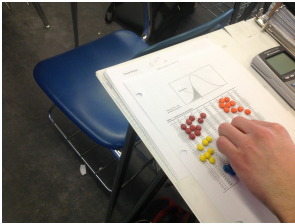
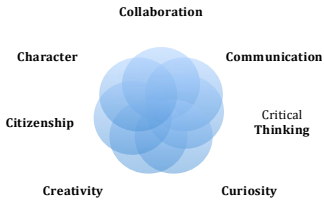


Content Area: Mathematics	Course: Algebra 2	Grade Level: 10-11
	<p>R14 The Seven Cs of Learning</p> 	
Unit Titles	Length of Unit	
<ul style="list-style-type: none"> • <i>Systems of Linear Equations</i> 	4-5 weeks	
<ul style="list-style-type: none"> • <i>Functions</i> 	3-4 weeks	
<ul style="list-style-type: none"> • <i>Operations on Polynomials and Factoring</i> 	3-4 weeks	
<ul style="list-style-type: none"> • <i>Solving Quadratic Functions</i> 	2-3 weeks	
<ul style="list-style-type: none"> • <i>Graphing Quadratic Functions</i> 	2-3 weeks	
<ul style="list-style-type: none"> • <i>Rational Exponents, Radical Functions, and Inverse Functions</i> 	4-5 weeks	
<ul style="list-style-type: none"> • <i>Exponential and Logarithmic Functions</i> 	4-5 weeks	
<ul style="list-style-type: none"> • <i>Rational Expressions and Equations</i> 	4-5 weeks	
<ul style="list-style-type: none"> • <i>Inferential Statistics</i> 	3-4 weeks	



Strands	Course Level Expectations
High School: Number and Quantity » The Real Number System	<ul style="list-style-type: none"> • Extend the properties of exponents to rational exponents. • Use properties of rational and irrational numbers. • Reason quantitatively and use units to solve problems. • Perform arithmetic operations with complex numbers.
High School: Algebra » Seeing Structure in Expressions	<ul style="list-style-type: none"> • Interpret the structure of expressions. • Write expressions in equivalent forms to solve problems. • Perform arithmetic operations on polynomials. • Understand the relationship between zeros and factors of polynomials. • Use polynomial identities to solve problems. • Rewrite rational expressions. • Create equations that describe numbers or relationships. • Understand solving equations as a process of reasoning and explain the reasoning. • Solve equations and inequalities in one variable. • Solve systems of equations. • Represent and solve equations and inequalities graphically.

Strands	<ul style="list-style-type: none"> • ○ Course Level Expectations
High School: Functions » Interpreting Functions	<ul style="list-style-type: none"> • Understand the concept of a function and use function notation. • Interpret functions that arise in applications in terms of the context. • Analyze functions using different representations. 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.
High School: Statistics & Probability » Interpreting Categorical & Quantitative Data	<ul style="list-style-type: none"> • Summarize, represent, and interpret data on a single count or measurement variable • Understand and evaluate random processes underlying statistical experiments • Make inferences and justify conclusions from sample surveys, experiments, and observational studies • Use probability to evaluate outcomes of decisions

Unit Title	Systems of Linear Equations	Length of Unit	4-5 weeks
Inquiry Questions (Engaging & Debatable)	<ul style="list-style-type: none"> • In what ways is a system of equations used to solve real world problems? • When is it more appropriate to use one method of solving systems of linear equations over another? • How does linear programming relate to optimizing situations in the real world? 		
Standards	<p>Creating Equations: A-CED 3.</p> <p>Rational Expressions: A-REI 5. A-REI 6.</p>		
Unit Strands & Concepts	<p>Solving Systems of Linear Equations by Graphing (By Hand and with a Calculator)</p> <ul style="list-style-type: none"> • Review Graphing by Slope-intercept form • Review Graphing by Intercepts <p>Solving Systems of Linear Equations by Substitution, Solving Systems of Linear Equations by Elimination, Classifying Systems by Number of Solutions, Real World Problems Involving Systems Systems with Inequalities, 3-variable Systems, Linear Programming</p>		
Key Vocabulary	<p>Linear Equations, L Slope, Y-Intercept, X-Intercept, System of Equations, Solution, Inequality No Solution(Parallel Lines), Infinitely Many Solutions, Linear Programming, Constraint, Objective Function</p>		

