

California

Career and Technical Education Matrix for Mathematics

The “✓” designations in the columns under each career pathway identify significant opportunities for academic standards-related instruction within the various career-technical programs. The absence of a “✓” should not, however, be interpreted as offering no opportunity for interdisciplinary instruction; and teachers should make decisions based on their own instructional goals, best judgments, and student interests. A significant number of academic content standards in the matrix below comprise one of the 11 foundation standards required in the California Career and Technical Education model curriculum standards. The “☑” designations also identify opportunities for integrated instruction and the knowledge and skills necessary for postsecondary education and employment as identified by the California Department of Education.

California Curriculum Content Standards High School Mathematics Algebra I	CAHSEE	STAR	Hospitality, Tourism, and Recreation			Information Technology				Manufacturing and Product Development			
			Food Science, Dietetics, and Nutrition	Food Service & Hospitality	Hospitality, Tourism, and Recreation	Information Support & Services	Media Support & Services	Network Communications	Programming & Systems Development	Graphic Arts Technology	Integrated Graphics Technology	Machine & Forming Technology	Welding Technology
Algebra I													
1.0 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.	L	M	☑	☑	☑	☑	☑	☑	☑	☑	☑	☑	☑
2.0 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.	M	H	✓					✓	✓			✓	
3.0 Students solve equations and inequalities involving absolute values.	M	M	✓					✓	✓			✓	
4.0 Students simplify expressions before solving linear equations and inequalities in one variable, such as $3(2x-5) + 4(x-2) = 12$.	H	H	✓					✓	✓			✓	
5.0 Students solve multistep problems, including word problems, involving linear equations and linear inequalities in one variable and provide justification for each step.	M	H	✓			☑	☑	☑	☑	☑	☑	☑	☑

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6.0 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 $2x + 6y < 4$).	H	H	✓			✓		✓	✓			✓	
7.0 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.	H	H				✓		✓	✓				
8.0 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.	M	M				✓		✓	✓	☑	☑	☑	☑
9.0 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.	M	H				✓	✓	✓	✓				
10.0 Students add, subtract, multiply, and divide monomials and polynomials. Students solve multistep problems, including word problems, by using these techniques.	M	H	✓			✓		✓	✓				
11.0 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.	L	H											
12.0 Students simplify fractions with polynomials in the numerator and denominator by factoring both and reducing them to the lowest terms.	L	H	✓			✓	✓	✓	✓	☑	☑	☑	☑
13.0 Students add, subtract, multiply, and divide rational expressions and functions. Students solve both computationally and conceptually challenging problems by using these techniques.	L	H	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓
14.0 Students solve a quadratic equation by factoring or completing the square.	L	H											
15.0 Students apply algebraic techniques to solve rate problems, work problems, and percent mixture problems.	M	H	✓			✓	✓	✓	✓	☑	☑	☑	☑

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16.0 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.	L	M	✓			✓	✓	✓	✓			✓	
17.0 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.	L	M				✓		✓	✓			✓	
18.0 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.	L	H				✓		✓	✓			✓	
19.0 Students know the quadratic formula and are familiar with its proof by completing the square.	L	H											
20.0 Students use the quadratic formula to find the roots of a second-degree polynomial and to solve quadratic equations.	L	H											
21.0 Students graph quadratic functions and know that their roots are the x-intercepts.	L	H											
22.0 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.	L	M										✓	
23.0 Students apply quadratic equations to physical problems, such as the motion of an object under the force of gravity.	L	H										✓	
24.0 Students use and know simple aspects of a logical argument:													
24.1 Students explain the difference between inductive and deductive reasoning and identify and provide examples of each.	L	M	☑	☑	☑	☑	☑	☑	☑	✓	✓	✓	✓
24.2 Students identify the hypothesis and conclusion in logical deduction.	L	M	☑	☑	☑	☑	☑	☑	☑	✓	✓	✓	✓
24.3 Students use counterexamples to show that an assertion is false and recognize that a single counterexample is sufficient to refute an assertion.	L	M	☑	☑	☑	☑	☑	☑	☑	✓	✓	✓	✓