EL DORADO UNION HIGH SCHOOL DISTRICT
EDUCATIONAL SERVICES

Course of Study Information Page

COURSE TITLE **Advanced Algebra 2**	
DISTRICT COURSE NUMBER **(#0227)**	4-DIGIT STATE COURSE CODE (COMPLETED BY SILT) **2408**
Rationale:	Students successfully completing this course will have an extensive background in algebra preparing them for college level or career technical coursework.
Course Description that will be in the Course Directory:	This course is designed for students bound for college or career technical training. Students will expand and develop algebra and trigonometric concepts to an advanced level of mathematics. Students will engage in an in-depth study of California's Common Core Standards for Mathematics. Topics include systems of equations and inequalities, quadratic functions, polynomial functions, exponential and logarithmic functions, rational and radical functions, sequences and series, conic sections, probability and statistics, and trigonometry.
How Does this Course align with or meet State and District content standards?	
NCLB Core Subjects:	*Select up to two that apply:* ☐ Arts ☐ Civics and Government ☐ Not Core Subject ☐ Economics ☐ History ☐ English ☒ Mathematics ☐ Foreign Language ☐ Reading / Language Arts ☐ Geography ☐ Science
CDE CALPADS Course Descriptors: (See Page 2 for Definitions)	CTE TECH PREP COURSE INDICATORS ☐ Tech Prep (32) ☐ Tech Prep & ROP (33) ☐ ROP ☐ N/A CTE COURSE CONTENT CODE ☐ CTE Introductory (01) ☐ CTE Concentrator (02) ☐ CTE Completer (03) ☒ N/A INSTRUCTIONAL LEVEL CODE ☐ Remedial (35) ☐ Honors UC-Certified (39) ☐ Honors Non UC-Certified (34) ☐ College (40) ☐ N/A
Length of Course:	☒ Year ☐ Semester
Grade Level(s):	☒ 9 ☒ 10 ☒ 11 ☒ 12
Credit:	☒ Number of units: **10** ☒ Meets graduation requirements ☐ Request for UC "a–g" requirements ☒ College Prep ☐ Elective ☐ Career Technical
Prerequisites:	B or better in Geometry or teacher recommendation
Department(s):	Mathematics
District Sites:	EDHS, ORHS, PHS, UMHS
Board of Trustees COS Adoption Date:	May 8, 2012
Textbooks / Instructional Materials:	**Algebra 2 Common Core**, Charles, Hall, Kennedy, Bell, Bragg, Handlin, Murphy & Wiggins, Pearson Publishing, ©2012, 978-0-13-318602-4

Funding Source:	General Fund
Board of Trustees Textbook Adoption Date:	May 8, 2012

Definitions

CALPADS	California Longitudinal Pupil Achievement Data System
CTE Technical Prep	A course within a CTE technical career pathway or program that has been articulated with a postsecondary education or through an apprenticeship program of at least 2 years following secondary instruction.
Instructional Level Code	Represents a nonstandard instructional level at which the content of a specific course is either above or below a 'standard' course instructional level. These levels may be identified by the actual level of instruction or identified by equating the course content and level of instruction with a state or nationally recognized advanced course of study, such as IB or AP.
Instructional Level Honors, UC Certified	Includes all AP courses.
Instructional Level Honors, non UC Certified	Requires Board approval.
Instructional Level College	Includes ACE courses. Equivalent to college course and content, but not an AP course. Not related to section, but to course.

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UNIT #1: Equations, Inequalities and Graphs

LEARNING OUTCOME: Students will create, recognize, solve and graph equations and inequalities.

