying zeros and asymptotes when suitable factorizations are available, and showing end behavior.

F-IF.8. Write a function defined by an expression in different but equivalent forms to reveal and explain different properties of the function.

a. Use the process of factoring and completing the square in a quadratic function to show zeros, extreme values, and symmetry of the graph, and interpret these in terms of a context.

F-IF.9. Compare properties of two functions each represented in a different way (algebraically, graphically, numerically in tables, or by verbal descriptions). *For example, given a graph of one quadratic function and an algebraic expression for another, say which has the larger maximum.*

- Compare the key features of two functions represented in different ways. For example, compare the end behavior of two functions, one of which is represented graphically and the other is represented symbolically.

F-LE.3. Observe using graphs and tables that a quantity increasing exponentially eventually exceeds a quantity increasing linearly, quadratically, or (more generally) as a polynomial function.

- Make the connection, using graphs and tables, that a quantity increasing exponentially eventually exceeds a quantity increasing linearly, quadratically, or any other polynomial function.

S-ID.6. Represent data on two quantitative variables on a scatter plot, and describe how the variables are related.

a. 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. (Categorize data as linear or not. Use algebraic methods and technology to fit a linear function to the data. Use the function to predict values. Explain the meaning of the slope and y-intercept in context. Categorize data as exponential. Use algebraic methods and technology to fit an exponential function to the data. Use the function to predict values. Explain the meaning of the growth rate and y-intercept in context. Categorize data as quadratic. Use algebraic methods and technology to fit a quadratic function to the data. Use the function to predict values. Explain the meaning of the constant and coefficients in context.)

MME Preparation & Geometry Review—Sept-March as time permits, with emphasis during the months of January, February, and March

1. MME overview
2. Test taking strategies
3. Pre-algebra review
4. Whole numbers
5. Decimals
6. Roots
7. Fractions
8. Order of operations
9. Percents
10. Ratio and proportion
11. Geometry exam review
12. Right triangles
13. Parallel lines
14. Angles
15. Quadrilaterals

Algebra 2A—11th grade

Units		Common Core Standards	Vocabulary	Pacing
Unit 1 – Linear Functions	Chapter 1, Section 2 Chapter 1, Section 3 Chapter 1, Section 4 Chapter 1, Section 5 Chapter 2, Section 1 Chapter 2, Section 2 Chapter 2, Section 4 Chapter 2, Section 5 Chapter 2, Section 6 Chapter 3, Section 1 Chapter 3, Section 2 Chapter 3, Section 6	**N-Q.1.** Use units as a way to understand problems and to guide the solution of multi-step problems; choose and interpret units consistently in formulas; choose and interpret the scale and the origin in graphs and data displays. **N-Q.2.** Define appropriate quantities for the purpose of descriptive modeling. **N-Q.3.** Choose a level of accuracy appropriate to limitations on measurement when reporting quantities. **A-SSE.1**. Interpret expressions that represent a quantity in terms of its context.★ **A-SSE.2.** Use the structure of an expression to identify ways to rewrite it. *For example, see $x^4 – y^4$ as $(x^2)^2 – (y^2)^2$, thus recognizing it as a difference of squares that can be factored as $(x^2 – y^2)(x^2 + y^2)$.* **A-SSE.3.** Choose and produce an equivalent form of an expression to reveal and explain properties of the quantity represented by the expression. **A-CED.1.** Create equations and inequalities in one variable 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 in two or more variables to represent relationships between quantities; graph equations on coordinate axes with labels and scales. **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. *For example, represent inequalities describing nutritional and cost constraints on combinations of different foods.* **A-CED.4.** Rearrange formulas to highlight a quantity of interest, using the same reasoning as in solving equations. *For example, rearrange Ohm's law $V = IR$ to highlight resistance R.* **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-REI.5.** Prove that, given a system of two equations in two variables, replacing one equation by the sum of that equation and a multiple of the other produces a system with the same solutions. **A-REI.6.** Solve systems of linear equations exactly and approximately (e.g., with graphs), focusing on pairs of linear equations in two variables. **A-REI.8. (+)** Represent a system of linear equations as a single matrix equation in a vector variable. **A-REI.9. (+)** Find the inverse of a matrix if it exists and use it to solve systems of linear equations (using technology for matrices of dimension 3×3 or greater).	Like terms Linear equations Linear inequalities Evaluate expressions Solve for a variable Absolute value equations and inequalities Functions Domain Range Linear functions Graphing lines Writing linear equations Linear regression Absolute value graphs Transforming graphs Linear systems Graphing systems Substitution Elimination Matrices	39 days
		Assessments: Multiple Quizzes Final Test		

