Title	**Algebra I Curriculum 2012 (HS)**
Type	Essential
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Curriculum Writing History	
Notes	
Attachments	

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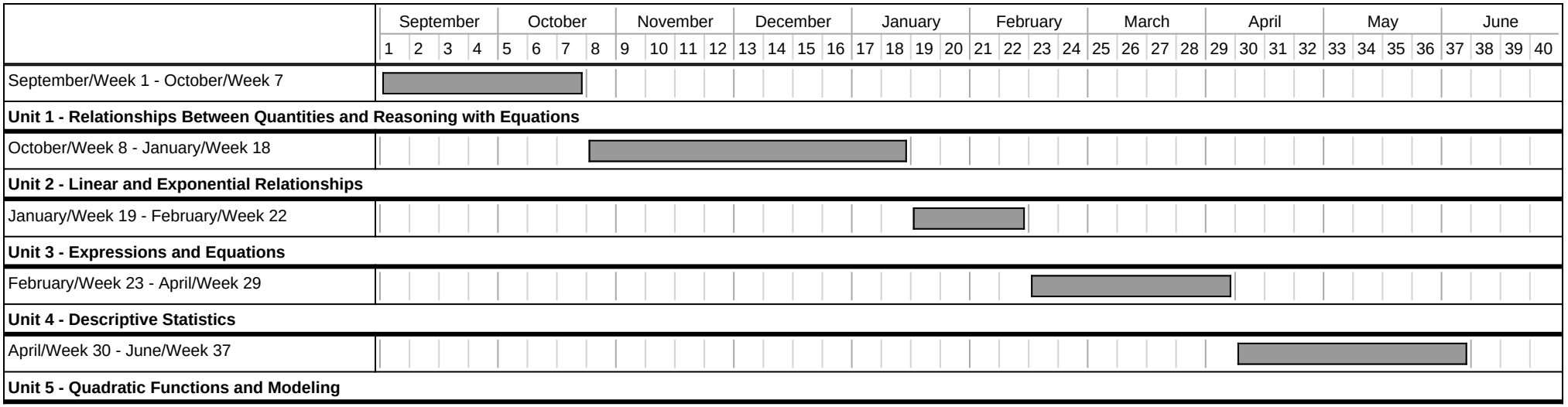

Title : Algebra I Curriculum 2012 (HS)
Type : Essential

Duration: September/Week 1 - October/Week 7				
UNIT NAME: Unit 1 - Relationships Between Quantities and Reasoning with Equations				
Enduring Understandings	**Essential Questions**	**Knowledge**	**Skills**	**Standards**
• Quantities can be represented by symbols or variables • In mathematics there exists a universal convention that applies to the order of procedures. • Mathematical conventions are the basis of effective communication and problem solving. • Algebraic and numeric conventions can be used to transform equations and inequalities so solutions can be found. • Logical patterns exist and are a regular occurrence in mathematics and in the world around us. • Algebraic representations can be used to generalize patterns and relationships • Relationships can be described and generalizations made for mathematical situations that have numbers or objects that repeat in a predictable way • Observable real world patterns can be represented in many ways. • Variables are symbols that take the place of numbers or a range of numbers • Variables can be used for many purposes	• What are some ways to represent, describe and analyze patterns? • When is one representation of a pattern more useful than another? • Why are rules and conventions necessary in algebra? • How can we use algebraic representations to analyze patterns? • How can numeric operations be extended to algebraic expressions? • What are the uses of variables? • What order is followed when evaluating an expression? • What are some ways to represent, describe and analyze patterns? • Why is an agreed upon order of operations necessary? • How do you write equations and inequalities? • How can you use a problem-solving plan to solve a problem? • When comparing two measurements, how do you determine which one is more precise? • How do you represent functions as tables and rules?	• Variables can be used as symbols for varying quantities, symbols for fixed unknown values, symbols for all numbers in a property or identity, symbols in a formula, and symbols for a parameter. • Distinguish and describe the use of a variable. • Reason quantitatively and use units to solve problems. • Interpret the structure of expressions • Apply the associative, commutative and distributive properties and know what operations they apply to. • Explain order of operations and describe the application of order of operations • Represent relationships or patterns as expressions, equations or inequalities. • Understand solving equations as a process of reasoning and explain the reasoning • Explain each step in solving a simple equation. • Solve equations and inequalities in one variable • Describe what it means to simply an expression via equivalent forms.	• Evaluate algebraic expressions including expressions containing exponents • Use the order of operations to evaluate expressions • Simplify algebraic expressions • Translate verbal quantitative situations into algebraic expressions • Translate verbal sentences into equations and inequalities • Model real world situations with algebraic expressions in a variety of representations (concrete, pictorial, symbolic, verbal) • Compare measurements for precision • Choose appropriate units of measurement • Represent functions as rules and as tables • Represent functions as graphs • Compare real numbers • Solve simple and multi-step equations • Solve equations with variables on both sides • Write a ratio and use equivalent ratios to construct a proportion. • Find missing elements in a proportion	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. (09-12) [State:New Jersey CCSS] N.Q.2-Define appropriate quantities for the purpose of descriptive modeling. (09-12) [State:New Jersey CCSS] N.Q.3-Choose a level of accuracy appropriate to limitations on measurement when reporting quantities. (09-12)[State:New Jersey CCSS] A.SSE.1-Interpret expressions that represent a quantity in terms of its context. * (09-12) [State:New Jersey CCSS] 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.* (09-12) [State:New Jersey CCSS] A.CED.2-Create equations in two or more variables to represent relationships between quantities; graph equations on coordinate axes with labels and scales. (09-12)[State:New Jersey CCSS]

