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California Standards - Eighth Grade Mathematics	**Math Word Problems**
ALGEBRA I	
1.0 Students identify & use the arithmetic properties of subsets of integers & rational, irrational,	✓
& real numbers, including closure properties for the four basic arithmetic operations where applicable	
2.0 Students understand & use such operations as taking the opposite, finding the reciprocal, taking a root,	
& raising to a fractional power. They understand & use the rules of exponents	
3.0 Students solve equations and inequalities involving absolute values	✓
4.0 Students simplify expressions before solving linear equations & inequalities in one variable	✓
5.0 Students solve multi-step problems, including word problems involving linear equations & linear	✓
inequalities in one variable & provide justification for each step	
6.0 Students graph a linear equation & compute the x- and y- intercepts They are also able to sketch	
the region defined by linear inequalities	
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	
8.0 Students understand the concepts of parallel lines & perpendicular lines & 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	
9.0 Students solve a system of two linear equations in two variables algebraically & are able to	
interpret the answer graphically. Students are able to solve a system of two linear	
inequalities in two variables & to sketch the solution sets	
10.0 Students add, subtract, multiply, & divide monomials & polynomials. Students	✓
solve multi-step problems, including word problems, by using these techniques	
11.0 Students apply basic factoring techniques to second- & simple third-degree polynomials.	

These techniques include finding a common factor for all terms in a polynomial, recognizing	
the difference of two squares, & recognizing perfect squares of binomials	
12.0 Students simplify fractions with polynomials in the numerator & denominator	
by factoring both and reducing them to the lowest terms	
13.0 Students add, subtract, multiply, & divide rational expressions & functions. Students solve	✓
both computationally and conceptually challenging problems by using these techniques	
14.0 Students solve a quadratic equation by factoring or completing the square	
15.0 Students apply algebraic techniques to solve rate problems, work problems	
& percent mixture problems	
16.0 Students understand the concepts of a relation & a function, determine whether a given	
relation defines a function, & give pertinent information about given relations & functions	
17.0 Students determine the domain of independent variables & the range of dependent	
variables defined by a graph, a set of ordered pairs, or a symbolic expression	
18.0 Students determine whether a relation defined by a graph, a set of ordered pairs,	
or a symbolic expression is a function & justify the conclusion	
19.0 Students know the quadratic formula & are familiar with its proof by completing the square	
20.0 Students use the quadratic formula to find the roots of a second-degree polynomial	
& to solve quadratic equations	
21.0 Students graph quadratic functions & know that their roots are the x-intercepts	
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	
23.0 Students apply quadratic equations to physical problems, such as the motion	
of an object under toe force of gravity	
24.0 Students use & know simple aspects of a logical argument	
25.0 Students use properties of the number system to judge the validity of results,	✓
to justify each step of a procedure, & to prove or disprove statements	

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GEOMETRY	
1.0 Students demonstrate understanding by identifying & giving examples of undefined	
terms, axioms, theorems, & inductive & deductive reasoning	
2.0 Students write geometric proofs, including proofs by contradiction	
3.0 Students construct & judge the validity of a logical argument & give counter	
examples to disprove a statement	
4.0 Students prove basic theorems involving congruence & similarity	
5.0 Students prove that triangles are congruent or similar, & they are able to use	
the concept of corresponding parts of congruent triangles	
6.0 Students know & are able to use the triangle inequality theorem	
7.0 Students prove & use theorems involving the properties of parallel lines cut by a	
transversal, the properties of quadrilaterals, & the properties of circles	
8.0 Students know, derive, & solve problems involving the perimeter, circumference,	
area, volume, lateral area, & surface area of common geometric figures	✓
9.0 Students compute the volumes & surface areas of prisms, pyramids, cylinders, cones,	
& spheres, & students commit to memory the formulas for prisms, pyramids, & cylinders	
10.0 Students compute areas of polygons, including rectangles, scalene triangles,	
equilateral triangles, rhombi, parallelograms, & trapezoids	
11.0 Students determine how changes in dimensions affect the perimeter, area,	
& volume of common geometric figures & solids	
12.0 Students find & use measures of sides & of interior & exterior angles of triangles	
& polygons to classify figures & solve problems	
13.0 Students prove relationships between angles in polygons by using properties	
of complementary, supplementary, vertical, & exterior angles	
14.0 Students prove the Pythagorean theorem	
15.0 Students use the Pythagorean theorem to determine distance & find missing	