LEARNING OUTCOME	INSTRUCTIONAL STRATEGIES	ASSESSMENTS	INTERVENTIONS
1. What students will learn, know, and be able to do? (Must be aligned to state content standards.) Students will create, solve and graph linear equations and inequalities. [A-CED] Students will solve and graph equations and inequalities with absolute value. [A-REI], [F-IF] Students will identify and apply properties of equality. [A-REI] Students will create and use equations and inequalities to represent relationships between quantities. [A-CED], [F-BF]	2. Instructional strategies that will be used to engage students. Teachers will use direct instruction utilizing Smart Notebook software to teach and demonstrate each concept to students. Students will work independently, in pairs and in groups to practice, apply and discuss each concept. Warm-ups, quizzes, Smart Responder activities and teacher monitoring will assess progress and check for understanding.	3. How will we know that students have learned? Include both Formative (for learning) and Summative (of learning) assessment examples. Formative assessments will include warm-ups, homework, individual quizzes and partner quizzes and activities. Summative assessments will include chapter or unit tests, a 1st semester final and year-end final.	4. What will we do if students don't learn? Grouping of students will allow peer-tutoring within learning activities. Re-teaching concept components will occur followed by monitoring of independent practice. Students may access additional remedial sessions available by teacher, math department or site. These may include peer-tutoring, Academic Recovery, D-Back hour, Blue Latte or teacher office hours. 5. What will we do if students already know it? A minimum of independent practice problems will be provided then the students will be allowed to move to the next topic.

Content Area Standards (Please identify the source)

The students will demonstrate mastery of the following content standards:

[A-CED.1] Create equations and inequalities in one variable including ones with absolute value and use them to solve problems in and out of context, including equations arising from linear 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.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.

[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.3.1] Solve equations and inequalities involving absolute value.

[F-BF.1.b] Write a function that describes a relationship 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.*

[F-IF.7.b] Graph functions expressed symbolically and show key features of the graph, by hand in simple cases and using technology for more complicated cases.
b. Graph square root, cube root, and piecewise-defined functions, including step functions and absolute value functions.

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UNIT #2: Numbers and Functions

LEARNING OUTCOME: Students will analyze and graph functions. Students will use function notation and exponent rules.

LEARNING OUTCOME	INSTRUCTIONAL STRATEGIES	ASSESSMENTS	INTERVENTIONS
1. What students will learn, know, and be able to do? (Must be aligned to state content standards.) Students will learn and apply order of operations and the laws of exponents. [N-RN], [A-CED] Students will identify domain and range of a function given an equation, a graph or a chart. [F-IF] Students will determine the inverse of a relation algebraically and graphically. [F-BF] Students will understand function notation and perform operations on functions including composition of functions. [F-IF], [F-BF] Students will graph parent functions, their transformations and piecewise functions. [G-CO], [F-IF], [F-BF]	2. Instructional strategies that will be used to engage students. Teachers will use direct instruction utilizing Smart Notebook software to teach and demonstrate each concept to students. Students will work independently, in pairs and in groups to practice, apply and discuss each concept. Warm-ups, quizzes, Smart Responder activities and teacher monitoring will assess progress and check for understanding.	3. How will we know that students have learned? Include both Formative (for learning) and Summative (of learning) assessment examples. Formative assessments will include warm-ups, homework, individual quizzes and partner quizzes and activities. Summative assessments will include chapter or unit tests, a 1st semester final and year-end final.	4. What will we do if students don't learn? Grouping of students will allow peer-tutoring within learning activities. Re-teaching concept components will occur followed by monitoring of independent practice. Students may access additional remedial sessions available by teacher, math department or site. These may include peer-tutoring, Academic Recovery, D-Back hour, Blue Latte or teacher office hours. 5. What will we do if students already know it? A minimum of independent practice problems will be provided then the students will be allowed to move to the next topic.

Content Area Standards (Please identify the source)

The students will demonstrate mastery of the following content standards:

[A-CED.1.1] Judge the validity of an argument according to whether the properties of real numbers, exponents, and logarithms have been applied correctly at each step.

[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-BF.3.1] Solve problems involving functional concepts, such as composition, defining the inverse function and performing arithmetic operations on functions.

[F-BF.4.a] 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* $f(x)=\frac{x+1}{x-1}$ *for* $x \neq 1$.

[F-BF.4.b] Find inverse functions.
b. Verify by composition that one function is the inverse of another.

