

Alignments of PSAT/NMSQT Skill Categories and State Standards

PSAT/NMSQT Skill Category and Description of Skills	California Math : Content Standards 1997		
	Course/ Level	Standard	Standard ID
Algebra and Functions Solve problems using algebraic expressions and symbols to represent relationships, patterns and functions of different types.	Algebra I	10.0 Students add, subtract, multiply, and divide monomials and polynomials. Students solve multistep problems, including word problems, by using these techniques.	AI.10.0
	Algebra I	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.	AI.11.0
	Algebra I	12.0 Students simplify fractions with polynomials in the numerator and denominator by factoring both and reducing them to the lowest terms.	AI.12.0
	Algebra I	13.0 Students add, subtract, multiply, and divide rational expressions and functions. Students solve both computationally and conceptually challenging problems by using these techniques.	AI.13.0
	Algebra I	14.0 Students solve a quadratic equation by factoring or completing the square.	AI.14.0
	Algebra I	15.0 Students apply algebraic techniques to solve rate problems, work problems, and percent mixture problems.	AI.15.0
	Algebra I	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.	AI.16.0
	Algebra I	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.	AI.17.0
	Algebra I	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.	AI.18.0
	Algebra I	19.0 Students know the quadratic formula and are familiar with its proof by completing the square.	AI.19.0
	Algebra I	20.0 Students use the quadratic formula to find the roots of a second-degree polynomial and to solve quadratic equations.	AI.20.0
	Algebra I	21.0 Students graph quadratic functions and know that their roots are the x-intercepts.	AI.21.0
Algebra I	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.	AI.22.0	

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	Course/ Level	Standard	Standard ID
Algebra and Functions Solve problems using algebraic expressions and symbols to represent relationships, patterns and functions of different types.	Algebra I	23.0 Students apply quadratic equations to physical problems, such as the motion of an object under the force of gravity.	AI.23.0
	Algebra I	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.	AI.24.1
	Algebra I	24.0 Students use and know simple aspects of a logical argument: 24.3 Students use counterexamples to show that an assertion is false and recognize that a single counterexample is sufficient to refute an assertion.	AI.24.3
	Algebra I	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: 25.1 Students use properties of numbers to construct simple, valid arguments (direct and indirect) for, or formulate counterexamples to, claimed assertions.	AI.25.1
	Algebra I	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: 25.3 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.	AI.25.3
	Algebra I	3.0 Students solve equations and inequalities involving absolute values.	AI.3.0
	Algebra I	4.0 Students simplify expressions before solving linear equations and inequalities in one variable, such as $3(2x - 5) + 4(x - 2) = 12$.	AI.4.0
	Algebra I	5.0 Students solve multistep problems, including word problems, involving linear equations and linear inequalities in one variable and provide justification for each step.	AI.5.0
	Algebra I	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 $2x + 6y < 4$).	AI.6.0

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Algebra and Functions Solve problems using algebraic expressions and symbols to represent relationships, patterns and functions of different types.	Algebra I	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.	AI.7.0
	Algebra I	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.	AI.8.0
	Algebra I	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.	AI.9.0
	Algebra II	1.0 Students solve equations and inequalities involving absolute value.	AII.1.0
	Algebra II	10.0 Students graph quadratic functions and determine the maxima, minima, and zeros of the function.	AII.10.0
	Algebra II	11.0 Students prove simple laws of logarithms.	AII.11.2
		11.2 Students judge the validity of an argument according to whether the properties of real numbers, exponents, and logarithms have been applied correctly at each step.	
	Algebra II	12.0 Students know the laws of fractional exponents, understand exponential functions, and use these functions in problems involving exponential growth and decay.	AII.12.0
	Algebra II	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.	AII.15.0
	Algebra II	16.0 Students demonstrate and explain how the geometry of the graph of a conic section (e.g., asymptotes, foci, eccentricity) depends on the coefficients of the quadratic equation representing it.	AII.16.0
Algebra II	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 and can recognize whether the graph of the equation is a circle, ellipse, parabola, or hyperbola. Students can then graph the equation.	AII.17.0	
Algebra II	2.0 Students solve systems of linear equations and inequalities (in two or three variables) by substitution, with graphs, or with matrices.	AII.2.0	