• Representing quantities by variables helps us to recognize and describe patterns, make generalizations, prove or explain conclusions. • Relationships among quantities can be represented using expressions, equations and inequalities. • Converting verbal conditions and constraints into algebraic equations allows to represent situations abstractly. • Functions represent a special type of relationship that uniquely maps the members of one set with the members of another set. • Units represent measurement and the type of unit is determined by what is being measured. • When using units in application problems you must consider the appropriate unit of measurement and the appropriate level of precision in derived measures.	• How do you represent functions as graphs? • How do you evaluate a square root and compare real numbers? • How do you simplify an expression? • How do you solve a simple equations and support your solution by giving a viable argument justifying your solution method? • How do you solve multi-step equations? • How do you solve equations with variables on both sides? • What does a ratio represent? • How do you solve proportions using ratios? • How do you rewrite equations? • Why would you rearrange a formulas? • Why is it useful to represent real-like situations algebraically?	• Define and give examples of the terms: factor, term, coefficient, expression, equality, exponents and functions.	• Rewrite equations and formulas to highlight a specific quantity using the same reasoning as solving an equation. • Solve absolute value inequalities expressing the solution graphically and as a range of values • Graph linear inequalities in two variables	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.* (09-12)[State:New Jersey CCSS] 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.* (09-12)[State:New Jersey CCSS] 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. (09-12)[State:New Jersey CCSS] A.REI.3-Solve linear equations and inequalities in one variable, including equations with coefficients represented by letters. (09-12)[State:New Jersey CCSS] R.CCR.1-Read closely to determine what the text says explicitly and to make logical inferences from it; cite specific textual evidence when writing or speaking to support conclusions drawn from the text. (06-12)

				[State:New Jersey CCSS] R.CCR.3-Analyze how and why individuals, events, or ideas develop and interact over the course of a text. (06-12) [State:New Jersey CCSS] R.CCR.4-Interpret words and phrases as they are used in a text, including determining technical, connotative, and figurative meanings, and analyze how specific word choices shape meaning or tone. (06-12)[State:New Jersey CCSS] R.CCR.7-Integrate and evaluate content presented in diverse formats and media, including visually and quantitatively, as well as in words. * (06-12) [State:New Jersey CCSS] W.CCR.1-Write arguments to support claims in an analysis of substantive topics or texts using valid reasoning and relevant and sufficient evidence. (06-12) [State:New Jersey CCSS] W.CCR.9-Draw evidence from literary or informational texts to support analysis, reflection, and research. (06-12)[State:New Jersey CCSS] 9.1.12.A.1-Apply critical thinking and problem-solving strategies during structured learning experiences. (09-12)[State:New Jersey] 9.1.12.B.1-Present resources and data in a format that effectively communicates the meaning of the data and its implications for solving

				problems, using multiple perspectives. (09-12)[State:New Jersey] MP.1-Make sense of problems and persevere in solving them. (PK, KG, 01-12)[State:New Jersey CCSS] MP.2-Reason abstractly and quantitatively. (PK, KG, 01-12)[State:New Jersey CCSS] MP.3-Construct viable arguments and critique the reasoning of others. (PK, KG, 01-12)[State:New Jersey CCSS] MP.4-Model with mathematics. (PK, KG, 01-12)[State:New Jersey CCSS] MP.8-Look for and express regularity in repeated reasoning. (KG, 01-12)[State:New Jersey CCSS]
Plans:				