lengths of sides of right triangles	
16.0 Students perform basic constructions with a straightedge & compass, such as angle	
bisectors, perpendicular bisectors, & the line parallel to given line through a point off the line	
17.0 Students prove theorems by using coordinate geometry, including the midpoint of a line	
segment, the distance formula, & various forms of equations of lines & circles	
18.0 Students know the definitions of the basic trigonometric functions defined by the angles	
of a right triangle. They also know & are able to use elementary relationships between them	
19.0 Students use trigonometric functions to solve for an unknown length of a side of a	
right triangle, given an angle & a length of a side	
20.0 Students know & are able to use angle & side relationships in problems with	
special right triangles, such as 30,degree, 60 degree, & 90 degree triangles and 45 degree,	
45 degree, and 90 degree triangles	
21.0 Students prove & solve problems regarding relationships among chords, secants,	
tangents, inscribed angles, & inscribed & circumscribed polygons of circles	
22.0 Students know the effect of rigid motions on figures in the coordinate plane & space,	
including rotations, translations, & reflections	
ALGEBRA II	
1.0 Students solve equation & inequalities involving absolute value	✓
2.0 Students solve systems of linear equations & inequalities by substitution,	
with graphs, or with matrices	
3.0 Students are adept at operations on polynomials, including long division	✓
4.0 Students factor polynomials representing the difference of squares, perfect square	
trinomials, & the sum & difference of two cubes	
5.0 Students demonstrate knowledge of how real & complex numbers are related both	
arithmetically & graphically. In particular, they can plot complex numbers as points in the plane	
6.0 Students add, subtract, multiply, and divide complex numbers	✓

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7.0 Students add, subtract, multiple, divide, reduce and evaluate rational expressions	✓
with monomial & polynomial denominators & simplify complicated rational expressions,	
including those with negative exponents in the denominator	
8.0 Students solve & graph quadratic equations by factoring, completing the square, or	
using the quadratic formula. Students apply these techniques in solving word problems.	
They also solve quadratic equations in the complex number system	
9.0 Students demonstrate & explain the effect that changing a coefficient has on the graph	
of quadratic functions' that is, students can determine how the graph of a parabola	
changes as a, b, and c vary in the equation y = a(x-b)2 +c	
10.0 Students graph quadratic functions & determine the maxima, & zero of the function	
11.0 Students prove simple laws of logarithms	
12.0 Students know the laws of fractional exponents, understand exponential functions,	
& use these functions in problems involving exponential growth & decay	
13.0 Students use the definition of logarithms to translate between logarithms in any base	
14.0 Students understand & use the properties of logarithms to simplify logarithmic	
numeric expressions & to identify their approximate values	
15.0 Students determine whether a specific algebraic statement involving rational expressions,	
radical expressions, or logarithmic or exponential functions is sometimes true,	
always true, or never true	
16.0 Students demonstrate & explain how the geometry of the graph of a conic section	
depends on the coefficients of the quadratic equation representing it	
17.0 Given a quadratic equation of the form $ax^2 + by^2 + cx + dy + e = 0$, students can	
use the method for completing the square to put the equation into standard form & can	
recognize whether the graph of the equation is a circle, ellipse, parabola, or hyperbola.	
Students can then graph the equation	
18.0 Students use fundamental counting principles to compute combinations & permutation	

19.0 Students use combinations & permutations to compute probabilities	
20.0 Students know the binomial theorem & use it to expand binomial expressions	
that are raised to positive integer powers	
21.0 Students apply the method of mathematical induction to prove general statements	
about the positive integers	
22.0 Students find the general term & the sums of arithmetic series & of both finite	
& infinite geometric series	
23.0 Students derive the summation formulas for arithmetic series & for both finite	
& infinite geometric series	
24.0 Students solve problems involving functional concepts, such as composition,	
defining the inverse function & performing arithmetic operations on functions	
25.0 Students use properties from number systems to justify steps in combining	
& simplifying functions	
PROBABILITY AND STATISTICS	
1.0 Students know the definition of the notion of independent events & can use the	
rules for addition, multiplication, & complementation to solve for probabilities	
of particular events in finite sample spaces	
2.0 Students know the definition of conditional probability and use it to solve for	
probabilities in finite sample spaces	
3.0 Students demonstrate an understanding of the notion of discrete random variables	
by using them to solve for the probabilities of outcomes, such as the probability of	
the occurrence of five heads of 14 coin tosses	
4.0 Students are familiar with the standard distributions (normal, binomial, & exponential)	
& can use them to solve for events in problems in which the distribution belongs to those families	
5.0 Students determine the mean & the standard deviation of a normally distributed random variable	
6.0 Students know the definitions of the mean, median, & mode of a distribution of data	

& can compute each in particular situations	
7.0 Students compute the variance & the standard deviation of a distribution of data	
8.0 Students organize & describe distributions of data by using a number of different methods,	
including frequency tables, histograms, standard line & bar graphs, stem-&-leaf displays,	
scatterplots, & box-&-whisker plots	