[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 the 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.7.b] Graph functions expressed symbolically and show key features of the graph, by hand in simple cases and using technology for more complicated cases.
b. Graph square root, cube root, and piecewise-defined functions, including step functions and absolute value functions.

[G-CO.2] Represent transformations in the plane using, e.g., transparencies and geometry software; describe transformations as functions that take points in the plane as inputs and give other points as outputs. Compare transformations that preserve distance and angle to those that do not (e.g., translation versus horizontal stretch).

[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* $5^{\frac{1}{3}}$ *to be the cube root of 5 because we want* $\left(5^{\frac{1}{3}}\right)^3 = 5^{\left(\frac{1}{3}\right)3}$ *to hold, so* $\left(5^{\frac{1}{3}}\right)^3$ *must equal 5.*

[N-RN.2] Rewrite expressions involving radicals and rational expressions using the properties of exponents.

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UNIT #3: Linear Systems

LEARNING OUTCOME: Students will solve, graph and apply systems of linear equations and inequalities.

LEARNING OUTCOME	INSTRUCTIONAL STRATEGIES	ASSESSMENTS	INTERVENTIONS
1. What students will learn, know, and be able to do? (Must be aligned to state content standards.) Students will graph systems of inequalities on a coordinate plane. [A-CED], [A-REI] Students will use linear programming to find solutions to real world applications involving constraints. [A-CED] Students will solve systems of two or three equations using the methods of graphing, substitution and elimination. [A-CED], [A-REI] Students will write and use systems of equations to solve word problems. [A-CED]	2. Instructional strategies that will be used to engage students. Teachers will use direct instruction utilizing Smart Notebook software to teach and demonstrate each concept to students. Students will work independently, in pairs and in groups to practice, apply and discuss each concept. Warm-ups, quizzes, Smart Responder activities and teacher monitoring will assess progress and check for understanding.	3. How will we know that students have learned? Include both Formative (for learning) and Summative (of learning) assessment examples. Formative assessments will include warm-ups, homework, individual quizzes and partner quizzes and activities. Summative assessments will include chapter or unit tests, a 1st semester final and year-end final.	4. What will we do if students don't learn? Grouping of students will allow peer-tutoring within learning activities. Re-teaching concept components will occur followed by monitoring of independent practice. Students may access additional remedial sessions available by teacher, math department or site. These may include peer-tutoring, Academic Recovery, D-Back hour, Blue Latte or teacher office hours. 5. What will we do if students already know it? A minimum of independent practice problems will be provided then the students will be allowed to move to the next topic.

Content Area Standards (Please identify the source)

The students will demonstrate mastery of the following content standards:

[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-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.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.

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UNIT #4: Quadratic Functions and Equations

LEARNING OUTCOME: Students will solve and graph quadratic functions. Students will perform operations with complex numbers.

LEARNING OUTCOME	INSTRUCTIONAL STRATEGIES	ASSESSMENTS	INTERVENTIONS
1. What students will learn, know, and be able to do? (Must be aligned to state content standards.) Students will perform operations of complex numbers including powers of i. [N-CN] Students will create and solve quadratic equations by factoring, using the quadratic formula and completing the square. [A-CED], [A-REI], [N-CN], [A-SSE], [F-LE] Students will solve and graph quadratic inequalities with one and two variables. [A-CED] Students will graph quadratic functions identifying zeros, intercepts, vertex and the axis of symmetry. [F-IF]	2. Instructional strategies that will be used to engage students. Teachers will use direct instruction utilizing Smart Notebook software to teach and demonstrate each concept to students. Students will work independently, in pairs and in groups to practice, apply and discuss each concept. Warm-ups, quizzes, Smart Responder activities and teacher monitoring will assess progress and check for understanding.	3. How will we know that students have learned? Include both Formative (for learning) and Summative (of learning) assessment examples. Formative assessments will include warm-ups, homework, individual quizzes and partner quizzes and activities. Summative assessments will include chapter or unit tests, a 1st semester final and year-end final.	4. What will we do if students don't learn? Grouping of students will allow peer-tutoring within learning activities. Re-teaching concept components will occur followed by monitoring of independent practice. Students may access additional remedial sessions available by teacher, math department or site. These may include peer-tutoring, Academic Recovery, D-Back hour, Blue Latte or teacher office hours. 5. What will we do if students already know it? A minimum of independent practice problems will be provided then the students will be allowed to move to the next topic.