Algebra 2A—11th grade

Units		Common Core Standards (cont.)	Vocabulary	Pacing
Unit 1 – Linear Functions (cont)		**A-REI.10.** Understand that the graph of an equation in two variables is the set of all its solutions plotted in the coordinate plane, often forming a curve (which could be a line). **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. Include cases where $f(x)$ and/or $g(x)$ are linear, polynomial, rational, absolute value, exponential, and logarithmic functions. **A-REI.12.** Graph the solutions to a linear inequality in two variables as a half-plane (excluding the boundary in the case of a strict inequality), and graph the solution set to a system of linear inequalities in two variables as the intersection of the corresponding half-planes. **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. If *f* is a function and *x* is an element of its domain, then $f(x)$ denotes the output of *f* corresponding to the input *x*. The graph of *f* is the graph of the equation $y = f(x)$. **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. *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(n) gives the number of person-hours it takes to assemble n engines in a factory, then the positive integers would be an appropriate domain for the function.* **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.		

Algebra 2A—11th grade

Units		Common Core Standards (cont.)	Vocabulary	Pacing
Unit 1 – Linear Functions (cont)		**F-IF.9.** Compare properties of two functions each represented in a different way (algebraically, graphically, numerically in tables, or by verbal descriptions). *For example, given a graph of one quadratic function and an algebraic expression for another, say which has the larger maximum.* **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. Experiment with cases and illustrate an explanation of the effects on the graph using technology. Include recognizing even and odd functions from their graphs and algebraic expressions for them. **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.3.** Observe using graphs and tables that a quantity increasing exponentially eventually exceeds a quantity increasing linearly, quadratically, or (more generally) as a polynomial function. **F-LE.5.** Interpret the parameters in a linear or exponential function in terms of a context. **G-GPE.5.** Prove the slope criteria for parallel and perpendicular lines and use them to solve geometric problems (e.g., find the equation of a line parallel or perpendicular to a given line that passes through a given point). **S-ID.6.** Represent data on two quantitative variables on a scatter plot, and describe how the variables are related. **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.		

Algebra 2A—11th grade

Units		Common Core Standards	Vocabulary	Pacing
Unit 2 – Quadratic Functions	Chapter 5, Section 1 Chapter 5, Section 2 Chapter 5, Section 3 Chapter 5, Section 4 Chapter 5, Section 5 Chapter 5, Section 6 Chapter 5, Section 8	**N-Q.1.** Use units as a way to understand problems and to guide the solution of multi-step problems; choose and interpret units consistently in formulas; choose and interpret the scale and the origin in graphs and data displays. **N-Q.2.** Define appropriate quantities for the purpose of descriptive modeling. **N-Q.3.** Choose a level of accuracy appropriate to limitations on measurement when reporting quantities. **N-CN.1.** Know there is a complex number i such that $i^2 = -1$, and every complex number has the form $a + bi$ with a and b real. **N-CN.2.** Use the relation $i^2 = -1$ and the commutative, associative, and distributive properties to add, subtract, and multiply complex numbers. **N-CN.7.** Solve quadratic equations with real coefficients that have complex solutions. **N-CN.9.** (+) Know the Fundamental Theorem of Algebra; show that it is true for quadratic polynomials. **A-SSE.1.** Interpret expressions that represent a quantity in terms of its context.★ **A-SSE.2.** Use the structure of an expression to identify ways to rewrite it. *For example, see* $x^4 - y^4$ *as* $(x^2)^2 - (y^2)^2$, *thus recognizing it as a difference of squares that can be factored as* $(x^2 - y^2)(x^2 + y^2)$. **A-SSE.3.** Choose and produce an equivalent form of an expression to reveal and explain properties of the quantity represented by the expression. **A-APR.3.** Identify zeros of polynomials when suitable factorizations are available, and use the zeros to construct a rough graph of the function defined by the polynomial. **A-APR.4.** Prove polynomial identities and use them to describe numerical relationships. *For example, the polynomial identity* $(x^2 + y^2)^2 = (x^2 - y^2)^2 + (2xy)^2$ *can be used to generate Pythagorean triples.* **A-CED.1.** Create equations and inequalities in one variable 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 in two or more variables to represent relationships between quantities; graph equations on coordinate axes with labels and scales. **A-REI.3.** Solve linear equations and inequalities in one variable, including equations with coefficients represented by letters. **A-REI.4.** Solve quadratic equations in one variable. **Assessments:** Multiple Quizzes Final Test	Quadratic Function Quadratic regression Parabolas Standard form Vertex form Graphing parabolas Line of symmetry Vertex Symmetry Factoring Greatest common factor Difference of squares $x^2 + bx + c$ factoring $ax^2 + bx + c$ factoring Grouping Trial and error Solving quad. Equations Complex numbers Quadratic formula Discriminant	29 days