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	Course/ Level	Standard	Standard ID
Algebra and Functions Solve problems using algebraic expressions and symbols to represent relationships, patterns and functions of different types.	Algebra II	21.0 Students apply the method of mathematical induction to prove general statements about the positive integers.	All.21.0
	Algebra II	22.0 Students find the general term and the sums of arithmetic series and of both finite and infinite geometric series.	All.22.0
	Algebra II	23.0 Students derive the summation formulas for arithmetic series and for both finite and infinite geometric series.	All.23.0
	Algebra II	24.0 Students solve problems involving functional concepts, such as composition, defining the inverse function and performing arithmetic operations on functions.	All.24.0
	Algebra II	25.0 Students use properties from number systems to justify steps in combining and simplifying functions.	All.25.0
	Algebra II	3.0 Students are adept at operations on polynomials, including long division.	All.3.0
	Algebra II	4.0 Students factor polynomials representing the difference of squares, perfect square trinomials, and the sum and difference of two cubes.	All.4.0
	Algebra II	7.0 Students add, subtract, multiply, divide, reduce, and evaluate rational expressions with monomial and polynomial denominators and simplify complicated rational expressions, including those with negative exponents in the denominator.	All.7.0
	Algebra II	8.0 Students solve and 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.	All.8.0
Algebra II	9.0 Students demonstrate and 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 $y = a(x - b)^2 + c$.	All.9.0	
Communication Express mathematical ideas precisely and communicate them coherently and clearly in the language and notation of mathematics.	Algebra I	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.	AI.16.0
	Algebra I	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.	AI.18.0

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Communication Express mathematical ideas precisely and communicate them coherently and clearly in the language and notation of mathematics.	Algebra II	16.0 Students demonstrate and explain how the geometry of the graph of a conic section (e.g., asymptotes, foci, eccentricity) depends on the coefficients of the quadratic equation representing it.	All.16.0
	Geometry	1.0 Students demonstrate understanding by identifying and giving examples of undefined terms, axioms, theorems, and inductive and deductive reasoning.	G.1.0
	Geometry	6.0 Students know and are able to use the triangle inequality theorem.	G.6.0
	Probability and Statistics	1.0 Students know the definition of the notion of independent events and can use the rules for addition, multiplication, and complementation to solve for probabilities of particular events in finite sample spaces.	PS.1.0
	Probability and Statistics	2.0 Students know the definition of conditional probability and use it to solve for probabilities in finite sample spaces.	PS.2.0
	Probability and Statistics	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 in 14 coin tosses.	PS.3.0
	Probability and Statistics	6.0 Students know the definitions of the mean, median, and mode of a distribution of data and can compute each in particular situations.	PS.6.0
Connections Connect ideas from different areas of mathematics (particularly geometry and algebra) to state or solve abstract or applied problems.	Algebra I	21.0 Students graph quadratic functions and know that their roots are the x-intercepts.	AI.21.0
	Algebra I	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.	AI.22.0
	Algebra I	23.0 Students apply quadratic equations to physical problems, such as the motion of an object under the force of gravity.	AI.23.0
	Algebra I	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.	AI.8.0
	Algebra I	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.	AI.9.0

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	Course/ Level	Standard	Standard ID
Connections Connect ideas from different areas of mathematics (particularly geometry and algebra) to state or solve abstract or applied problems.	Algebra II	8.0 Students solve and 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.	All.8.0
	Algebra II	9.0 Students demonstrate and 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 $y = a(x - b)^2 + c$.	All.9.0
	Geometry	22.0 Students know the effect of rigid motions on figures in the coordinate plane and space, including rotations, translations, and reflections.	G.22.0
Data, Statistics, and Probability Analyze data, understand descriptive statistics, make inferences and determine the likelihood that certain events will occur.	Algebra II	18.0 Students use fundamental counting principles to compute combinations and permutations.	All.18.0
	Algebra II	19.0 Students use combinations and permutations to compute probabilities.	All.19.0
	Probability and Statistics	1.0 Students know the definition of the notion of independent events and can use the rules for addition, multiplication, and complementation to solve for probabilities of particular events in finite sample spaces.	PS.1.0
	Probability and Statistics	2.0 Students know the definition of conditional probability and use it to solve for probabilities in finite sample spaces.	PS.2.0
	Probability and Statistics	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 in 14 coin tosses.	PS.3.0
	Probability and Statistics	4.0 Students are familiar with the standard distributions (normal, binomial, and exponential) and can use them to solve for events in problems in which the distribution belongs to those families.	PS.4.0
	Probability and Statistics	5.0 Students determine the mean and the standard deviation of a normally distributed random variable.	PS.5.0
	Probability and Statistics	6.0 Students know the definitions of the mean, median, and mode of a distribution of data and can compute each in particular situations.	PS.6.0
Probability and Statistics	8.0 Students organize and describe distributions of data by using a number of different methods, including frequency tables, histograms, standard line and bar graphs, stem-and-leaf displays, scatterplots, and box-and-whisker plots.	PS.8.0	