Unit Title	Systems of Linear Equations	Length of Unit	4-5 weeks
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Critical Content: My students will Know ...	Key Skills: My students will be able to (Do) ...
<ul style="list-style-type: none"> • A system of linear equations is an algebraic way to compare two equations that model a situation, find the breakeven point or choose the most efficient or economical plan. • There are four methods to solve systems and equations – one graphic and three algebraic. All methods result in the same solution but one method may be more efficient. • Many real life problems involve a process called optimization, which means finding the maximum or minimum value of a specific quantity. 	<ul style="list-style-type: none"> • Solve a system of linear equations by graphing. • Solve a system of linear equations by substitution. • Solve a system of linear equations by elimination. • Solve a system of linear equations in three variables. • Write and solve a linear system to represent a real world scenario. • Solve a system of linear inequalities. • Solve a linear programming problem from a set group of constraints and an objective function.

Assessments:	Units quizzes Performance Based Assessment
Teacher Resources:	<ul style="list-style-type: none"> • Textbook – Algebra II Larson - Sections 3.1-3.4 • TI-84 graphing calculator • Various materials from CT SDE Algebra 2 curriculum

Unit Title	Functions	Length of Unit	3-4 weeks
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Inquiry Questions (Engaging & Debatable)	<ul style="list-style-type: none"> • What is a function? What makes a function linear? • What are domain and range? • What is the difference between a linear function and an absolute value function? • What is a transformation and how do transformations impact graphs?
Standards	<p>Interpreting Functions HSF.IF.A.1-, HSF.IF.A.2- ,HSF.IF.B.5. ,HSF.IF.C.7- , HSF.IC.7.A, HSF.IF.C.7.B-</p> <p>Building Functions: HSF.BF.A.1, HSF.BF.B.3-</p> <p>Linear, Quadratic & Exponential Models HSF.LE.A.2- ,HSF-IF 4.</p>
Strands & Concepts	Define a Function, Function Notation, Input from Output and Output from Input (both Algebraically and Graphically), Domain and Range using interval notation, Determining if a Relation is a Function, Continuous and Discrete (*Honors), Solving Absolute Value Equations, Graphs of types of Functions (Absolute Value, Quadratic, Cubic, Square Root, Cube Root), Transformations on Functions, Finding Intercepts, Piecewise Functions, Step Functions(Ceiling and Floor)
Key Vocabulary	Function, Input/Independent Variable, Output/Dependent Variable, Domain, Range, Interval Notation, Relation, Vertical Line Test, Continuous(*Honors), Discrete(*Honors), Absolute Value Function, Quadratic Function, Parabola , Cubic Function, Square Root Function, Cube Root, Functions, Vertical Shift, Horizontal Shift, Vertical Stretch/Shrink on Absolute Value Functions Reflection over X-axis, Piecewise Function, Step Function

Unit Title	Functions	Length of Unit	3-4 weeks
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Critical Content: My students will Know...	Key Skills: My students will be able to (Do)...
<ul style="list-style-type: none"> • A function is a specific type of relation in which each element in the domain is paired with a unique element of the range. Any situation that has a constant rate of change can be represented with a linear function. • The terms domain, input and independent can be used interchangeably. The terms range, output and dependent variable can be used interchangeably. An independent variable is the controlling factor of the function. The dependent variable changes based on the value of the independent variable. • A linear function is the graph of a line while the absolute value function is the graph of two symmetrical linear branches that meet at a common point (vertex). • A transformation is a mathematical operation performed on a parent function which changes a graph's size, shape, orientation or position. • Determining an output value for a particular input involves evaluating an expression. 	<ul style="list-style-type: none"> • Find the input of a function given the output and vice versa. • Determine if a relation is a function. • Identify the domain and range of a function • Solve an absolute value equation • Sketch a graph of each type of function discussed in the unit. • Perform transformations on each function type. • Graph a piecewise function.