Content Area Standards (Please identify the source)

The students will demonstrate mastery of the following content standards:

[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-REI.4.a] Solve quadratic equations in one variable.
a. 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.

[A-REI.4.b] Solve quadratic equations in one variable.
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.

[A-SSE.2.1] Apply basic factoring techniques to second- and simple third-degree polynomials. These techniques include finding a common factor for all terms in a polynomial, recognizing the difference of two squares, and recognizing perfect squares of binomials.)

[A-SSE.3.a] 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.

[A-SSE.3.b] Choose and produce an equivalent form of an expression to reveal and explain properties of the quantity represented by the expression.
b. Complete the square in a quadratic expression to reveal the maximum or minimum value of the function it defines.

[F-IF.7.a] 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.

[F-LE.6] Apply quadratic equations to physical problems, such as the motion of an object under the force of gravity.

[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.3] Find the conjugate of a complex number; use the conjugates to find moduli and quotients of complex numbers.

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

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UNIT #5: Polynomials and Polynomial Functions

LEARNING OUTCOME: Students will identify, classify and perform operations on polynomials. Students will identify zeros of polynomials.

LEARNING OUTCOME	INSTRUCTIONAL STRATEGIES	ASSESSMENTS	INTERVENTIONS
1. What students will learn, know, and be able to do? (Must be aligned to state content standards.) Students will identify and classify polynomials. [A-SSE] Students will factor and perform operations with polynomials including multiplication and division. [A-APR] Students will identify zeros of polynomials with degree three and higher. [A-APR]	2. Instructional strategies that will be used to engage students. Teachers will use direct instruction utilizing Smart Notebook software to teach and demonstrate each concept to students. Students will work independently, in pairs and in groups to practice, apply and discuss each concept. Warm-ups, quizzes, Smart Responder activities and teacher monitoring will assess progress and check for understanding.	3. How will we know that students have learned? Include both Formative (for learning) and Summative (of learning) assessment examples. Formative assessments will include warm-ups, homework, individual quizzes and partner quizzes and activities. Summative assessments will include chapter or unit tests, a 1st semester final and year-end final.	4. What will we do if students don't learn? Grouping of students will allow peer-tutoring within learning activities. Re-teaching concept components will occur followed by monitoring of independent practice. Students may access additional remedial sessions available by teacher, math department or site. These may include peer-tutoring, Academic Recovery, D-Back hour, Blue Latte or teacher office hours. 5. What will we do if students already know it? A minimum of independent practice problems will be provided then the students will be allowed to move to the next topic.

Content Area Standards (Please identify the source)

The students will demonstrate mastery of the following content standards:

[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, and divide polynomials by monomials. Solve problems in and out of context.

[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-SSE.1.a] Interpret expressions that represent a quantity in terms of its context.
a. Interpret parts of an expression, such as terms, factors, and coefficients.

[A-SSE.2.1] Apply basic factoring techniques to second- and simple third-degree polynomials. These techniques include finding a common factor for all terms in a polynomial, recognizing the difference of two squares, and recognizing perfect squares of binomials.

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UNIT #6: Exponential and Logarithmic Functions

LEARNING OUTCOME: Students will apply logarithmic properties and solve logarithmic and exponential equations.