Algebra 2A—11th grade

Units		Comon Core Standards (cont.)	Vocabulary	Pacing
Unit 2 – Quadratic Functions (cont.)		**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.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.7.** Graph functions expressed symbolically and show key features of the graph, by hand in simple cases and using technology for more complicated cases. **F-IF.8.** Write a function defined by an expression in different but equivalent forms to reveal and explain different properties of the function. **F-IF.9.** Compare properties of two functions each represented in a different way (algebraically, graphically, numerically in tables, or by verbal descriptions). *For example, given a graph of one quadratic function and an algebraic expression for another, say which has the larger maximum.* **F-LE.3.** Observe using graphs and tables that a quantity increasing exponentially eventually exceeds a quantity increasing linearly, quadratically, or (more generally) as a polynomial function. **S-ID.6.** Represent data on two quantitative variables on a scatter plot, and describe how the variables are related.		

Algebra 2A—11th grade

Units		Common Core Standards	Vocabulary	Pacing
Unit 3 – Exponential and Logarithmic Functions	Chapter 8, Section 1 Chapter 8, Section 2 Chapter 7, Section 1 (Algebra 1 review) Chapter 7, Section 4 Chapter 7, Section 6 Chapter 7, Section 7 Chapter 8, Section 3 Chapter 8, Section 4 Chapter 8, Section 5 Chapter 8, Section 6	**N-Q.1.** Use units as a way to understand problems and to guide the solution of multi-step problems; choose and interpret units consistently in formulas; choose and interpret the scale and the origin in graphs and data displays. **N-Q.2.** Define appropriate quantities for the purpose of descriptive modeling. **N-Q.3.** Choose a level of accuracy appropriate to limitations on measurement when reporting quantities. **A-SSE.1.** Interpret expressions that represent a quantity in terms of its context.★ **A-SSE.2.** Use the structure of an expression to identify ways to rewrite it. *For example, see* $x^4 - y^4$ *as* $(x^2)^2 - (y^2)^2$*, thus recognizing it as a difference of squares that can be factored as* $(x^2 - y^2)(x^2 + y^2)$. **A-SSE.3.** Choose and produce an equivalent form of an expression to reveal and explain properties of the quantity represented by the expression. **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. **A-CED.1.** Create equations and inequalities in one variable and use them to solve problems. *Include equations arising from linear and quadratic functions, and simple rational and exponential functions.* **A-REI.3.** Solve linear equations and inequalities in one variable, including equations with coefficients represented by letters. **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.7.** Graph functions expressed symbolically and show key features of the graph, by hand in simple cases and using technology for more complicated cases. **F-IF.8.** Write a function defined by an expression in different but equivalent forms to reveal and explain different properties of the function. **F-BF.1.** Write a function that describes a relationship between two quantities. **F-BF.4.** Find inverse functions. **F-BF.5.** (+) Understand the inverse relationship between exponents and logarithms and use this relationship to solve problems involving logarithms and exponents.	Exponential functions Growth/decay e compounded interest continuous interest exponent rules fractional exponents function operations function composition inverse functions logarithms change of base logarithm properties logarithm equations exponential equations natural logarithms	23 days
		Assessments: Multiple Quizzes Final Test		

Algebra 2A—11th grade

Units		Common Core Standards (cont.)	Vocabulary	Pacing
Unit 3 – Exponential and Logarithmic Functions (cont.)		**F-LE.1.** Distinguish between situations that can be modeled with linear functions and with exponential functions. (Given a contextual situation, describe whether the situation in question has a linear pattern of change or an exponential pattern of change.) **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.3.** Observe using graphs and tables that a quantity increasing exponentially eventually exceeds a quantity increasing linearly, quadratically, or (more generally) as a polynomial function. **F-LE.4.** For exponential models, express as a logarithm the solution to ab^{ct} = d where a, c, and d are numbers and the base b is 2, 10, or e; evaluate the logarithm using technology. **F-LE.5.** Interpret the parameters in a linear or exponential function in terms of a context. **S-ID.6.** Represent data on two quantitative variables on a scatter plot, and describe how the variables are related.		

