

Perris Union High School District Course of Study

A. COURSE INFORMATION

Course Title: <div style="border: 1px solid black; padding: 2px; margin-bottom: 5px;">Algebra 2/ Trig</div> <input type="checkbox"/> New <input checked="" type="checkbox"/> Revised	Subject Area: <input type="checkbox"/> Social Science <input type="checkbox"/> English <input checked="" type="checkbox"/> Mathematics <input type="checkbox"/> Laboratory Science <input type="checkbox"/> World Languages <input type="checkbox"/> Visual or Performing Arts <input type="checkbox"/> College Prep Elective <input type="checkbox"/> Other	Grade Level <input type="checkbox"/> MS <input type="checkbox"/> HS <input type="checkbox"/> 5 <input type="checkbox"/> 6 <input type="checkbox"/> 7 <input type="checkbox"/> 8 <input checked="" type="checkbox"/> 9 <input checked="" type="checkbox"/> 10 <input checked="" type="checkbox"/> 11 <input checked="" type="checkbox"/> 12
Transcript Title/Abbreviation: <div style="border: 1px solid black; height: 20px; width: 100%;"></div> (To be assigned by Educational Services)	Is this classified as a Career Technical Education course? <input type="checkbox"/> Yes <input checked="" type="checkbox"/> No	
Transcript Course Code/Number: <div style="border: 1px solid black; height: 20px; width: 100%;"></div> (To be assigned by Educational Services)		
Required for Graduation: <input type="checkbox"/> Yes <input checked="" type="checkbox"/> No	Credential Required to teach this course: <div style="border: 1px solid black; padding: 5px; text-align: center; margin-bottom: 5px;">Mathematics</div> <i>To be completed by Human Resources only.</i>	
Meets UC/CSU Requirements? <input checked="" type="checkbox"/> Yes <input type="checkbox"/> No Was this course <u>previously approved by UC</u> for PUHSD? <input checked="" type="checkbox"/> Yes <input type="checkbox"/> No (Will be verified by Ed Services)	<div style="border: 1px solid black; padding: 5px; margin-bottom: 5px;"> 5/5/17 </div> <div style="display: flex; justify-content: space-between; font-size: small;"> Signature Date </div>	
Meets "AP" Requirements? <input type="checkbox"/> Yes <input checked="" type="checkbox"/> No	Meets "Honors" Requirements? <input type="checkbox"/> Yes <input checked="" type="checkbox"/> No	
Submitted by: Amanda Darton Site: SSC Date: 4/28/17	Unit Value/Length of Course: <input type="checkbox"/> 0.5 (half year or semester equivalent) <input checked="" type="checkbox"/> 1.0 (one year equivalent) <input type="checkbox"/> 2.0 (two year equivalent) <input type="checkbox"/> Other:	
Approvals	Name/Signature	Date
Director of Curriculum & Instruction		5/1/17
Asst. Superintendent of Educational Services		5.4.17
Governing Board		

Prerequisite(s) (REQUIRED):

Algebra 1 with a "C" or Higher

Corequisite(s) (REQUIRED):

None

Brief Course Description (REQUIRED):

The Algebra 2/Trig course is designed to build on previous work with linear, quadratic, and exponential functions, students extend their repertoire of functions to include logarithmic, polynomial, rational, and radical functions. This course includes standards from the conceptual categories of Number and Quantity, Algebra, Functions, Geometry, and Statistics and Probability. Students work closely with the expressions that define the functions, competently manipulate algebraic expressions, and continue to expand and hone their abilities to model situations and to solve equations, including solving quadratic equations over the set of complex numbers and solving exponential equations using the properties of logarithms. For the Algebra II course, instructional time should focus on four critical areas: (1) relate arithmetic of rational expressions to arithmetic of rational numbers; (2) expand understandings of functions and graphing to include trigonometric functions; (3) synthesize and generalize functions and extend understanding of exponential functions to logarithmic functions; and (4) relate data display and summary statistics to probability and explore a variety of data collection methods.

B. COURSE CONTENT**Course Purpose (REQUIRED):**

What is the purpose of this course? Please provide a brief description of the goals and expected outcomes. Note: More specificity than a simple recitation of the State Standards is needed.