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Geometry and Measurement Solve problems based on understanding the properties of shapes, such as triangles and circles, and the spatial relationships between angles and lines.	Algebra I	24.0 Students use and know simple aspects of a logical argument:	AI.24.2
		24.2 Students identify the hypothesis and conclusion in logical deduction.	
	Geometry	1.0 Students demonstrate understanding by identifying and giving examples of undefined terms, axioms, theorems, and inductive and deductive reasoning.	G.1.0
	Geometry	10.0 Students compute areas of polygons, including rectangles, scalene triangles, equilateral triangles, rhombi, parallelograms, and trapezoids.	G.10.0
	Geometry	11.0 Students determine how changes in dimensions affect the perimeter, area, and volume of common geometric figures and solids.	G.11.0
	Geometry	12.0 Students find and use measures of sides and of interior and exterior angles of triangles and polygons to classify figures and solve problems.	G.12.0
	Geometry	13.0 Students prove relationships between angles in polygons by using properties of complementary, supplementary, vertical, and exterior angles.	G.13.0
	Geometry	14.0 Students prove the Pythagorean theorem.	G.14.0
	Geometry	15.0 Students use the Pythagorean theorem to determine distance and find missing lengths of sides of right triangles.	G.15.0
	Geometry	16.0 Students perform basic constructions with a straightedge and compass, such as angle bisectors, perpendicular bisectors, and the line parallel to a given line through a point off the line.	G.16.0
	Geometry	17.0 Students prove theorems by using coordinate geometry, including the midpoint of a line segment, the distance formula, and various forms of equations of lines and circles.	G.17.0
	Geometry	2.0 Students write geometric proofs, including proofs by contradiction.	G.2.0
	Geometry	20.0 Students know and are able to use angle and side relationships in problems with special right triangles, such as 30°, 60°, and 90° triangles and 45°, 45°, and 90° triangles.	G.20.0
	Geometry	21.0 Students prove and solve problems regarding relationships among chords, secants, tangents, inscribed angles, and inscribed and circumscribed polygons of circles.	G.21.0

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Geometry and Measurement Solve problems based on understanding the properties of shapes, such as triangles and circles, and the spatial relationships between angles and lines.	Geometry	22.0 Students know the effect of rigid motions on figures in the coordinate plane and space, including rotations, translations, and reflections.	G.22.0
	Geometry	3.0 Students construct and judge the validity of a logical argument and give counterexamples to disprove a statement.	G.3.0
	Geometry	4.0 Students prove basic theorems involving congruence and similarity.	G.4.0
	Geometry	5.0 Students prove that triangles are congruent or similar, and they are able to use the concept of corresponding parts of congruent triangles.	G.5.0
	Geometry	6.0 Students know and are able to use the triangle inequality theorem.	G.6.0
	Geometry	7.0 Students prove and use theorems involving the properties of parallel lines cut by a transversal, the properties of quadrilaterals, and the properties of circles.	G.7.0
	Geometry	8.0 Students know, derive, and solve problems involving the perimeter, circumference, area, volume, lateral area, and surface area of common geometric figures.	G.8.0
	Geometry	9.0 Students compute the volumes and surface areas of prisms, pyramids, cylinders, cones, and spheres; and students commit to memory the formulas for prisms, pyramids, and cylinders.	G.9.0
Number and Operations Understand types of numbers (integers, fractions, decimals), their properties and the correct order of operations (addition, multiplication, division). Perform computations correctly.	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:	AI.1.1
		1.1 Students use properties of numbers to demonstrate whether assertions are true or false.	
	Algebra I	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.	AI.2.0
	Algebra I	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:	AI.25.2
		25.2 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.	