LEARNING OUTCOME	INSTRUCTIONAL STRATEGIES	ASSESSMENTS	INTERVENTIONS
1. What students will learn, know, and be able to do? (Must be aligned to state content standards.) Students will convert between equivalent logarithmic and exponential expressions. [F-IF] Students will identify exponential growth and decay. [F-IF] Students will write an equation to solve compound interest problems. [A-SSE], [F-IF] Students will apply properties of logarithmic functions. [A-SSE], [A-CED] Students will solve logarithmic and exponential equations. [F-BF]	2. Instructional strategies that will be used to engage students. Teachers will use direct instruction utilizing Smart Notebook software to teach and demonstrate each concept to students. Students will work independently, in pairs and in groups to practice, apply and discuss each concept. Warm-ups, quizzes, Smart Responder activities and teacher monitoring will assess progress and check for understanding.	3. How will we know that students have learned? Include both Formative (for learning) and Summative (of learning) assessment examples. Formative assessments will include warm-ups, homework, individual quizzes and partner quizzes and activities. Summative assessments will include chapter or unit tests, a 1st semester final and year-end final.	4. What will we do if students don't learn? Grouping of students will allow peer-tutoring within learning activities. Re-teaching concept components will occur followed by monitoring of independent practice. Students may access additional remedial sessions available by teacher, math department or site. These may include peer-tutoring, Academic Recovery, D-Back hour, Blue Latte or teacher office hours. 5. What will we do if students already know it? A minimum of independent practice problems will be provided then the students will be allowed to move to the next topic.

Content Area Standards (Please identify the source)

The students will demonstrate mastery of the following content standards:

[A-CED.1.1] Judge the validity of an argument according to whether the properties of real numbers, exponents, and logarithms have been applied correctly at each step.

[A-SSE.1.b] Interpret expressions that represent a quantity in terms of its context.
b. Interpret complicated expressions by viewing one or more of their parts as a single entity. *For example, interpret* $P(1+r)^n$ *as a product of* P *and a factor not dependent on* P.

[A-SSE.3.c] Choose and produce an equivalent form of an expression to reveal and explain properties of the quantity represented by the expression.
c. Use the properties of exponents to transform expressions for exponential functions. *For example, the expression* 1.15^t *can be rewritten as* $\left(1.15^{\frac{1}{12}}\right)^{12t} \approx 1.012^{12t}$ to reveal the approximate equivalent monthly interest rate if the annual rate is 15%.

[A-SSE.3.d] Choose and produce an equivalent form of an expression to reveal and explain properties of the quantity represented by the expression.
d. Prove simple laws of logarithms.

[A-SSE.3.f] Choose and produce an equivalent form of an expression to reveal and explain properties of the quantity represented by the expression.
f. Understand and use the properties of logarithms to simplify logarithmic numeric expressions and to identify their approximate values.

[F-BF.5] Understand the inverse relationship between exponents and logarithms and use this relationship to solve problems involving logarithms and exponents.

[F-IF.8.b] Write a function defined by an expression in different but equivalent forms to reveal and explain different properties of the function.
b. Use the properties of exponents to interpret expressions for exponential functions. *For example, identify percent rate of change in functions such as* $y = (1.02)^t$, $y = (.97)^t$, $y = (1.01)^{12t}$, $y = (1.2)^{\frac{t}{10}}$, *and classify them as representing exponential growth and decay.*

[F-LE.1.c] Distinguish between situations that can be modeled with linear functions and with exponential functions.
c. Recognize situations in which a quantity grows or decays by a constant percent rate per unit interval relative to another.

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UNIT #7: Rational and Radical Functions

LEARNING OUTCOME: Students will perform operations on rational and radical expressions. Students will solve rational and radical equations.

