

# Algebra 1 Course Outline

## General Information--

### Prerequisites:

Students should be proficient with all integer operations as well as all operations with fractions, decimals and percents with out a calculator. Students should be able to draw and set up a basic mathematical model from a written or practical problem. Students should be able to graph both equalities and inequalities in one and two dimensions, be familiar with the properties of absolute value and be able to graph absolute value inequalities.

Grades 9-12

### Course Summary

The students will demonstrate their understanding of the concepts and processes contained in the California Academic Content Standards for Mathematics. The students will exercise on daily objectives. Different lesson strategies will enable various learners to build their individual skills. Topics will include expressions, equations, real numbers, exponents, polynomials, radicals, quadratic equations, two variable equations, linear functions, rational expressions, absolute value, systems of equations, inequalities and an emphasis on problem solving and graphing. See the state standards in the next section for a more detailed description of topics.

## Course Content Quarter Taught

California Academic Contents Standards for Algebra I	Q1	Q2	Q3	Q4
<b>1.0</b> Students identify and use the arithmetic properties of subsets of integers and rational, irrational, and real numbers, including closure properties for the four basic arithmetic operations where applicable:	X		X	
<b>1.1</b> Students use properties of numbers to demonstrate whether assertions are true or false.	X			
<b>2.0</b> Students understand and use such operations as taking the opposite, finding the reciprocal, taking a root, and raising to a	X			X

fractional power. They understand and use the rules of exponents.				
<b>3.0</b> Students solve equations and inequalities involving absolute values.		X		
<b>4.0</b> Students simplify expressions before solving linear equations and inequalities in one variable, such as $3(2x-5) + 4(x-2) = 12$ .	X	X		
<b>5.0</b> Students solve multistep problems, including word problems, involving linear equations and linear inequalities in one variable and provide justification for each step.	X	X		
<b>6.0</b> Students graph a linear equation and compute the $x$ - and $y$ -intercepts (e.g., graph $2x + 6y = 4$ ). They are also able to sketch the region defined by linear inequality (e.g., they sketch the region defined by $2x + 6y < 4$ ).		X		
<b>7.0</b> Students verify that a point lies on a line, given an equation of the line. Students are able to derive linear equations by using the point-slope formula.		X		
<b>8.0</b> Students understand the concepts of parallel lines and perpendicular lines and how those slopes are related. Students are able to find the equation of a line perpendicular to a given line that passes through a given point.		X		
<b>9.0</b> Students solve a system of two linear equations in two variables algebraically and are able to interpret the answer graphically. Students are able to solve a system of two linear inequalities in two variables and to sketch the solution sets.		X		
<b>10.0</b> Students add, subtract, multiply, and divide monomials and polynomials. Students solve multistep problems, including word problems, by using these techniques.				X
<b>11.0</b> Students 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.			X	
<b>12.0</b> Students simplify fractions with polynomials in the numerator and denominator by factoring both and reducing them to the lowest terms.				X
<b>13.0</b> Students add, subtract, multiply, and divide rational				X

expressions and functions. Students solve both computationally and conceptually challenging problems by using these techniques.				
<b>14.0</b> Students solve a quadratic equation by factoring or completing the square.			X	X
<b>15.0</b> Students apply algebraic techniques to solve rate problems, work problems, and percent mixture problems.	X	X	X	
<b>16.0</b> Students understand the concepts of a relation and a function, determine whether a given relation defines a function, and give pertinent information about given relations and functions.	X	X	X	X
<b>17.0</b> Students determine the domain of independent variables and the range of dependent variables defined by a graph, a set of ordered pairs, or a symbolic expression.		X	X	X
<b>18.0</b> Students determine whether a relation defined by a graph, a set of ordered pairs, or a symbolic expression is a function and justify the conclusion.	X	X		
<b>19.0</b> Students know the quadratic formula and are familiar with its proof by completing the square.			X	X
<b>20.0</b> Students use the quadratic formula to find the roots of a second-degree polynomial and to solve quadratic equations.			X	
<b>21.0</b> Students graph quadratic functions and know that their roots are the $x$ -intercepts.			x	
<b>22.0</b> Students use the quadratic formula or factoring techniques or both to determine whether the graph of a quadratic function will intersect the $x$ -axis in zero, one, or two points.				X
<b>23.0</b> Students apply quadratic equations to physical problems, such as the motion of an object under the force of gravity.			X	X
<b>24.0</b> Students use and know simple aspects of a logical argument:	X			X
<b>24.1</b> Students explain the difference between inductive and deductive reasoning and identify and provide examples of each.				X

<b>24.2</b> Students identify the hypothesis and conclusion in logical deduction.				X
<b>24.3</b> Students use counterexamples to show that an assertion is false and recognize that a single counterexample is sufficient to refute an assertion.				X
<b>25.0</b> Students use properties of the number system to judge the validity of results, to justify each step of a procedure, and to prove or disprove statements:				X
<b>25.1</b> Students use properties of numbers to construct simple, valid arguments (direct and indirect) for, or formulate counterexamples to, claimed assertions.				X
<b>25.2</b> Students judge the validity of an argument according to whether the properties of the real number system and the order of operations have been applied correctly at each step.				X
<b>25.3</b> Given a specific algebraic statement involving linear, quadratic, or absolute value expressions or equations or inequalities, students determine whether the statement is true sometimes, always, or never.				X

## Instructional Plan

The students will exercise on daily objectives. These daily objectives are presented many times within a semester. Objectives are first presented by the teacher in various ways, then the students practice on an assignment, then a related "problem of the day" is provided the next day, then the most recent assignment is evaluated by the student, then the assignment is evaluated by the teacher for thoroughness, then a quiz is performed the most recent objectives, then the quiz is returned and reviewed the day after the quiz was performed, then a test is performed on several objectives, then the test is returned and reviewed the day after the test was taken, then a Superintendent's Quarterly Content Standards Assessment is performed at the end of

each quarter and a comprehensive semester final. Different lesson strategies will enable various learners to build their individual skills. When possible physical models with and without technology will be used by the students.

The textbook will be used by the students and teacher as a resource as well as a source for problems. Students will often have an answer to work towards using the textbook. This course is based on what the Management of PGUSD deems important for Algebra 1 students to learn, how they should learn the objectives and how they should be assessed.

### **Assessment-Student Achievement-Grades**

**Superintendent's Semester Content Standards Assessment-** By decree a standardized test will be performed by the students at the end of each semester containing all California Standards covered during that semester.

### **Daily assignments-**

**Quizzes and Tests--**quizzes have the value of 1/4 of a test and will be given throughout the year. There is no make-ups for quizzes, however, one quiz will be dropped per semester.

**Notebook evaluations each semester-**Two notebook quizzes will be given during each quarter. Scores from the notebook quiz will constitute the notebook grade. To maximize notebook quiz scores the following is essential:

- a. **Vocabulary-** Every vocabulary word or concept is recorded in chronological order with complete definitions and grouped in some manner by day and clearly dated.
- b. **Notes-**The notes must clearly describe the Algebra for each day. Each must be clearly dated, in order and complete. No credit is earned for notes that are not useful.
- c. **Assignments-** Every assignment is completed, numbered and in order to earn any credit. See the back of your assignment sheet for the Daily Assignment Standards. A copy of the Daily Assignment Standards is also included in this mandated document for what is meant by a complete assignment.
- d. Quizzes

e. Tests

**The Semester Final Exam**-The final will count as 25% of the semester grade.

V. Algebra 1 Concepts and Skills by Larson, Boswell, Kanold and Stiff