Title : Algebra I Curriculum 2012 (HS)
Type : Essential

Duration: October/Week 8 - January/Week 18				
UNIT NAME: Unit 2 - Linear and Exponential Relationships				
Enduring Understandings	**Essential Questions**	**Knowledge**	**Skills**	**Standards**
• Linear equations and functions can be represented graphically • The graph of a line represents the set of points that satisfies the equation of the line • A line can be represented by its graph or by an equation • The equation of a line defines the relationship between two variables • The slope of a line represents a constant rate of change in the dependent variable when the independent variable changes by a constant amount • Changes in linear equations and functions affect their graphs • Graphs of linear equations and functions can be used to represent and solve real-world problems • Linear equations are written in a variety of forms • Linear models can be used to model data and predict outcomes • Properties of inequalities and order are used to solve inequalities	• What do points on the coordinate plane represent? • How do you graph linear equations using slope, x and y intercepts and/or transformations of the parent function? • How do you find the slope of a line and interpret slope as a rate of change? • How do you graph linear equations given in slope-intercept form? • What effects can translations have on the graph of a line? • How do you write and graph direct variation equations? • What is function notation? • How do write an equation of a line in slope-intercept form? • How can you find the slope of a line given two points or the equation of line? • How do you find the equation of a line given two points? • How do you write linear equations in point-slope form? • How do you write linear equations in standard form? • How do write equations of parallel and perpendicular lines?	• Content specific vocabulary:slope, x and y intercept, coefficient, coordinate, system, parallel, perpendicular, function • The slope of a line is the change in y-values/change in x-values given the coordinates of two points • The slope of a line, defined by the letter m, is the coefficient of x when the equation is in the form y=mx +b • The slope of a vertical line is undefined • The slope of a horizontal line is zero • The slope of a line that rises from left to right on the coordinate grid is positive • The slope of a line that falls from left to right on the coordinate grid is negative. • Solve systems of equations • Recognize and describe a line with a slope that is positive, negative, zero or undefined • Parallel lines have equal slope • The product of the slopes of perpendicular lines is -1 unless one of the lines has undefined slope	• Use content specific vocabulary when describing solutions • Identify and plot points in a coordinate plane • Graph linear equations in a coordinate plane using a table of values • Graph linear equations using intercepts • Find the slope of a line and interpret slope as a rate of a change • Graph linear equations using slope intercept form • Use transformational graphs to describe the effects of changes in the equation on the graph of the equation • Write and graph direct variation equations • Use function notation • Write equations of lines in slope intercept form • Write an equation of a line using points on the line • Write linear equations in point slope form • Write the equation of a line given the graph of the line • Write equations in standard form • Write equations of parallel and perpendicular lines • Make predictions using best fitting lines	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. (09-12) [State:New Jersey CCSS] A.REI.6-Solve systems of linear equations exactly and approximately (e.g., with graphs), focusing on pairs of linear equations in two variables. (09-12)[State:New Jersey CCSS] 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). (09-12)[State:New Jersey CCSS] 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.* (09-12)

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• A system of linear equations can be used to model real world conditions that must be satisfied simultaneously. • Systems of linear equations can have many, one or no solutions. • Systems of linear inequalities can model real world situations especially in economics, business and science • A relationship exists between the laws of exponents and scientific notation	• How do you make scatter plots and write equations to model data? • How can you use a best fitting line to make predictions about data? • How do you solve and graph inequalities? • How do you solve compound inequalities? • How do you solve absolute value equations? • How do you solve absolute value inequalities? • How do you graph a linear inequality in two variables? • How do you solve linear systems by graphing? • How do you solve linear systems by substitution? • How do you solve linear systems by multiplying first (linear combination)? • How can you identify the number of solutions of a linear system? • How do you solve systems of linear inequalities in two variables? • Describe the solution of a system of inequalities • What are the properties of exponents? • How do you use zero and negative exponents? • How can you distinguish between linear and exponential relationships? What are the distinguishing characteristics of each graph?	• A system of linear equations with exactly one solution is characterized by the graphs of two lines intersecting in a single point • The point of intersection of the graphs of two linear equations represents x and y values that satisfy both equations • A system of equations with no solutions is characterized graphically by a pair of parallel lines • A system of equations having infinite solutions is graphically represented as two lines that coincide and the coordinates of all points on the line satisfy both equations. • Represent and solve equations and inequalities graphically • Understand the concept of a function and use function notation • Interpret function that arise in applications in terms of a context • Analyze functions from different representations	• Make scatter plots and write equations to model data • Solve inequalities using addition and subtractions • Solve inequalities using multiplication and division • Solve multi-step inequalities • Solve compound inequalities • Solve absolute value equations • Solve absolute value inequalities • Graph linear inequalities in two variables • Graph and solve systems of linear equations • Solve systems of linear equations by substitution • Solve systems by adding and subtracting • Solve systems by multiplying first • Identify the number of solutions of a linear system • Solve systems of linear inequalities in two variables • Use properties of exponents involving products • Use properties of exponents involving quotients • Use zero and negative exponents • Write and graph exponential growth and decay models • Simplify monomial expressions with integral exponents using the law of exponents	[State:New Jersey CCSS] 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. (09-12)[State:New Jersey CCSS] 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). (09-12)[State:New Jersey CCSS] 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. (09-12)[State:New Jersey CCSS] F.IF.3-Recognize that sequences are functions, sometimes defined recursively, whose domain is a subset of the integers. *For example, the Fibonacci sequence is defined recursively by f(0) = f(1) = 1, f(n +1) = f(n) + f(n-1) for n ≥ 1.* (09-12)[State:New Jersey CCSS]