Building on their work with linear, quadratic, and exponential functions, students extend their repertoire of functions to include logarithmic, polynomial, rational, and radical functions in the Algebra II course. This course includes standards from the conceptual categories of Number and Quantity, Algebra, Functions, Geometry, and Statistics and Probability. Some standards are repeated in multiple higher mathematics courses; therefore instructional notes, which appear in brackets, indicate what is appropriate for study in this particular course. Standards that were limited in Algebra I no longer have those restrictions in Algebra II. Students work closely with the expressions that define the functions, competently manipulate algebraic expressions, and continue to expand and hone their abilities to model situations and to solve equations, including solving quadratic equations over the set of complex numbers and solving

exponential equations using the properties of logarithms.

For the Algebra II course, instructional time should focus on four critical areas: (1) relate arithmetic of rational expressions to arithmetic of rational numbers; (2) expand understandings of functions and graphing to include trigonometric functions; (3) synthesize and generalize functions and extend understanding of exponential functions to logarithmic functions; and (4) relate data display and summary statistics to probability and explore a variety of data collection methods.

- (1) A central theme of this Algebra II course is that the arithmetic of rational expressions is governed by the same rules as the arithmetic of rational numbers. Students explore the structural similarities between the system of polynomials and the system of integers. They draw on analogies between polynomial arithmetic and base-ten computation, focusing on properties of operations, particularly the distributive property. Connections are made between multiplication of polynomials with multiplication of multi-digit integers, and division of polynomials with long division of integers. Students identify zeros of polynomials, including complex zeros of quadratic polynomials, and make connections between zeros of polynomials and solutions of polynomial equations. The Fundamental Theorem of Algebra is examined.
- (2) Building on their previous work with functions and on their work with trigonometric ratios and circles in the Geometry course, students now use the coordinate plane to extend trigonometry to model periodic phenomena.
- (3) Students synthesize and generalize what they have learned about a variety of function families. They extend their work with exponential functions to include solving exponential equations with logarithms. They explore the effects of transformations on graphs of diverse functions, including functions arising in an application, in order to abstract the general principle that transformations on a graph always have the same effect regardless of the type of the underlying function. They identify appropriate types of functions to model a situation, they adjust parameters to improve the model, and they compare models by analyzing appropriateness of fit and making judgments about the domain over which a model is a good fit. The description of modeling as “the process of choosing and using mathematics and statistics to analyze empirical situations, to understand them better, and to make decisions” is at the heart of this Algebra II course. The narrative discussion and diagram of the modeling cycle should be considered when knowledge of functions, statistics, and geometry is applied in a modeling context.
- (4) Students see how the visual displays and summary statistics they learned in earlier grades relate to different types of data and to probability distributions. They identify different ways of collecting data—including sample surveys, experiments, and simulations—and consider how randomness and careful design affect the conclusions that can be drawn.

The Standards for Mathematical Practice complement the content standards so that students increasingly engage with the subject matter as they grow in mathematical maturity and expertise throughout the elementary, middle, and high school years.

Course Outline (REQUIRED):

Detailed description of topics covered. All historical knowledge is expected to be empirically based, give examples. Show examples of how the text is incorporated into the topics covered.

Students will learn:

- Algebra
 - Properties
 - In the transition from arithmetic to algebra , attention shifts from arithmetic operations to use of the properties of these operations.
 - All of the facts of arithmetic and algebra follow from certain properties.
 - Variable
 - Quantities are used to form expressions, equations and inequalities.
 - An expressions refer to a quantity but does not make a statement about it/ An equation is a statement about the quantities it mentions.
 - Using variables in place of numbers in equations allow the statement of relationships among numbers that are unknown or unspecified.
 - Equivalence
 - A single quantity may be represented by many different expressions.
 - The facts about a quantity may be expressed by many different equations or inequalities.
 - Solving Equations and Inequalities
 - Solving an equation is the process of rewriting the equation to make what it says about its variable(s) as simple as possible.
 - Properties of numbers and equality can be used to transform an equation (or inequality) into equivalent, simpler equations (or inequalities) in order to find solutions.
 - Useful information about equations and inequalities (including solutions) can be found by analyzing graphs or tables.
 - The numbers and types of solutions vary predictably, based on the type of equation.
 - Proportionality
 - Two quantities are proportional if they have the same ratio in each instance where they are measured together
 - Two quantities are inversely proportional if they have the same product in each instance where they are measured together.
 - Function
 - A function is a relationship between variables in which each value of the input variable is associated with a unique value of the output variable.
 - Functions can be represented in a variety of ways, such as graphs, tables, equations, or words. Each representation is particularly useful in certain situations.
 - Some important families of functions are developed through transformations of the simplest form of the function.
 - New functions can be made from other functions by applying arithmetic operations or by applying one function to the output of another.
 - Modeling
 - Many real-world mathematical problems can be represented algebraically. These representations can lead to algebraic solutions.
 - A function that models a real-world situation can then be used to make estimates or predictions about future occurrences.
- Statistics and Probability
 - Data Collection and Analysis
 - Sampling techniques are used to gather data from real-world situations. If the data are representative of the larger population, inferences can be made about that population.
 - Based sampling techniques yield data unlikely to be representative of the larger population.

- Sets of numerical data are described using measures of central tendency and dispersion.
- Data Representation
 - The most appropriate data representations depend on the type of data-quantitative or qualitative, and univariate or bivariate.
 - Line plots, boxplots, and histograms are different ways to show distribution of data over a possible range of values.
- Probability
 - Probability expresses the likelihood that a particular event will occur.
 - Data can be used to calculate an experimental probability, and mathematical properties can be used to determine a theoretical probability.
 - Either experimental or theoretical probability can be used to make predictions or decisions about future events.
 - Various counting methods can be used to develop theoretical probabilities.
- Geometry
 - Visualization
 - Visualization can help you connect properties of real objects with two-dimensional drawings of these objects.
 - Transformations
 - Transformations are mathematical functions that model concrete operations with figures.
 - Transformations may be described geometrically or by coordinates.
 - Symmetries of figures may be defined and classified by transformations.
 - Measurement
 - Some attributes of geometric figures, such as length, area, volume, and angle measure, are measurable. Units are used to describe these attributes.
 - Reasoning and Proof
 - Definitions establish meaning and remove possible misunderstanding.
 - Other truths are more complex and difficult to see. It is often possible to verify complex truths by reasoning from simpler ones by using deductive reasoning.
 - Similarity
 - Two geometric figures are similar when corresponding lengths are proportional and corresponding angles are congruent.
 - Areas of similar figures are proportional to the squares of their corresponding lengths.
 - Volumes of similar figures are proportional to the cubes of their corresponding lengths.
 - Coordinate Geometry
 - A coordinate system on a line on which points are labeled, corresponding to the real numbers.
 - A coordinate system in a plane is formed by two perpendicular number lines, called x- and y-axes, and the quadrants they form. The coordinate plane can be used to graph many functions.
 - It is possible to verify some complex truths using deductive reasoning in combination with Distance, Midpoint, and Slope formulas.

Writing Assignments (REQUIRED):

Give examples of the writing assignments and the use of critical analysis within the writing assignments.

Writing assignments will include:

- Justifications and/or Explanations
- Cornell Notes
- Assessments
- Projects/Performance Tasks
- Journals/Learning Logs – Reflections/Summaries
- Writing Prompts
- Other CFUs (i.e. Warm ups and Tickets out the Door)

INSTRUCTIONAL MATERIALS (REQUIRED)

Textbook #1

Title: Algebra 2 Student Edition + Digital Courseware + MathXL (8-year licence)	Edition: First
Author: Charles, Hall, Kennedy, Bellman, Bragg, Handlin, Murphy and Wiggins	ISBN: 13: 9780133315134
Publisher: Pearson	Publication Date: 2015
Usage: <input checked="" type="checkbox"/> Primary Text <input type="checkbox"/> Read in entirety or near	

Textbook #2

Title:	Edition:
Author:	ISBN:
Publisher:	Publication Date:
Usage: <input type="checkbox"/> Primary Text <input type="checkbox"/> Read in entirety or near	

Supplemental Instructional Materials *Please include online, and open source resources if any.*