Assessments:	Quizzes and a performance based assessment
Teacher Resources:	<ul style="list-style-type: none"> • Textbook – Algebra II Larson • TI-84 graphing calculator • Various materials from CT SDE Algebra 2 curriculum

Unit Title	<i>Operations on Polynomials and Factoring</i>	Length of Unit	3-4 weeks
Inquiry Questions (Engaging & Debatable)	<ul style="list-style-type: none"> ● How is a linear equation different from a quadratic equation? ● How can we solve a quadratic equation using a variety of methods? ● Why is factoring useful? 		
Standards	<p>Seeing Structure in Expressions A-SSE 1.,A-SSE 2. ,A-SSE 3.</p> <p>Arithmetic with Polynomials & Rational Expressions A-APR 1.</p> <p>Reasoning with Equations & Inequalities A-REI 4. A-REI 11.</p> <p>Interpreting Functions F-IF 9.</p>		
Unit Strands & Concepts	Terminology of Polynomials, Adding, Subtracting, and Multiplying Polynomials (Including Product of Powers Rule), Factoring by GCF (Including Quotient of Powers Rule), Factoring Trinomials ($a=1$) Factoring Trinomials ($a \neq 1$), Special Types (Difference of Squares, Perfect Square Trinomials) Factoring by Grouping, Sum and Difference of Cubes (*Honors), Solving an Equation with Factoring Solving Quadratic Word Problems (Consecutive Integer Problem, Area and Perimeter Problems)		
Vocabulary	Coefficients, Leading Coefficient, Degree of a Polynomial, Exponents, Standard Form of a Polynomial Prime Factorization, Factors and Factoring, Monomial, Binomial, Trinomial, Polynomial, Quadratic, Cubic, Quartic, GCF, Difference of Squares, Perfect Square Trinomial, Zero Product Property Consecutive (Even/odd) Integers		

Unit Title	<i>Operations on Polynomials and Factoring</i>	Length of Unit	3-4 Weeks
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Critical Content: My students will Know ...	Key Skills: My students will be able to (Do) ...
<ul style="list-style-type: none"> • The differences between linear equation and quadratic equations • How to classify polynomials by degree and number of terms • How to factor polynomials using various methods • To solve a quadratic equation by factoring it must be set equal to zero 	<ul style="list-style-type: none"> • Add, subtract, and multiply polynomials • Solve a quadratic equation using factoring • Utilize multiple techniques to solve a single factoring problem • Model a real world situation with a quadratic equation

Assessments:	Quizzes Unit test or performance based assessment
Teacher Resources:	<ul style="list-style-type: none"> • Textbook – Algebra II Larson • TI-84 graphing calculator • Various materials from CT SDE Algebra 2 curriculum

Unit Title	Solving Quadratic Functions	Length of Unit	2-3 weeks
Inquiry Questions (Engaging & Debatable)	<ul style="list-style-type: none"> • How do the characteristics of a quadratic equation affect its graphical representation? • Why are there different methods of solving quadratic equations and when is it appropriate to use each method? • What determines the nature (real or complex) of the solutions to a quadratic equation? • How are quadratic functions used to model situations that occur in the real world? 		
Standards	<p>Complex Number System: N-CN 1. , N-CN 2. ,N-CN 7.</p> <p>Reasoning with Equations and Inequalities: A-REI 10. , A-REI 4.</p> <p>Interpreting Functions: F-IF 8.</p>		
Unit Strands & Concepts	Simplify, adding, subtracting, multiplying, and dividing radicals Conjugates(*Honors), Solve quadratic equations by finding square roots, Solve quadratics by completing the square, Solve quadratics using quadratic formula, Using the discriminant to determine the number of real/imaginary solutions, Simplify, add, subtract, and multiply complex numbers, Divide complex numbers using complex conjugates (*Honors), Solve quadratics using various methods, Solving word problems using various methods		
Key Vocabulary	Radical, Solutions, zeros, roots, x-intercept, Completing the square, Quadratic Formula Discriminant, Complex number, imaginary and real part, Conjugate(honors)		