	• How do you write and graph equations for exponential growth and decay?			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. * (09-12)[State:New Jersey CCSS] 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. * (09-12)[State:New Jersey CCSS] 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.* (09-12)[State:New Jersey CCSS] MP.1-Make sense of problems and persevere in solving them. (PK, KG, 01-12)[State:New Jersey CCSS] MP.2-Reason abstractly and quantitatively. (PK, KG, 01-12)[State:New Jersey CCSS] MP.3-Construct viable arguments and critique the reasoning of others. (PK, KG, 01-12)[State:New Jersey CCSS]

				MP.4-Model with mathematics. (PK, KG, 01-12)[State:New Jersey CCSS] MP.6-Attend to precision. (PK, KG, 01-12)[State:New Jersey CCSS] MP.7-Look for and make use of structure. (KG, 01-12) [State:New Jersey CCSS] RH.11–12.7-Integrate and evaluate multiple sources of information presented in diverse formats and media (e.g., visually, quantitatively, as well as in words) in order to address a question or solve a problem. (11, 12)[State:New Jersey CCSS] RH.11–12.9-Integrate information from diverse sources, both primary and secondary, into a coherent understanding of an idea or event, noting discrepancies among sources. (11, 12) [State:New Jersey CCSS] RST.11–12.3-Follow precisely a complex multistep procedure when carrying out experiments, taking measurements, or performing technical tasks; analyze the specific results based on explanations in the text. (11, 12)[State:New Jersey CCSS] RST.11–12.4-Determine the meaning of symbols, key terms, and other domain-specific words and phrases as they are used in a specific scientific or technical context relevant to grades 11–12 texts and topics.

				(11, 12)[State:New Jersey CCSS] WHST.11–12.2-Write informative/explanatory texts, including the narration of historical events, scientific procedures/ experiments, or technical processes. (11, 12) [State:New Jersey CCSS] WHST.11–12.2.a-Introduce a topic and organize complex ideas, concepts, and information so that each new element builds on that which precedes it to create a unified whole; include formatting (e.g., headings), graphics (e.g., figures, tables), and multimedia when useful to aiding comprehension. (11, 12) [State:New Jersey CCSS] 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 $(x^2 – y^2)(x^2 + y^2)$.* (09-12) [State:New Jersey CCSS] Write expressions in equivalent forms to solve problems. (09-12) [State:New Jersey CCSS] A.SSE.3.c-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%.* (09-12)[State:New Jersey

				CCSS] 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.* (09-12) [State:New Jersey CCSS] A.CED.2-Create equations in two or more variables to represent relationships between quantities; graph equations on coordinate axes with labels and scales. (09-12)[State:New Jersey CCSS] 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.* (09-12)[State:New Jersey CCSS] Solve systems of equations. (09-12)[State:New Jersey CCSS] 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. (09-12) [State:New Jersey CCSS] A.REI.6-Solve systems of linear equations exactly and approximately (e.g., with

				graphs), focusing on pairs of linear equations in two variables. (09-12)[State:New Jersey CCSS] 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. (09-12)[State:New Jersey CCSS] F.LE.1-Distinguish between situations that can be modeled with linear functions and with exponential functions. (09-12)[State:New Jersey CCSS] F.LE.1.a-Prove that linear functions grow by equal differences over equal intervals, and that exponential functions grow by equal factors over equal intervals. (09-12)[State:New Jersey CCSS] F.LE.1.b-Recognize situations in which one quantity changes at a constant rate per unit interval relative to another. (09-12)[State:New Jersey CCSS] F.LE.1.c-Recognize situations in which a quantity grows or decays by a constant percent rate per unit interval relative to another. (09-12)[State:New Jersey CCSS]
Plans:				