LEARNING OUTCOME	INSTRUCTIONAL STRATEGIES	ASSESSMENTS	INTERVENTIONS
1. What students will learn, know, and be able to do? (Must be aligned to state content standards.) Students will perform operations and simplify rational expressions. [A-APR] Students will solve rational equations. [A-REI] Students will perform operations and simplify radical expressions. [N-RN] Students will solve radical equations. [A-REI]	2. Instructional strategies that will be used to engage students. Teachers will use direct instruction utilizing Smart Notebook software to teach and demonstrate each concept to students. Students will work independently, in pairs and in groups to practice, apply and discuss each concept. Warm-ups, quizzes, Smart Responder activities and teacher monitoring will assess progress and check for understanding.	3. How will we know that students have learned? Include both Formative (for learning) and Summative (of learning) assessment examples. Formative assessments will include warm-ups, homework, individual quizzes and partner quizzes and activities. Summative assessments will include chapter or unit tests, a 1st semester final and year-end final.	4. What will we do if students don't learn? Grouping of students will allow peer-tutoring within learning activities. Re-teaching concept components will occur followed by monitoring of independent practice. Students may access additional remedial sessions available by teacher, math department or site. These may include peer-tutoring, Academic Recovery, D-Back hour, Blue Latte or teacher office hours. 5. What will we do if students already know it? A minimum of independent practice problems will be provided then the students will be allowed to move to the next topic.

Content Area Standards (Please identify the source)

The students will demonstrate mastery of the following content standards:

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

[N-RN.2] Rewrite expressions involving radicals and rational exponents using the properties of exponents.

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UNIT #8: Sequences and Series

LEARNING OUTCOME: Students will create and analyze arithmetic and geometric sequences and series. Students will expand binomials.

LEARNING OUTCOME	INSTRUCTIONAL STRATEGIES	ASSESSMENTS	INTERVENTIONS
1. What students will learn, know, and be able to do? (Must be aligned to state content standards.) Students will distinguish between arithmetic, geometric and neither type sequences and series. [F-BF] Students will write and use explicit and recursive formulas for arithmetic and geometric sequences and series. [F-IF], [A-SSE], [F-BF] Students will apply Pascal's Triangle and combination notation to expand binomials. [A-APR]	2. Instructional strategies that will be used to engage students. Teachers will use direct instruction utilizing Smart Notebook software to teach and demonstrate each concept to students. Students will work independently, in pairs and in groups to practice, apply and discuss each concept. Warm-ups, quizzes, Smart Responder activities and teacher monitoring will assess progress and check for understanding.	3. How will we know that students have learned? Include both Formative (for learning) and Summative (of learning) assessment examples. Formative assessments will include warm-ups, homework, individual quizzes and partner quizzes and activities. Summative assessments will include chapter or unit tests, a 1st semester final and year-end final.	4. What will we do if students don't learn? Grouping of students will allow peer-tutoring within learning activities. Re-teaching concept components will occur followed by monitoring of independent practice. Students may access additional remedial sessions available by teacher, math department or site. These may include peer-tutoring, Academic Recovery, D-Back hour, Blue Latte or teacher office hours. 5. What will we do if students already know it? A minimum of independent practice problems will be provided then the students will be allowed to move to the next topic.

Content Area Standards (Please identify the source)

The students will demonstrate mastery of the following content standards:

[A-APR.5] Know and apply the Binomial Theorem for the expansion of $(x + y)^n$ in powers of x and y for a positive integer n, where x and y are any numbers, with coefficients determined for example by Pascal's Triangle.

[A-SSE.4] Derive the formula for the sum of a finite geometric series (when the common ratio is not 1), and use the formula to solve problems. *For example, calculate mortgage rates.*

[F-BF.1.a] 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.

[F-BF.2] Write arithmetic and geometric sequences both recursively and with an explicit formula, use them to model situations, and translate between the two forms.

[F-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* $n \geq 1$.

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UNIT #9: Conic Sections

LEARNING OUTCOME: Students will identify, put into standard form, graph and label components of each of the four conic sections.