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	Course/ Level	Standard	Standard ID
Problem Solving Solve abstract and practical problems, applying and adapting a variety of strategies. Monitor progress and evaluate answers in terms of questions asked.	Algebra I	10.0 Students add, subtract, multiply, and divide monomials and polynomials. Students solve multistep problems, including word problems, by using these techniques.	AI.10.0
	Algebra I	13.0 Students add, subtract, multiply, and divide rational expressions and functions. Students solve both computationally and conceptually challenging problems by using these techniques.	AI.13.0
	Algebra I	14.0 Students solve a quadratic equation by factoring or completing the square.	AI.14.0
	Algebra I	15.0 Students apply algebraic techniques to solve rate problems, work problems, and percent mixture problems.	AI.15.0
	Algebra I	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.	AI.17.0
	Algebra I	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.	AI.2.0
	Algebra I	20.0 Students use the quadratic formula to find the roots of a second-degree polynomial and to solve quadratic equations.	AI.20.0
	Algebra I	3.0 Students solve equations and inequalities involving absolute values.	AI.3.0
	Algebra I	5.0 Students solve multistep problems, including word problems, involving linear equations and linear inequalities in one variable and provide justification for each step.	AI.5.0
	Algebra II	1.0 Students solve equations and inequalities involving absolute value.	AII.1.0
	Algebra II	12.0 Students know the laws of fractional exponents, understand exponential functions, and use these functions in problems involving exponential growth and decay.	AII.12.0
	Algebra II	18.0 Students use fundamental counting principles to compute combinations and permutations.	AII.18.0
	Algebra II	19.0 Students use combinations and permutations to compute probabilities.	AII.19.0
Algebra II	2.0 Students solve systems of linear equations and inequalities (in two or three variables) by substitution, with graphs, or with matrices.	AII.2.0	

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	Course/ Level	Standard	Standard ID
Problem Solving Solve abstract and practical problems, applying and adapting a variety of strategies. Monitor progress and evaluate answers in terms of questions asked.	Algebra II	22.0 Students find the general term and the sums of arithmetic series and of both finite and infinite geometric series.	All.22.0
	Algebra II	24.0 Students solve problems involving functional concepts, such as composition, defining the inverse function and performing arithmetic operations on functions.	All.24.0
	Algebra II	3.0 Students are adept at operations on polynomials, including long division.	All.3.0
	Algebra II	7.0 Students add, subtract, multiply, divide, reduce, and evaluate rational expressions with monomial and polynomial denominators and simplify complicated rational expressions, including those with negative exponents in the denominator.	All.7.0
	Geometry	10.0 Students compute areas of polygons, including rectangles, scalene triangles, equilateral triangles, rhombi, parallelograms, and trapezoids.	G.10.0
	Geometry	12.0 Students find and use measures of sides and of interior and exterior angles of triangles and polygons to classify figures and solve problems.	G.12.0
	Geometry	15.0 Students use the Pythagorean theorem to determine distance and find missing lengths of sides of right triangles.	G.15.0
	Geometry	20.0 Students know and are able to use angle and side relationships in problems with special right triangles, such as 30°, 60°, and 90° triangles and 45°, 45°, and 90° triangles.	G.20.0
	Geometry	21.0 Students prove and solve problems regarding relationships among chords, secants, tangents, inscribed angles, and inscribed and circumscribed polygons of circles.	G.21.0
	Geometry	8.0 Students know, derive, and solve problems involving the perimeter, circumference, area, volume, lateral area, and surface area of common geometric figures.	G.8.0
	Geometry	9.0 Students compute the volumes and surface areas of prisms, pyramids, cylinders, cones, and spheres; and students commit to memory the formulas for prisms, pyramids, and cylinders.	G.9.0
	Probability and Statistics	4.0 Students are familiar with the standard distributions (normal, binomial, and exponential) and can use them to solve for events in problems in which the distribution belongs to those families.	PS.4.0
	Probability and Statistics	5.0 Students determine the mean and the standard deviation of a normally distributed random variable.	PS.5.0

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	Course/ Level	Standard	Standard ID
Reasoning Develop and use mathematical arguments and proofs to explore the truth of conjectures and justify conclusions.	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.	AI.1.1
	Algebra I	19.0 Students know the quadratic formula and are familiar with its proof by completing the square.	AI.19.0
	Algebra I	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.	AI.24.1
	Algebra I	24.0 Students use and know simple aspects of a logical argument: 24.2 Students identify the hypothesis and conclusion in logical deduction.	AI.24.2
	Algebra I	24.0 Students use and know simple aspects of a logical argument: 24.3 Students use counterexamples to show that an assertion is false and recognize that a single counterexample is sufficient to refute an assertion.	AI.24.3
	Algebra I	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: 25.1 Students use properties of numbers to construct simple, valid arguments (direct and indirect) for, or formulate counterexamples to, claimed assertions.	AI.25.1
	Algebra I	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: 25.2 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.	AI.25.2