Title : Algebra I Curriculum 2012 (HS)
Type : Essential

Duration: January/Week 19 - February/Week 22				
UNIT NAME: Unit 3 - Expressions and Equations				
Enduring Understandings	**Essential Questions**	**Knowledge**	**Skills**	**Standards**
• Operations with polynomials can be represented concretely, pictorially and symbolically • Polynomial expressions can be used to model real-world situations • The distributive property is the unifying concept that enables operations with polynomials • Addition and subtraction of polynomials can be written using the distributive property • Factoring reverses the multiplication of polynomials • Some polynomials are prime and cannot be factored over the set of real numbers • Algebra tiles can be used to model factoring • Polynomials expressions can be used to define functions and these functions can be represented graphically • There is a relationship between the factors of a polynomial and the x-intercept of the graph of its related function • Polynomial equations can represent real-world problems and be used to solve real-world problems	• How do you perform operations on polynomials? • How do you solve polynomial equations in factored form? • How do you factor quadratic trinomials? • How do you factor polynomials completely? • How do you graph a quadratic function? • How do you graph a quadratic function in standard form? • How do you solve a quadratic equation by graphing? • How do you solve a quadratic equation by taking a square root? • How do you solve a quadratic equation by completing the square? • How do you solve a quadratic equation by using the quadratic formula? • How do you solve a system of equations that includes a quadratic equation? • How do you decide whether a linear, exponential, or quadratic model best represents data? • How can you identify key features of linear, exponential, and quadratic functions when they are modeled in different ways?	• Understand, define and use concept specific vocabulary: Polynomial, monomial, binomial, trinomial, factor, sum, difference, integer, degree of a polynomial, lead coefficient, term. roots • Identify and name polynomials • Interpret the structure of expressions • Represent polynomials by a diagram • Write expressions in equivalent forms to solve problems • Perform arithmetic operations on polynomials • Determine the greatest number of factors possible for a polynomial • Determine when a polynomial is not factorable • Recognize prime polynomials • Create equations that describe numbers or relationships • Solve quadratic equations and inequalities in one variable	• Name polynomials • Identify the degree of a polynomial • Rewrite a polynomial as a sum or difference • Rewrite a polynomial as a product or quotient • Add and subtract polynomials • Multiply and divide polynomials • Square a binomial • Simplify an expression containing polynomials • Find the product of polynomials written in function form • Solve polynomial equations in factored form • Factor quadratic trinomials • Factor polynomials completely • Graph simple quadratic functions • Graph general quadratic functions • Solve quadratic equations by graphing • Solve quadratic equations by finding square roots • Solve quadratic equations by completing the square • Solve quadratic equations by using the quadratic formula • Solve systems that include a quadratic equation	A.SSE.1-Interpret expressions that represent a quantity in terms of its context. * (09-12) [State:New Jersey CCSS] 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 $(x^2 – y^2)(x^2 + y^2)$.* (09-12) [State:New Jersey CCSS] A.SSE.3-Choose and produce an equivalent form of an expression to reveal and explain properties of the quantity represented by the expression. * (09-12)[State:New Jersey CCSS] 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. (09-12)[State:New Jersey CCSS] 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.* (09-12) [State:New Jersey CCSS] A.CED.2-Create equations in two or more variables to

• Vertical motion is modeled by a quadratic equation • Solving quadratic equations • Comparing linear, exponential, and quadratic models			• Compare linear, exponential, and quadratic models • Compare representations of linear, exponential, and quadratic models • Justify solutions • Use a graphing calculator to explore and verify solutions	represent relationships between quantities; graph equations on coordinate axes with labels and scales. (09-12)[State:New Jersey CCSS] 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.* (09-12) [State:New Jersey CCSS] A.REI.4-Solve quadratic equations in one variable. (09-12)[State:New Jersey CCSS] A.REI.7-Solve a simple system consisting of a linear equation and a quadratic equation in two variables algebraically and graphically. For example, find the points of intersection between the line $y = –3x$ and the circle $x^2 + y^2 = 3$. (09-12) [State:New Jersey CCSS] A.SSE.3.a-Factor a quadratic expression to reveal the zeros of the function it defines. (09-12) [State:New Jersey CCSS] A.REI.4.b-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. (09-12) [State:New Jersey CCSS] MP.1-Make sense of problems