9780133281262	Teacher's Edition	\$107.97
9780133186178	Teacher Resource DVD	\$100.97
9780133281101	Overview and Implementation Guide	\$9.97

9780133186123	Student Companion Book	\$6.47
9780133186130	Student Companion Teacher's Guide	\$21.97
9780133186147	Practice & Problem Solving Workbook	\$6.47
9780133188448	Practice & Problem Solving Teacher's Guide	\$21.97
9780133186161	Standards Practice & Review Workbook	\$4.97
9780133186154	Standards Practice & Review Teacher's Guide	\$32.47
9780133188431	All-In-One Teaching Resources	\$212.47
9780133706086	Teaching w/TI Technology Booklet w/CD-ROM	\$265.47
9780133288179	Teacher's Online Access Pack	\$318.47
9780133185652	ExamView CD-ROM	\$137.97
9780133196948	TI N-Spire Lesson Support CD-Rom	\$424.47
9780133185669	Answers and Solutions Key CD-ROM	\$159.47
9780133186147	Practice & Problem Solving Workbook	\$6.47

Estimated costs for classroom materials and supplies (REQUIRED). *Please describe in detail.*
If more space is needed than what is provided, please attach backup as applicable.

Cost for class set of textbooks: \$ 6784.92	Description of Additional Costs: Per contract all resources are free.
Additional costs:\$ 0	
Total cost per class set of instructional materials:	\$6784.92

Key Assignments (REQUIRED):

Please provide a detailed description of the Key Assignments including tests, and quizzes, which should incorporate not only short answers but essay questions also. How do assignments incorporate topics? Include all major assessments that students will be required to complete

Key Assignments will include:

- End of Unit Assessments
- Daily/Lesson Quizzes

- Semester Benchmarks/Finals
- Performance Tasks/ Projects
- Homework
- Midterm/mid-unit Assessments
- Cornell Notes

Instructional Methods and/or Strategies (REQUIRED):

Please list specific instructional methods that will be use.

Instructional Strategies will include:

- Direct Instruction
- Targeted Feedback
- Reciprocal Teaching
- Collaboration
- Adapting to learning styles and multiple intelligences
- Realia
- Modeling
- Guided and Independent practice
- Partner/ Group work
- Spiraling
- Questioning strategies that look for participation and content understanding

Assessment Methods and/or Tools (REQUIRED):

Please list different methods of assessments that will be used.

Assessment Methods will include:

- Type of Questions include:
 - Open Response
 - Multiple Choice
 - Performance Assessment\
 - Multiple Choice
- Investigations
- Projects
- Self-assessment
- Whiteboards
- Find the error
- Portfolios/"Notebooks"
- Ticket out the Doors
- Homework

Platforms include: Pearson, Eadms, Haiku, Desmos and MathXL

COURSE PACING GUIDE AND OBJECTIVES (REQUIRED)

Day(s)	Objective	Standard(s)	Chapter(s)	Reference
8-14	Expressions, Equations, and Inequalities 1-1 Patterns and Expressions Reviews 1-2 Properties of Real Numbers Reviews 1-3 Algebraic Expressions 1-4 Solving Equations 1-5 Solving Inequalities 1-6 Absolute Value Equations and Inequalities	A.SSE.3 N.RN.3 A.SSE.1a A.CED.1 A.CED.4 A.SSE.1b	Chapter 1	Essential Standards Addressed
17-25	Functions, Equations, and Graphs 2-1 Relations and Functions Reviews 2-2 Direct Variation 2-3 Linear Functions and Slope-Intercept Form 2-4 More About Linear Equations 2-5 Using Linear Models 2-6 Families of Functions 2-7 Absolute Value Functions and Graphs 2-8 Two-Variable Inequalities	A.CED.2 A.REI.12 F.IF.7.b F.BF.3 N.Q.1 F.IF.4 F.IF.6 F.LE.2 S.ID.6 S.ID.6.a S.ID.6.c S.ID.7 S.ID.8 N.Q.1 F.IF.8 F.IF.7.a F.LE.5 F.IF.1 F.IF.2 F.IF.7		
10-16	Linear Systems 3-1 Solving Systems Using Tables and Graphs 3-2 Solving Systems Algebraically	N.Q.1 A.CED.2 A.CED.3 A.REI.6 A.REI.11		

