Perris Union High School District
Course of Study

A. COURSE INFORMATION

Course Title:

Algebra 1b

- ❏ New
- ☒ Revised

Transcript Title/Abbreviation:

(To be assigned by Educational Services)

Transcript Course Code/Number:

(To be assigned by Educational Services)

Subject Area:
- ❏ Social Science
- ❏ English
- ✓ Mathematics
- ❏ Laboratory Science
- ❏ World Languages
- ❏ Visual or Performing Arts
- ❏ College Prep Elective
- ❏ Other

Is this classified as a Career Technical Education course?
- ❏ Yes
- ❏ No

Grade Level
- ❏ MS
- ❏ HS
- ❏ 5
- ❏ 6
- ❏ 7
- ✓ 8
- ✓ 9
- ✓ 10
- ✓ 11
- ✓ 12

Required for Graduation:
- ✓ Yes
- ❏ No

*in conjunction with 1a

Meets UC/CSU Requirements?
- ✓ Yes
- ❏ No

*in conjunction with 1a

Was this course _previously approved by UC_ for PUHSD?
- ☒ Yes
- ❏ No

(Will be verified by Ed Services)

Credential Required to teach this course:

Mathematics

To be completed by Human Resources only.

Signature   Date

Meets "Honors" Requirements?
- ❏ Yes
- ✓ No

Meets "AP" Requirements?
- ❏ Yes
- ✓ No

Submitted by: Amanda Darton
Site: SSC
Date: 4/28/17

Unit Value/Length of Course:
- ❏ 0.5 (half year or semester equivalent)
- ✓ 1.0 (one year equivalent)
- ❏ 2.0 (two year equivalent)
- ❏ 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):
None

Corequisite(s) (REQUIRED):
None

Brief Course Description (REQUIRED):
Algebra 1b is the second half of the Algebra 1a-1b series. The fundamental purpose of the Algebra 1a course is to formalize and extend the mathematics that students learned in the middle grades. This course includes standards from the conceptual categories of Number and Quantity, Algebra, Functions, and Statistics and Probability.

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.

The fundamental purpose of the Algebra I course is to formalize and extend the mathematics that students learned in the middle grades. This course includes standards from the conceptual categories of Number and Quantity, Algebra, Functions, 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. For example, the scope of Algebra I is limited to linear, quadratic, and exponential expressions and functions as well as some work with absolute value, step, and functions that are piecewise-defined. Therefore, although a standard may include references to logarithms or trigonometry, those functions are not to be included in course work for Algebra I; they will be addressed later in Algebra II.

For the Algebra I course, instructional time should focus on four critical areas: (1) deepen and extend understanding of linear and exponential relationships; (2) contrast linear and exponential relationships with each other and engage in methods for analyzing, solving, and using quadratic functions; (3) extend the laws of exponents to square and cube roots; and (4) apply linear models to data that exhibit a linear trend.

(1) In previous grades, students learned to solve linear equations in one variable and applied graphical and algebraic methods to analyze and solve systems of linear equations in two variables. In Algebra I, students analyze and explain the process of solving an equation and justify the process used in solving a system of equations. Students develop fluency in writing, interpreting, and translating among various forms of linear equations and inequalities and use them to solve problems. They master the solution of linear equations and apply related solution techniques and the laws of exponents to the creation and solution of simple exponential equations.

(2) In earlier grades, students define, evaluate, and compare functions and use them to model relationships between quantities. In Algebra I, students learn function notation and develop the concepts of domain and range. They focus on linear, quadratic, and exponential functions, including sequences, and also explore absolute value, step, and piecewise-defined functions; they interpret functions given graphically, numerically, symbolically, and verbally; translate between representations; and understand the limitations of various representations. Students build on and extend their understanding of integer exponents to consider exponential functions. They compare and contrast linear and exponential functions, distinguishing between additive and multiplicative change. Students explore systems of equations and inequalities, and they find and interpret their solutions. They interpret arithmetic sequences as linear functions and geometric sequences as exponential functions.

(3) Students extend the laws of exponents to rational exponents involving square and cube roots and apply this new understanding of number; they strengthen their ability to see structure in and create quadratic and exponential expressions. They create and solve equations, inequalities, and systems of equations involving quadratic expressions. Students become facile with algebraic manipulation, including rearranging and collecting terms, and factoring, identifying, and canceling common factors in rational expressions. Students consider quadratic functions, comparing the key characteristics of quadratic functions to those of linear and exponential functions. They select from these functions to model phenomena. Students learn to anticipate the graph of a quadratic function by interpreting various forms of quadratic expressions. In particular, they identify the real solutions of a quadratic equation as the zeros of a related quadratic function. Students expand their experience with functions to include more specialized functions—absolute value, step, and those that are piecewise-defined.