Unit Title	Solving Quadratic Functions	Length of Unit	2-3 weeks
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Critical Content: My students will Know ...	Key Skills: My students will be able to (Do) ...
<ul style="list-style-type: none"> • The form of the quadratic equation determines which solution method (factoring, square roots, completing the square, and quadratic formula) is most efficient or appropriate. • Complex numbers arise when the solution includes the square root of a negative number. • How to determine the number and type of solutions to a quadratic equation using the discriminant. • Quadratic functions model real-world data that is parabolic in nature. 	<ul style="list-style-type: none"> • Simplify, add, subtract, and multiply radicals • Solve a quadratic using the most efficient method (factoring, square root method, completing the square, quadratic formula) • Simplify, add, subtract, and multiply complex numbers

Assessments:	Quizzes 1 unit test or performance based assessment
Teacher Resources:	<ul style="list-style-type: none"> • Textbook – Algebra II Larson • TI-84 graphing calculator • Various materials from CT SDE Algebra 2 curriculum

Unit Title	Graphing Quadratic Functions	Length of Unit	2-3 weeks
Inquiry Questions (Engaging & Debatable)	<ul style="list-style-type: none"> • How do the characteristics of a quadratic equation affect its graphical representation? • How does the form of a quadratic determine the way we graph the quadratic? • How are quadratic functions used to model situations that occur in the real world? 		
Standards	Reasoning with Equations and Inequalities: A-REI 11. Interpreting Functions: F-IF 7. F-IF 8. F-IF 9. F-IF 4.		
Unit Strands & Concepts	<ul style="list-style-type: none"> • Graphing a quadratic given standard form • Graphing a quadratic given vertex form • Graphing a quadratic given intercept form • Converting from one form to another • Writing a quadratic function • Solve problems involving vertical motion algebraically and graphically • Solve problems involving maximum and minimum algebraically and graphically (using a TI Calculator) • Quadratic Regression • Solving a system of equations with quadratic and linear equations (*Honors) 		
Key Vocabulary	Parabola, X-intercepts, roots, zeros, Y-intercept Maximum and minimum, Vertex, Vertical and Horizontal Shift, Vertical Stretch, Axis of symmetry Domain and Range, Interval Notation, Vertical Motion Equation, Initial Velocity, Initial Height		

Unit Title	Graphing Quadratic Functions	Length of Unit	2-3 weeks
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Critical Content: My students will Know ...	Key Skills: My students will be able to (Do) ...
<ul style="list-style-type: none"> The quadratic equation represents the graph of a parabola. The characteristics of a quadratic equation determine the size and direction of the parabola. Quadratic equations take on various forms and represent the same graphical picture The general equation that models an object's vertical motion. How to write a quadratic equation given specific information 	<ul style="list-style-type: none"> Find the vertex, intercepts of a quadratic algebraically and graphically using all forms of a quadratics Graph parabolas from standard, vertex, and intercept form Convert between various forms of a quadratic equation Calculate maximum and minimum values of real world situations Model the heights of objects thrown Write quadratic models Determine an approximation of data using quadratic regression Solve a system of equations with quadratic and linear equations (*Honors)

Assessments:	Formative assessment 1 unit test or performance based assessment
Teacher Resources:	<ul style="list-style-type: none"> Textbook – Algebra II Larson TI-84 graphing calculator Various materials from CT SDE Algebra 2 curriculum

Unit Title	<i>Rational Exponents, Radical Functions, and Inverse Functions</i>	Length of Unit	4-5 weeks
Inquiry Questions (Engaging & Debatable)	<ul style="list-style-type: none"> • What is the meaning of an exponent that is not positive and/or an integer? • What is the importance in learning to solve radical equations? • What is the relationship between a function and its inverse? • What are the different ways functions can be combined? • How do transformations affect the graphs of square root and cube root parent functions?(honors) 		
Standards	<p>Real Number System: N-RN 1.. N-RN 2.</p> <p>Reasoning with Equations and Equalities: A-REI 2.</p> <p>Interpreting Functions: F-IF 1. F-IF 2.</p> <p>Building Functions: F-BF 1. F-BF 4.</p>		
Strands & Concepts	<ul style="list-style-type: none"> • Evaluate and simplify nth roots • Solve equations using nth roots • Simplify expressions involving rational exponents • Perform function operations and composition • Find inverse functions • Range of Inverse Functions based on the domain of the original function (*Honors) • Graph cube root and square root functions with transformations (*Honors) • Solve equations with rational exponents • Solve equations with radicals on both sides 		
Key Vocabulary	Inverse, Rational exponent, Radical function, Nth root, Index, Extraneous Solutions, Composition of functions, Reflection over the line $y=x$, Restricted Domain(*Honors), Horizontal Line Test(*Honors) Power function		