LEARNING OUTCOME	INSTRUCTIONAL STRATEGIES	ASSESSMENTS	INTERVENTIONS
1. What students will learn, know, and be able to do? (Must be aligned to state content standards.) Students will identify, put into standard form and graph a parabola identifying the vertex, focus, directrix and axis of symmetry. [G-GPE] Students will identify, put into standard form and graph a circle identifying the center and radius. [G-GPE] Students will identify, put into standard form and graph an ellipse identifying the center, foci, vertices and co-vertices. [G-GPE] Students will identify, put into standard form and graph a hyperbola identifying the center, foci, vertices, co-vertices and asymptotes. [G-GPE]	2. Instructional strategies that will be used to engage students. Teachers will use direct instruction utilizing Smart Notebook software to teach and demonstrate each concept to students. Students will work independently, in pairs and in groups to practice, apply and discuss each concept. Warm-ups, quizzes, Smart Responder activities and teacher monitoring will assess progress and check for understanding.	3. How will we know that students have learned? Include both Formative (for learning) and Summative (of learning) assessment examples. Formative assessments will include warm-ups, homework, individual quizzes and partner quizzes and activities. Summative assessments will include chapter or unit tests, a 1st semester final and year-end final.	4. What will we do if students don't learn? Grouping of students will allow peer-tutoring within learning activities. Re-teaching concept components will occur followed by monitoring of independent practice. Students may access additional remedial sessions available by teacher, math department or site. These may include peer-tutoring, Academic Recovery, D-Back hour, Blue Latte or teacher office hours. 5. What will we do if students already know it? A minimum of independent practice problems will be provided then the students will be allowed to move to the next topic.

Content Area Standards (Please identify the source)

The students will demonstrate mastery of the following content standards:

[G-GPE.2] Derive the equation of a parabola given a focus and directrix.

[G-GPE.3.2] Given a quadratic equation of the form $ax^2 + by^2 + cx + dy + e = 0$, use the method for completing the square to put the equation into standard form and recognize whether the graph of the equation is a circle, ellipse, parabola, or hyperbola. Then graph the equation.

[G-GPE.3.3] Be familiar with conic sections, both analytically and geometrically.

EL DORADO UNION HIGH SCHOOL DISTRICT

EDUCATIONAL SERVICES

Department: Mathematics

Course Title: Advanced Algebra 2 (#0227)

UNIT #10: Probability and Statistics

LEARNING OUTCOME: Students will calculate probabilities, combinations, permutations, measures of central tendency and dispersion.

LEARNING OUTCOME	INSTRUCTIONAL STRATEGIES	ASSESSMENTS	INTERVENTIONS
1. What students will learn, know, and be able to do? (Must be aligned to state content standards.) Students will apply the fundamental counting principle and calculate probability. [S-CP] Students will correctly identify and calculate combinations and permutations. [S-CP] Students will calculate conditional probability. [S-CP] Students will calculate measures of central tendencies and dispersion. [S-ID]	2. Instructional strategies that will be used to engage students. Teachers will use direct instruction utilizing Smart Notebook software to teach and demonstrate each concept to students. Students will work independently, in pairs and in groups to practice, apply and discuss each concept. Warm-ups, quizzes, Smart Responder activities and teacher monitoring will assess progress and check for understanding.	3. How will we know that students have learned? Include both Formative (for learning) and Summative (of learning) assessment examples. Formative assessments will include warm-ups, homework, individual quizzes and partner quizzes and activities. Summative assessments will include chapter or unit tests, a 1st semester final and year-end final.	4. What will we do if students don't learn? Grouping of students will allow peer-tutoring within learning activities. Re-teaching concept components will occur followed by monitoring of independent practice. Students may access additional remedial sessions available by teacher, math department or site. These may include peer-tutoring, Academic Recovery, D-Back hour, Blue Latte or teacher office hours. 5. What will we do if students already know it? A minimum of independent practice problems will be provided then the students will be allowed to move to the next topic.

Content Area Standards (Please identify the source)

The students will demonstrate mastery of the following content standards:

[S-CP.2] Understand that two events A and B are independent if the probability of A and B occurring together is the product of their probabilities, and use this characterization to determine if they are independent.

[S-CP.3] Understand the conditional probability of A given B as $P(A \text{ and } B)/P(B)$, and interpret independence of A and B as saying that the conditional probability of A given B is the same as the probability of A, and the conditional probability of B given A is the same as the probability of B.

