

# CALIFORNIA CONTENT STANDARDS

## ALGEBRA 1

<b>Symbolic reasoning and calculations with symbols are central in algebra. Through the study of algebra, a student develops an understanding of the symbolic language of mathematics and the sciences. In addition, algebraic skills and concepts are developed and used in a wide variety of problem-solving situations.</b>	
<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:	
1.1 Students use properties of numbers to demonstrate whether assertions are true or false.	
<b>2.0</b> Students understand and use such operations as taking the opposite, finding the reciprocal, taking a root, and raising to a fractional power. They understand and use the rules of exponents.	
<b>3.0</b> Students solve equations and inequalities involving absolute values.	
<b>4.0</b> Students simplify expressions before solving linear equations and inequalities in one variable, such as $3(2x-5) + 4(x-2) = 12$ .	
<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.	
<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 $2x + 6y < 4$ ).	
<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.	
<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.	
<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.	
<b>10.0</b> Students add, subtract, multiply, and divide monomials and polynomials. Students solve multistep problems, including word problems, by using these techniques.	
<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.	
<b>12.0</b> Students simplify fractions with polynomials in the numerator and denominator by factoring both and reducing them to the lowest terms.	
<b>13.0</b> Students add, subtract, multiply, and divide rational 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.	
<b>15.0</b> Students apply algebraic techniques to solve rate problems, work problems, and percent mixture problems.	
<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.	
<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.	
<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.	
<b>19.0</b> Students know the quadratic formula and are familiar with its proof by completing the square.	
<b>20.0</b> Students use the quadratic formula to find the roots of a second-degree polynomial and to solve quadratic equations.	
<b>21.0</b> Students graph quadratic functions and know that their roots are the $x$ - intercepts.	

<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.	
<b>23.0</b> Students apply quadratic equations to physical problems, such as the motion of an object under the force of gravity.	
<b>24.0 Students use and know simple aspects of a logical argument:</b>	
<b>24.1</b> Students explain the difference between inductive and deductive reasoning and identify and provide examples of each.	
<b>24.2</b> Students identify the hypothesis and conclusion in logical deduction.	
<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.	
<b>25.0 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:</b>	
<b>25.1</b> Students use properties of numbers to construct simple, valid arguments (direct and indirect) for, or formulate counterexamples to, claimed assertions.	
<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.	
<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.	