				and persevere in solving them. (PK, KG, 01-12)[State:New Jersey CCSS] MP.2-Reason abstractly and quantitatively. (PK, KG, 01-12) [State:New Jersey CCSS] MP.3-Construct viable arguments and critique the reasoning of others. (PK, KG, 01-12)[State:New Jersey CCSS] MP.4-Model with mathematics. (PK, KG, 01-12)[State:New Jersey CCSS] MP.5-Use appropriate tools strategically. (PK, KG, 01-12) [State:New Jersey CCSS] MP.6-Attend to precision. (PK, KG, 01-12)[State:New Jersey CCSS] MP.7-Look for and make use of structure. (KG, 01-12) [State:New Jersey CCSS] MP.8-Look for and express regularity in repeated reasoning. (KG, 01-12)[State:New Jersey CCSS] RH.9–10.2-Determine the central ideas or information of a primary or secondary source; provide an accurate summary of how key events or ideas develop over the course of the text. (09, 10)[State:New Jersey CCSS] RH.9–10.3-Analyze in detail a series of events described in a text; determine whether earlier events caused later ones or simply preceded them. (09, 10) [State:New Jersey CCSS] RH.9–10.4-Determine the meaning of words and phrases

				as they are used in a text, including vocabulary describing political, social, or economic aspects of history/social science. (09, 10)[State:New Jersey CCSS] RST.9–10.1-Cite specific textual evidence to support analysis of science and technical texts, attending to the precise details of explanations or descriptions. (09, 10)[State:New Jersey CCSS] RST.9–10.2-Determine the central ideas or conclusions of a text; trace the text's explanation or depiction of a complex process, phenomenon, or concept; provide an accurate summary of the text. (09, 10)[State:New Jersey CCSS] RST.9–10.3-Follow precisely a complex multistep procedure when carrying out experiments, taking measurements, or performing technical tasks, attending to special cases or exceptions defined in the text. (09, 10)[State:New Jersey CCSS] WHST.9–10.2.d-Use precise language and domain-specific vocabulary to manage the complexity of the topic and convey a style appropriate to the discipline and context as well as to the expertise of likely readers. (09, 10)[State:New Jersey CCSS]
Plans:				

Duration: February/Week 23 - April/Week 29				
UNIT NAME: Unit 4 - Descriptive Statistics				
Enduring Understandings	**Essential Questions**	**Knowledge**	**Skills**	**Standards**
• Data can be represented mathematically • The results of a statistical investigation can be used to support or refute an argument • Linear, quadratic and exponential models can be used to represent real world problems • Functions fitted to data are used to solve problems in the context of the data	• How can data be represented mathematically? • How can the collection, organization, interpretation, and display of data be used to answer questions? • How can the representation of data influence decisions? • How do you identify populations and sampling methods? • How do you compare measures of central tendency and dispersion? • How do you find a marginal frequency in a two-way frequency table? • How you make stem-and-leaf plots and histograms? • How do you make and interpret box-and-whisker plots? • How can you use a scatter plot to predict future outcomes?	• Use concept specific vocabulary: linear, quadratic, exponential, frequency, stem-and-leaf, whisker plot, correlation • Create scatter plots and estimate a line of best fit • Describe the correlation of data • Interpret the slope and y-intercept of the line of best fit in the context of the model • Summarize, represent, and interpret data on a single count or measurement variable • Summarize, represent, and interpret data on two categorical and quantitative variables • Interpret linear models • Build a function that models a relationship between two quantities • Construct and compare linear, quadratic, and exponential models and solve problems • Linear functions grow by equal differences over equal intervals • Exponential functions grow by equal factors over equal intervals	• Represent data with plots on the real number line • Compare measures of central tendency and dispersion • Find frequencies in a two-way frequency table • Make stem-and-leaf plots and histograms • Make and interpret box and whisker plots • Create scatter plots and estimate a line of best fit • Interpret the slope and y-intercept of a line of best fit in the context of the model • Use line of best fit to predict outcomes • Describe the correlation of data	S.ID.1-Represent data with plots on the real number line (dot plots, histograms, and box plots). (09-12)[State:New Jersey CCSS] S.ID.2-Use statistics appropriate to the shape of the data distribution to compare center (median, mean) and spread (interquartile range, standard deviation) of two or more different data sets. (09-12) [State:New Jersey CCSS] S.ID.3-Interpret differences in shape, center, and spread in the context of the data sets, accounting for possible effects of extreme data points (outliers). (09-12)[State:New Jersey CCSS] S.ID.5-Summarize categorical data for two categories in two-way frequency tables. Interpret relative frequencies in the context of the data (including joint, marginal, and conditional relative frequencies). Recognize possible associations and trends in the data. (09-12) [State:New Jersey CCSS] S.ID.6.-Represent data on two quantitative variables on a scatter plot, and describe how the variables are related. (09-12) [State:New Jersey CCSS] S.ID.7-Interpret the slope (rate of change) and the intercept (constant term) of a linear