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 measureable. 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 1 Student Edition + Digital Courseware + MathXL (8-year licence)	Edition: First
Author: Charles, Hall, Kennedy, Bellman, Bragg, Handlin, Murphy and Wiggins	ISBN: 13: 9780133286618
Publisher: Pearson	Publication Date: 2015

Usage:
- ✓ Primary Text
- ❏ Read in entirety or near

Textbook #2

Title:	Edition:
Author:	ISBN:
Publisher:	Publication Date:

Usage:
- ❏ Primary Text
- ❏ Read in entirety or near

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

9780133283228	Teacher's Edition	$107.97
9780133185638	Teacher Resource DVD	$100.97
9780133281125	Overview and Implementation Guide	$9.97
9780133185591	Student Companion Book	$6.47
9780133185607	Student Companion Teacher's Guide	$21.97
9780133185614	Practice & Problem Solving Workbook	$6.47
9780133188400	Practice & Problem Solving Teacher's Guide	$21.97
9780133185676	Standards Practice & Review Workbook	$4.97
9780133185621	Standards Practice & Review Teacher's Guide	$32.47
9780133188394	All-In-One Teaching Resources	$212.47

9780133706086	Teaching w/TI Technology Booklet w/CD-ROM	$265.47
9780133288148	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
9780133185614	Practice & Problem Solving Workbook	$6.45

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: $ 6511.32	Description of Additional Costs:
	Per contract all additional resources are free.
Additional costs:$0	
Total cost per class set of instructional materials:	$6511.32

Key Assignments (REQUIRED):

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**
15-20	Systems of Equations and Inequality 6-1 Solving Systems by Graphing 6-2 Solving Systems Using Substitution 6-3 Solving Systems Using Elimination 6-4 Applications of Linear Equations 6-5 Linear Inequalities	A.REI.6 A.REI.5 A.CED.3 A.REI.12	Chapter 6	Essential Standards Addressed

	6-6 Systems of Linear Inequalities			
16-22	Exponents and Exponential Functions 7-1 Zero and Negative Exponents 7-2 Multiplication Powers With the Same Base 7-3 More Multiplication Properties of Exponents 7-4 Division Properties of Exponents 7-5 Rational Exponents and Radicals 7-6 Exponential Functions 7-7 Exponential Growth and Decay 7-8 Geometric Sequences	N.RN.1 N.RN.2 A.CED.2 F.IF.4 F.IF.5 F.IF.7.e F.LE.2 F.LE.5	Chapter 7	
16-22	Polynomials and Factoring 8-1 Adding and Subtracting Polynomials 8-2 Multiplying and Factoring 8-3 Multiplying Binomials 8-4 Multiplying Special Cases 8-5 Factoring $x^2 + bx + c$ 8-6 Factoring $ax^2 + bx + c$ 8-7 Factoring Special Cases 8-8 Factoring by Grouping	A.APR.1 A.SSE.1 A.SSE.1.a A.SSE.1.b A.SSE.2	Chapter 8	
21-27	Quadratic Functions and Equations 9-1 Quadratic Graphs and Their Properties 9-2 Quadratic Functions	A.CED.2 F.IF.4 F.IF.5 F.IF.7 F.IF.7.a	Chapter 9	

		9-3 Solving Quadratic Equations 9-4 Factoring to Solve Quadratic Equations 9-5 Completing the Square 9-6 The Quadratic Formula and the Discriminant 9-7 Linear, Quadratic, and Exponential Models 9-8 Systems of Linear and Quadratic Equations	F.BF.3 A.CED.1 A.REI.4 A.REI.4.b A.REI.1 A.SSE.1.a A.SSE.1.b A.REI.4.a N.Q.3 A.SSE.1 F.LE.1 F.LE.1.a F.LE.2 F.LE.3 S.ID.6 S.ID.6.a		
12-17	Radical Expressions and Equations 10-1 The Pythagorean Theorem 10-2 Simplifying Radicals 10-3 Operations with Radical Expressions 10-4 Solving Radical Equations 10-5 Graphing Square Root Functions 10-6 Trigonometric Ratios	G.SRT.8 A.REI.2 A.CED.2 F.IF.7.b	Chapter 10	
15-21	Rational Expressions and Functions 11-1 Simplifying Rational Expressions 11-2 Multiplying and Dividing Rational Expressions 11-3 Dividing Polynomials 11-4 Adding and Subtracting Rational Expressions 11-5 Solving Rational Equations	A.APR.7 A.APR.6 A.CED.1 A.REI.2 A.CED.2 F.IF.5	Chapter 11	

	11-6 Inverse Variation 11-7 Graphing Rational Functions			
14-20	Rational Expressions and Functions 12-1 Organizing Data Using Matrices 12-2 Frequency and Histograms 12-3 Measures of Central Tendency and Dispersion 12-4 Box-and-Whisker Plots 12-5 Samples and Surveys 12-6 Permutations and Combinations 12-7 Theoretical and Experimental Probability 12-8 Probability of Compound Events	N.VM.6 N.Q.1 S.ID.1 N.Q.2 S.ID.2 S.ID.3 S.IC.3 S.CP.9 S.CP.1 S.CP.4	Chapter 12	

C. HONORS COURSES ONLY

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

D. BACKGROUND INFORMATION

Context for course (optional)

History of Course Development (optional)