	<p>3-3 Systems of Inequalities</p> <p>3-4 Linear Programming</p> <p>3-5 Systems With Three Variables</p> <p>3-6 Solving Systems Using Matrices</p>	A.REI.5		
16-25	<p>Quadratic Functions and Equations</p> <p>4-1 Quadratic Functions and Transformations</p> <p>4-2 Standard Form of a Quadratic Function</p> <p>4-3 Modeling With Quadratic Functions</p> <p>4-4 Factoring Quadratic Expressions</p> <p>4-5 Quadratic Equations</p> <p>4-6 Completing the Square</p> <p>4-7 The Quadratic Formula</p> <p>4-8 Complex Numbers</p> <p>4-9 Quadratic Systems</p>	<p>A.CED.1</p> <p>F.IF.1</p> <p>F.IF.2</p> <p>F.IF.4</p> <p>F.IF.7</p> <p>F.IF.7.a</p> <p>F.BF.3</p> <p>A.REI.4.b</p> <p>N.Q.1</p> <p>F.IF.5</p> <p>F.LE.5</p> <p>A.SSE.3</p> <p>A.SSE.3.c</p> <p>A.CED.2</p> <p>A.REI.11</p> <p>F.IF.8</p> <p>A.SSE.1.a</p> <p>A.SSE.1.b</p> <p>A.SSE.4</p> <p>A.CED.3</p> <p>A.REI.7</p> <p>N.CN.1</p> <p>N.CN.2</p> <p>N.CN.3</p> <p>N.CN.5</p> <p>N.CN.7</p> <p>A.REI.4</p> <p>A.REI.4.a</p>		
16-25	<p>Polynomials and Polynomial Functions</p> <p>5-1 Polynomial Functions</p> <p>5-2 Polynomials, Linear Factors, and Zeros</p> <p>5-3 Solving Polynomial Equations</p>	<p>F.IF.1</p> <p>F.IF.2</p> <p>F.IF.7.c</p> <p>A.SSE.1.a,</p> <p>A.SSE.1.b</p> <p>A.APR.1</p> <p>A.APR.3</p> <p>A.SSE.2</p>	Chapter 5	

	<p>5-4 Dividing Polynomials</p> <p>5-5 Theorems About Roots of Polynomial Equations</p> <p>5-6 The Fundamental Theorem of Algebra</p> <p>5-7 The Binomial Theorem</p> <p>5-8 Polynomial Models in the Real World</p> <p>5-9 Transforming Polynomial Functions</p>	<p>A.REI.11</p> <p>A.APR.2</p> <p>A.APR.6</p> <p>N.CN.7</p> <p>N.CN.8</p> <p>N.CN.9</p> <p>G.GPE.5</p> <p>A.APR.5</p> <p>N.Q.1</p> <p>F.IF.4</p> <p>F.IF.5</p> <p>F.IF.8</p> <p>F.BF.3</p>		
11-19	<p>Radical Functions and Rational Exponents</p> <p>6-1 Roots and Radical Expressions</p> <p>6-2 Multiplying and Dividing Radical Expressions</p> <p>6-3 Binomial Radical Expressions</p> <p>6-4 Rational Exponents</p> <p>6-5 Solving Square Root and Other Radical Equations</p> <p>6-6 Function Operations</p> <p>6-7 Inverse Relations and Functions</p> <p>6-8 Graphing Radical Functions</p>	<p>A.SSE.2</p> <p>N.RN.1</p> <p>N.RN.2</p> <p>A.REI.2</p> <p>F.BF.1.b</p> <p>F.BF.1.c</p> <p>F.BF.4</p> <p>F.BF.4.a</p> <p>F.BF.4.b</p> <p>F.BF.4.c</p> <p>F.IF.7.b</p> <p>F.IF.8</p>	Chapter 6	
12-18	<p>Exponential and Logarithmic Functions</p> <p>7-1 Exploring Exponential Models</p> <p>7-2 Properties of Exponential Functions</p> <p>7-3 Logarithmic Functions as Inverses</p> <p>7-4 Properties of Logarithms</p> <p>7-5 Exponential and Logarithmic Equations</p> <p>7-6 Natural Logarithms</p>	<p>N.Q.1</p> <p>A.CED.2</p> <p>F.IF.1</p> <p>F.IF.2</p> <p>F.IF.7.e</p> <p>F.IF.8</p> <p>F.IF.8.b</p> <p>F.LE.2</p> <p>S.ID.6.a</p> <p>F.LE.5</p> <p>A.SSE.1.b</p> <p>F.BF.4.a</p> <p>F.BF.5</p>	Chapter 7	