Algebra 2A—11th grade

Units		Common Core Standards	Vocabulary	Pacing
Unit 4 – Polynomial, Radical, and Rational Functions	Chapter 6, Section 1 Chapter 6, Section 2 Chapter 6, Section 3 Chapter 7, Section 2 Chapter 7, Section 3 Chapter 7, Section 5 Chapter 9, Section 4 Chapter 9, Section 5 Chapter 9, Section 6 Chapter 9, Section 3	**N-Q.1.** Use units as a way to understand problems and to guide the solution of multi-step problems; choose and interpret units consistently in formulas; choose and interpret the scale and the origin in graphs and data displays. **N-Q.2.** Define appropriate quantities for the purpose of descriptive modeling. **N-Q.3.** Choose a level of accuracy appropriate to limitations on measurement when reporting quantities. **A-SSE.1.** Interpret expressions that represent a quantity in terms of its context.★ **A-SSE.2.** Use the structure of an expression to identify ways to rewrite it. *For example, see $x^4 - y^4$ as $(x^2)^2 - (y^2)^2$, thus recognizing it as a difference of squares that can be factored as $(x^2 - y^2)(x^2 + y^2)$.* **A-SSE.3.** Choose and produce an equivalent form of an expression to reveal and explain properties of the quantity represented by the expression. **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. **A-APR.2.** Know and apply the Remainder Theorem: For a polynomial p(x) and a number a, the remainder on division by x – a is p(a), so p(a) = 0 if and only if (x – a) is a factor of p(x). **A-APR.3.** Identify zeros of polynomials when suitable factorizations are available, and use the zeros to construct a rough graph of the function defined by the polynomial. **A-APR.3.** Identify zeros of polynomials when suitable factorizations are available, and use the zeros to construct a rough graph of the function defined by the polynomial. **A-APR.7.** (+) Understand that rational expressions form a system analogous to the rational numbers, closed under addition, subtraction, multiplication, and division by a nonzero rational expression; add, subtract, multiply, and divide rational expressions. **A-CED.1.** Create equations and inequalities in one variable 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 in two or more variables to represent relationships between quantities; graph equations on coordinate axes with labels and scales. **A-REI.2.** Solve simple rational and radical equations in one variable, and give examples showing how extraneous solutions may arise. **A-REI.3.** Solve linear equations and inequalities in one variable, including equations with coefficients represented by letters.	Polynomial functions Linear Quadratic Cubic Quartic Quantic Monomial Binomial Trinomial Polynomial regression Zeros End behavior Positive and negative Remainder theorem Radical operations Simplifying radicals Rationalize Conjugate Radical equations Extraneous solutions Rational functions Rational operations Rational equations Hyperbola Points of discontinuity Hole Asymptote	36 days
		Assessments: Multiple Quizzes Final Test		

Algebra 2A—11th grade

Units		Common Core Standards (cont.)	Vocabulary	Pacing
Unit 4 – Polynomial, Radical, and Rational Functions(cont.)		**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.7.** Graph functions expressed symbolically and show key features of the graph, by hand in simple cases and using technology for more complicated cases. **F-IF.8.** Write a function defined by an expression in different but equivalent forms to reveal and explain different properties of the function. **F-IF.9.** Compare properties of two functions each represented in a different way (algebraically, graphically, numerically in tables, or by verbal descriptions). *For example, given a graph of one quadratic function and an algebraic expression for another, say which has the larger maximum.* **F-LE.3.** Observe using graphs and tables that a quantity increasing exponentially eventually exceeds a quantity increasing linearly, quadratically, or (more generally) as a polynomial function. **S-ID.6.** Represent data on two quantitative variables on a scatter plot, and describe how the variables are related.		

Algebra 2A—11th grade

Units		Common Core Standards	Vocabulary	Pacing
MME Preparation and Review		MME Preparation & Geometry Review **Assessments:** Multiple quizzes MME/ACT test	MME overview Test taking strategies Pre-algebra review Whole numbers Decimals Roots Fractions Order of operations Percents Ratio and proportion Geometry exam review Right triangles Parallel lines Angles Quadrilaterals	23 days Throughout Sept-March