				model in the context of the data. (09-12)[State:New Jersey CCSS] S.ID.8-Compute (using technology) and interpret the correlation coefficient of a linear fit. (09-12)[State:New Jersey CCSS] S.ID.9-Distinguish between correlation and causation. (09-12)[State:New Jersey CCSS] F.LE.1-Distinguish between situations that can be modeled with linear functions and with exponential functions. (09-12) [State:New Jersey CCSS] 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). (09-12)[State:New Jersey CCSS] RH.9–10.7-Integrate quantitative or technical analysis (e.g., charts, research data) with qualitative analysis in print or digital text. (09, 10) [State:New Jersey CCSS] RST.9–10.3-Follow precisely a complex multistep procedure when carrying out experiments, taking measurements, or performing technical tasks, attending to special cases or exceptions defined in the text. (09, 10)[State:New Jersey CCSS] RST.9–10.4-Determine the

				meaning of symbols, key terms, and other domain-specific words and phrases as they are used in a specific scientific or technical context relevant to grades 9–10 texts and topics. (09, 10)[State:New Jersey CCSS] RST.9–10.5-Analyze the structure of the relationships among concepts in a text, including relationships among key terms (e.g., force, friction, reaction force, energy). (09, 10) [State:New Jersey CCSS] WHST.9–10.1.c-Use words, phrases, and clauses to link the major sections of the text, create cohesion, and clarify the relationships between claim(s) and reasons, between reasons and evidence, and between claim(s) and counterclaims. (09, 10)[State:New Jersey CCSS] WHST.9–10.5-Develop and strengthen writing as needed by planning, revising, editing, rewriting, or trying a new approach, focusing on addressing what is most significant for a specific purpose and audience. (09, 10) [State:New Jersey CCSS] MP.1-Make sense of problems and persevere in solving them. (PK, KG, 01-12)[State:New Jersey CCSS] MP.2-Reason abstractly and quantitatively. (PK, KG, 01-12) [State:New Jersey CCSS] MP.3-Construct viable arguments and critique the

				reasoning of others. (PK, KG, 01-12)[State:New Jersey CCSS] MP.4-Model with mathematics. (PK, KG, 01-12)[State:New Jersey CCSS] MP.5-Use appropriate tools strategically. (PK, KG, 01-12)[State:New Jersey CCSS] MP.6-Attend to precision. (PK, KG, 01-12)[State:New Jersey CCSS] MP.7-Look for and make use of structure. (KG, 01-12)[State:New Jersey CCSS] MP.8-Look for and express regularity in repeated reasoning. (KG, 01-12)[State:New Jersey CCSS]
Plans:				