		A.REI.11 F.LE.4		
12-18	Rational Functions 8-1 Inverse Variation 8-2 The Reciprocal Function Family 8-3 Rational Functions and Their Graphs 8-4 Rational Expressions 8-5 Adding and Subtracting Rational Expressions 8-6 Solving Rational Equations	N.Q.1 A.CED.2 F.BF.3 F.BF.1.b A.CED.1 F.IF.7 F.IF.7.d A.SSE.1.a A.SSE.1.b A.SSE.2 A.APR.6 A.REI.2 A.REI.11	Chapter 8	
7-12	Sequences and Series 9-1 Mathematical Patterns 9-2 Arithmetic Sequences 9-3 Geometric Sequences 9-4 Arithmetic Series Extends 9-5 Geometric Series	F.IF.3 F.BF.1.a F.BF.2 F.LE.2 A.SSE.4	Chapter 9	
9-15	Quadratic Relations and Conic Sections 10-1 Exploring Conic Sections 10-2 Parabolas 10-3 Circles 10-4 Ellipses 10-5 Hyperbolas 10-6 Translating Conic Sections	G.GPE.1 G.GPE.2 G.GPE.3	Chapter 10	
12-22	Probability and Statistics	S.CP.9	Chapter 11	

	11-1 Permutations and Combinations 11-2 Probability 11-3 Probability of Multiple Events 11-4 Conditional Probability 11-5 Probability Models 11-6 Analyzing Data 11-7 Standard Deviation 11-8 Samples and Surveys 11-9 Binomial Distribution 11-10 Normal Distribution	S.IC.2 S.CP.7 S.CP.6 S.MD.6 S.MD.7 S.ID.4 S.ID.1		
8-14	Matrices 12-1 Adding and Subtracting Matrices 12 -2 Matrix Multiplication 12-3 Determinants and Inverses 12-4 Inverse Matrices and System 12-5 Geometric Transformations 12-6 Vectors	N.VM.8 N.VM.6 N.VM.7 N.VM.9 N.VM.10 N.VM.12 G.CO.5 N.VM.5a	Chapter 12	
14-22	Periodic Functions and Trigonometry 13-1 Exploring Periodic Data 13-2 Angles and the Unit Circle 13-3 Radian Measures 13-4 The Sine Function	F.IF.4 F.TF.5 F.TF.2 F.TF.1 F.IF.7e	Chapter 13	

	<p>13-5 The Cosine Function</p> <p>13-6 The Tangent Function</p> <p>13-7 Translating Sine and Cosine Functions</p> <p>13-8 Reciprocal Trigonometric Functions</p>			
9-16	<p>Trigonometric Identities and Equations</p> <p>14-1 Trigonometric Identities</p> <p>14-2 Solving Trigonometric Equations Using Inverses</p> <p>14-3 Right Triangles and Trigonometric Ratios</p> <p>14-4 Area and the Law of Sines</p> <p>14-5 The Law of Cosines</p> <p>14-6 Angle Identities</p> <p>14-7 Double-Angle and Half-Angle Identities</p>	<p>F.TF.8</p> <p>F.TF.6</p> <p>F.TF.7</p> <p>G.SRT.6</p> <p>G.SRT.8</p> <p>G.SRT.9</p> <p>G.SRT.11</p> <p>G.SRT.10</p> <p>F.TF.9</p>	Chapter 14	

C. HONORS COURSES ONLY

Indicate how much this honors course is different from the standard course.

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D. BACKGROUND INFORMATION

Context for course (optional)

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History of Course Development (optional)