[S-CP.4] Construct and interpret two-way frequency tables of data when two categories are associated with each object being classified. Use the two-way table as a sample space to decide if events are independent and to approximate conditional probabilities. *For example, collect data from a random sample of students in your school on their favorite subject among math, science, and English. Estimate the probability that a randomly selected student from your school will favor science given that the student is in tenth grade. Do the same for other subjects and compare.*

[S-CP.5] Recognize and explain the concepts of conditional probability and independence in everyday language and everyday situations. *For example, compare the chance of having lung cancer if you are a smoker with the chance of being a smoker if you have lung cancer.*

[S-CP.6] Find the conditional probability of A given B as the fraction of B's outcomes that also belong to A, and interpret the answer in terms of the model.

[S-CP.7] Apply the Addition Rule, $P(A \text{ or } B) = P(A) + P(B) - P(A \text{ and } B)$, and interpret the answer in terms of the model.

[S-CP.8] Apply the general Multiplication Rule in a uniform probability model, $P(A \text{ and } B) = P(A)P(B|A) = P(B)P(A|B)$,,and interpret the answer in terms of the model.

[S-CP.9] Use permutations and combinations to compute probabilities of compound events and solve problems.

[S-ID.2] Use statistics appropriate to the shape of the data distribution to compare center (median, mean) and spread (interquartile range, standard deviation) of two or more different data sets.

[S-ID.4] Use the mean and standard deviation of a data set to fit it to a normal distribution and to estimate population percentages. Recognize that there are data sets for which such a procedure is not appropriate. Use calculators, spreadsheets, and tables to estimate areas under the normal curve.

EL DORADO UNION HIGH SCHOOL DISTRICT

EDUCATIONAL SERVICES

Department: Mathematics

Course Title: Advanced Algebra 2 (#0227)

UNIT #11: Trigonometry

LEARNING OUTCOME: Students will use trigonometry to solve right and non-right triangles.

LEARNING OUTCOME	INSTRUCTIONAL STRATEGIES	ASSESSMENTS	INTERVENTIONS
1. What students will learn, know, and be able to do? (Must be aligned to state content standards.) Students will solve right triangles using trigonometry. [G-SRT] Students will solve non-right triangles using Law of Sines and Law of Cosines. [G-SRT], [F-TF] Students will write the ratios for all six trigonometric functions given a right triangle. [G-SRT]	2. Instructional strategies that will be used to engage students. Teachers will use direct instruction utilizing Smart Notebook software to teach and demonstrate each concept to students. Students will work independently, in pairs and in groups to practice, apply and discuss each concept. Warm-ups, quizzes, Smart Responder activities and teacher monitoring will assess progress and check for understanding.	3. How will we know that students have learned? Include both Formative (for learning) and Summative (of learning) assessment examples. Formative assessments will include warm-ups, homework, individual quizzes and partner quizzes and activities. Summative assessments will include chapter or unit tests, a 1st semester final and year-end final.	4. What will we do if students don't learn? Grouping of students will allow peer-tutoring within learning activities. Re-teaching concept components will occur followed by monitoring of independent practice. Students may access additional remedial sessions available by teacher, math department or site. These may include peer-tutoring, Academic Recovery, D-Back hour, Blue Latte or teacher office hours. 5. What will we do if students already know it? A minimum of independent practice problems will be provided then the students will be allowed to move to the next topic.

Content Area Standards (Please identify the source)

The students will demonstrate mastery of the following content standards:

[F-TF.6.2] Compute, by hand, the values of the trigonometric functions and the inverse trigonometric functions at various standard points.

[G-SRT.6] Understand that by similarity, side ratios in the right triangles are properties of the angles in the triangle, leading to definitions of trigonometric ratios for acute angles.

[G-SRT.8] Use trigonometric ratios and the Pythagorean Theorem to solve right triangles in applied problems.

[G-SRT.11] Understand and apply the Law of Sines and the Law of Cosines to find unknown measurements in right and non-right triangles (e.g., surveying problems, resultant forces).