Title : Algebra I Curriculum 2012 (HS)
Type : Essential

Duration: April/Week 30 - June/Week 37				
UNIT NAME: Unit 5 - Quadratic Functions and Modeling				
Enduring Understandings	**Essential Questions**	**Knowledge**	**Skills**	**Standards**
• Properties of integer exponents extend to rational exponents • A function models a relationship between two quantities • Functions can be defined by an expression in different but equivalent forms to reveal and explain different properties of the function • Graphs can be discrete or continuous functions • Graphs are a representation of a function • Quadratic equations can be solved in many ways • Choosing a solution method depends on the structure of the quadratic equation • All quadratic equations do not have real solutions • Piecewise functions • Graph absolute value functions	• How do you evaluate expressions with rational exponents? • How can you show that the sum of a rational number and an irrational number is irrational? • How do you tell if a function is discrete or continuous? • How do you construct linear, quadratic and exponential models? • How do graphs and equations relate? • How do you graph a quadratic function? • How do you graph quadratic functions in vertex form? • How do attributes of quadratic function effect the graph? • How do you graph piecewise functions? • How do you graph absolute value functions? • How can you create an equation to represent the graph of a quadratic function? • How do you solve a quadratic equation? • How are attributes of the graph reflected in the equation of a function? • What do the x and y intercepts represent?	• Concept specific vocabulary such as rational, exponent, base, vertex, x and y intercept, function, discrete, continuous, zeros, axis of symmetry • Extend the properties of exponents to rational exponents • Use properties of rational and irrational numbers • Interpret functions that arise in applications in terms of context (limited to quadratic and linear functions) • Analyze functions using different representations (limit to linear and quadratic functions) • Build a function that models a relationship between two quantities • Build new functions from existing functions • Construct and compare linear, quadratic, and exponential models and solve problems • Interpret expressions for functions in terms of the situation they model • Distinguish between situations that can be modeled with linear and exponential functions	• Identify whether sets of rational and irrational numbers are closed under operations • Explain the meaning of rational exponents • Apply the properties of exponents to rational exponents • Graph and classify discrete and continuous functions • Graph linear and quadratic functions and show intercepts, maxima and minima, vertex • Graph quadratic functions in intercept form • Graph quadratic functions in vertex form • Graph and write piecewise functions • Graph absolute value functions • Find the vertex and x and y intercepts given a quadratic function • Identify the attributes of a quadratic function that effect the graph: opening up or down, moves the graph right or left or up and down • Use the quadratic formula to solve a quadratic equation • Choose an appropriate method of solving a quadratic equation	N.RN.1-Explain how the definition of the meaning of rational exponents follows from extending the properties of integer exponents to those values, allowing for a notation for radicals in terms of rational exponents. *For example, we define $5^{1/3}$ to be the cube root of 5 because we want $(5^{1/3})^3 = 5^{(1/3)3}$ to hold, so $(5^{1/3})^3$ must equal 5.* (09-12)[State:New Jersey CCSS] N.RN.2-Rewrite expressions involving radicals and rational exponents using the properties of exponents. (09-12) [State:New Jersey CCSS] N.RN.3-Explain why the sum or product of two rational numbers is rational that the sum of a rational number and an irrational number is irrational; and that the product of a nonzero rational number and an irrational number is irrational. (09-12)[State:New Jersey CCSS] 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

	• What are the zeros of a quadratic function?	• Identify attributes of a quadratic function and how they effect the graph of the function • Know and apply the quadratic formula	• Solve a quadratic equation by factoring, completing the square, taking the square root, using the quadratic formula • Outline the procedure for solving a quadratic equation • Determine the number of real solution of a quadratic equation	increasing, decreasing, positive, or negative; relative maximums and minimums; symmetries; end behavior; and periodicity.* (09-12)[State:New Jersey CCSS] 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. * (09-12)[State:New Jersey CCSS] 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. * (09-12) [State:New Jersey CCSS] 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. * (09-12) [State:New Jersey CCSS] F.IF.8-Write a function defined by an expression in different but equivalent forms to reveal and explain different properties of the function. (09-12)[State:New Jersey CCSS] 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.* (09-12)[State:New Jersey CCSS] F.BF.1-Write a function that describes a relationship between two quantities. * (09-12)[State:New Jersey CCSS] 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. (09-12)[State:New Jersey CCSS] F.BF.4-Find inverse functions. (09-12)[State:New Jersey CCSS] 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. (09-12)[State:New Jersey CCSS] F.LE.5-Interpret the parameters in a linear or exponential function in terms of a context. (09-12)[State:New Jersey

				CCSS] MP.1-Make sense of problems and persevere in solving them. (PK, KG, 01-12)[State:New Jersey CCSS] MP.2-Reason abstractly and quantitatively. (PK, KG, 01-12) [State:New Jersey CCSS] MP.3-Construct viable arguments and critique the reasoning of others. (PK, KG, 01-12)[State:New Jersey CCSS] MP.4-Model with mathematics. (PK, KG, 01-12)[State:New Jersey CCSS] MP.5-Use appropriate tools strategically. (PK, KG, 01-12) [State:New Jersey CCSS] MP.6-Attend to precision. (PK, KG, 01-12)[State:New Jersey CCSS] MP.7-Look for and make use of structure. (KG, 01-12) [State:New Jersey CCSS] MP.8-Look for and express regularity in repeated reasoning. (KG, 01-12)[State:New Jersey CCSS] 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.* (09-12) [State:New Jersey CCSS] A.REI.4.b-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. (09-12) [State:New Jersey CCSS] 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.* (09-12) [State:New Jersey CCSS] F.IF.7.a-Graph linear and quadratic functions and show intercepts, maxima, and minima. (09-12)[State:New Jersey CCSS] A.CED.2-Create equations in two or more variables to represent relationships between quantities; graph equations on coordinate axes with labels and scales. (09-12)[State:New Jersey CCSS] 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. (09-12)[State:New Jersey CCSS] F.IF.7.c-Graph polynomial functions, identifying zeros when suitable factorizations are available, and showing end behavior. (09-12)[State:New Jersey CCSS] 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. (09-12)[State:New Jersey CCSS]
Plans:				