Unit Title	<i>Rational Exponents, Radical Functions, and Inverse Functions</i>	Length of Unit	4-5 weeks
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Critical Content: My students will Know ...	Key Skills: My students will be able to (Do) ...
<ul style="list-style-type: none"> • Rational exponents and radicals are different ways of expressing the same quantities. • Radical methods expand our capability to solve equations whose domain does not include all real numbers. • Every function has an inverse and that inverse is not necessarily a function, which is graphically represented by its reflection over the $y = x$ line. • An inverse relation interchanges the domain and range of the original function, and therefore “undoes” the original function. • Arithmetic operations can be performed on functions. 	<ul style="list-style-type: none"> • Evaluate nth roots and simplify rational exponents • Perform function operations and composition (include nth roots and rational exponents) • Find an inverse function • Determine the Range of Inverse Functions based on the domain of the original function (*Honors) • Perform the horizontal line test for inverse functions (*Honors) • Graph square root and cube root functions with transformations (*Honors) • Solve radical equations

Assessments:	Formative assessments Performance based assessment
Teacher Resources:	<ul style="list-style-type: none"> • Textbook – Algebra II Larson • TI-84 graphing calculator • Various materials from CT SDE Algebra 2 curriculum

Unit Title	<i>Exponential and Logarithmic Functions</i>	Length of Unit	4-5 weeks
Inquiry Questions (Engaging & Debatable)	<ul style="list-style-type: none"> • How can exponential functions be used to model growth and decay? • What is the purpose of logarithms? • How are the exponential and logarithmic functions related to each other? • How are exponential and logarithmic functions used to model real-world problems? 		
Unit Strands & Standards	<p>Seeing Structure in Expressions: A-SSE 3.</p> <p>Reasoning with Equations & Inequalities: A-REI 11.</p> <p>Interpreting Functions: F-IF 7. F-IF 8.</p> <p>Building Functions: F-BF 1. F-BF 5.</p> <p>Linear, Quadratic & Exponential Models: F-LE 1. F-LE 2. F-LE 3. F-LE 4..F-LE 5</p>		
Concepts	<ul style="list-style-type: none"> • Graph exponential growth and decay functions • Use exponential functions to model real-world situations • Evaluate logarithms • Graph Logarithmic functions • Expand and Condense Logarithms • Solve exponential and Logarithmic Equations • Write and Apply Exponential and Power functions 		
Key Vocabulary	Exponential growth and decay function, Growth and Decay factor, Asymptote, Natural base e Logarithm of y with base b, Common logarithm, Natural logarithm, Power function, Compound continuously, Compound monthly, quarterly		

Unit Title	Exponential and Logarithmic functions continued	Length of Unit	4-5 weeks
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Critical Content: My students will Know ...	Key Skills: My students will be able to (Do) ...
<ul style="list-style-type: none"> Exponential functions model situations which grow or decline at a constant percent rate. Exponential and logarithmic equations are inverse functions. Many phenomena such as population growth, cooling and heating systems, compound and continuous interest, and the Richter scale are modeled by exponential and logarithmic functions. Logarithms can be used to solve equations for which no other algebraic method exists. 	<ul style="list-style-type: none"> Graph exponential growth and decay functions Graph logarithmic functions State and graph the asymptote of exponential and logarithmic models Identify growth and decay factor and rates given a real-world situations involving exponential functions Create data tables of exponential and logarithmic models Calculate compound interest and interest compounded continuously Solve real-world problems involving base e Rewrite logarithmic expressions as exponential equations Model and solve real world problems (for example loudness of sounds) Solve exponential and logarithmic equations Solve problems using Newton's Law of Cooling (*Honors)

Assessments:	Quizzes and 1 unit test or performance based assessment
Teacher Resources:	<ul style="list-style-type: none"> Textbook – Algebra II Larson TI-84 graphing calculator Various materials from CT SDE Algebra 2 curriculum

Unit Title	<i>Rational Expressions and Equations</i>	Length of Unit	4-5 Weeks
Inquiry Questions (Engaging & Debatable)	<ul style="list-style-type: none"> • What are rational expressions and how do we perform operations on rational expressions? • What is the importance in learning to solve rational equations? • How are direct, inverse, and joint variation used in the real-world? 		
Standards	Arithmetic with Polynomials & Rational Expressions: A-APR 7.		
Unit Strands & Concepts	<ul style="list-style-type: none"> • Perform Operations on Rational Expressions • Solve rational equations • Write direct and indirect variation models • Use direct and indirect variation models in real world situations • Graphing Rational Functions 		
Key Vocabulary	Proportion, Least Common Denominator, Extraneous Solution, Inverse and Direct Variation Constant of variation, Rational function, Reciprocal, Complex fractions Graph of a rational function		

Unit Title	<ul style="list-style-type: none"> <i>Rational Expressions and Equations</i> 	Length of Unit	4-5 Weeks
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Critical Content: My students will Know ...	Key Skills: My students will be able to (Do) ...
<ul style="list-style-type: none"> Rational expressions are quotients of polynomials that follow the same rules as rational numbers. The denominator of a rational expression cannot equal zero. Solving rational equations expands our capability to solve equations whose domain does not include all real numbers. Different real-world situations can be modeled by direct, inverse, and joint variation. 	<ul style="list-style-type: none"> Simplify, Add, Subtract, and Multiply Rational Expressions Simplify complex fractions Solve rational equations Check for extraneous solutions when solving a rational equation Graph a rational function

Assessments:	Formative assessment 1 unit test or performance based assessment
Teacher Resources:	<ul style="list-style-type: none"> Textbook – Algebra II Larson TI-84 graphing calculator Various materials from CT SDE Algebra 2 curriculum

Unit Title	Inferential Statistics	Length of Unit	3-4 Weeks
Inquiry Questions (Engaging & Debatable)	<ul style="list-style-type: none"> • How can we determine the probability of an event based on a normal distribution? • Why is statistical inference important? • What is the difference between a confidence interval and a hypothesis test? • How can sample statistics be used to make inferences about population parameters? 		
Standards	Interpreting Categorical & Quantitative Data: HSS.ID.A.1, HSS.ID.A.4, HSS.IC.A.1		
Unit Strands & Concepts	<ul style="list-style-type: none"> • Calculation and interpretation of Mean and Standard Deviation • Calculation of probability based on a normal distribution • Construction and analysis of histograms based on center, shape, and spread • Sample versus Population • Hypothesis testing (including interpretation) • Creation and interpretation of confidence intervals 		
Key Vocabulary	Sample, Population, Mean, Standard Deviation, Histogram, Center, Shape, Spread, Normal Distribution, Skewed Distribution Confidence Interval, Margin of Error, Hypothesis Test, Sampling Variability		

Unit Title	Inferential Statistics	Length of Unit	3-4 Weeks
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Critical Content: My students will Know ...	Key Skills: My students will be able to (Do) ...
<ul style="list-style-type: none"> • All numerical data can be described based on center, shape, and spread. • Unimodal data is either skewed left, skewed right, or symmetric (bell shaped or uniform) • A sample is a subgroup of the population of interest. • A hypothesis test provides evidence for rejecting or not rejecting a claim, whereas a confidence interval gives a range of possible values for a population parameter. 	<ul style="list-style-type: none"> • Calculate a mean and standard deviation for a set of data. • Create a histogram for a set of data. • Determine the probability of obtaining greater than or less than a specific value, or a specific mean, from a normally distributed set. • Conduct a hypothesis test and interpret the result in context. • Produce a confidence interval and interpret the result in context.

Assessments:	Quizzes 1 unit test or performance based assessment
Teacher Resources:	<ul style="list-style-type: none"> • Textbook – Algebra II Larson • TI-84 graphing calculator • Various materials from CT SDE Algebra 2 curriculum