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Reasoning Develop and use mathematical arguments and proofs to explore the truth of conjectures and justify conclusions.	Algebra I	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:	AI.25.3
		25.3 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.	
	Algebra I	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.	AI.7.0
	Algebra II	11.0 Students prove simple laws of logarithms.	All.11.2
		11.2 Students judge the validity of an argument according to whether the properties of real numbers, exponents, and logarithms have been applied correctly at each step.	
	Algebra II	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.	All.15.0
	Algebra II	21.0 Students apply the method of mathematical induction to prove general statements about the positive integers.	All.21.0
	Algebra II	23.0 Students derive the summation formulas for arithmetic series and for both finite and infinite geometric series.	All.23.0
	Algebra II	25.0 Students use properties from number systems to justify steps in combining and simplifying functions.	All.25.0
	Geometry	11.0 Students determine how changes in dimensions affect the perimeter, area, and volume of common geometric figures and solids.	G.11.0
	Geometry	13.0 Students prove relationships between angles in polygons by using properties of complementary, supplementary, vertical, and exterior angles.	G.13.0
	Geometry	14.0 Students prove the Pythagorean theorem.	G.14.0
	Geometry	17.0 Students prove theorems by using coordinate geometry, including the midpoint of a line segment, the distance formula, and various forms of equations of lines and circles.	G.17.0

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Reasoning Develop and use mathematical arguments and proofs to explore the truth of conjectures and justify conclusions.	Geometry	2.0 Students write geometric proofs, including proofs by contradiction.	G.2.0
	Geometry	3.0 Students construct and judge the validity of a logical argument and give counterexamples to disprove a statement.	G.3.0
	Geometry	4.0 Students prove basic theorems involving congruence and similarity.	G.4.0
	Geometry	5.0 Students prove that triangles are congruent or similar, and they are able to use the concept of corresponding parts of congruent triangles.	G.5.0
	Geometry	7.0 Students prove and use theorems involving the properties of parallel lines cut by a transversal, the properties of quadrilaterals, and the properties of circles.	G.7.0
Representation Use and translate among representations including verbal, numerical, symbolic and graphical to communicate mathematical ideas and solve problems.	Algebra I	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.	AI.11.0
	Algebra I	12.0 Students simplify fractions with polynomials in the numerator and denominator by factoring both and reducing them to the lowest terms.	AI.12.0
	Algebra I	4.0 Students simplify expressions before solving linear equations and inequalities in one variable, such as $3(2x - 5) + 4(x - 2) = 12$.	AI.4.0
	Algebra I	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 $2x + 6y < 4$).	AI.6.0
	Algebra II	10.0 Students graph quadratic functions and determine the maxima, minima, and zeros of the function.	All.10.0
	Algebra II	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 and can recognize whether the graph of the equation is a circle, ellipse, parabola, or hyperbola. Students can then graph the equation.	All.17.0
	Algebra II	4.0 Students factor polynomials representing the difference of squares, perfect square trinomials, and the sum and difference of two cubes.	All.4.0
	Geometry	16.0 Students perform basic constructions with a straightedge and compass, such as angle bisectors, perpendicular bisectors, and the line parallel to a given line through a point off the line.	G.16.0

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<p>Representation</p> <p>Use and translate among representations including verbal, numerical, symbolic and graphical to communicate mathematical ideas and solve problems.</p>	Probability and Statistics	8.0 Students organize and describe distributions of data by using a number of different methods, including frequency tables, histograms, standard line and bar graphs, stem-and-leaf displays, scatterplots, and box-and-whisker plots.	PS.8.0

PSAT/NMSQT Skills Insight™ Alignment to State Standards

Executive Summary, July 2010

Purpose

PSAT/NMSQT *Skills Insight*™ is a free online tool designed to help students and educators gain a better understanding of how PSAT/NMSQT® scores relate to specific academic skills. It provides a description of the academic skills that are typical of students scoring at each score band, suggestions for improvement, and practice test questions. Learn more by visiting www.collegeboard.com/psatskills.

The information provided by PSAT/NMSQT *Skills Insight* is organized by skill category. There are five skill categories for the critical reading section, nine for the mathematics section (4 content skill categories; 5 process skill categories), and 5 for the writing skills section. This report shows the alignment between state standards in English Language Arts and Mathematics and the content and skills measured by the PSAT/NMSQT.

Using Alignment Results with PSAT/NMSQT Reports

Schools and districts that administer the PSAT/NMSQT have access to the *Summary of Answers and Skills* (SOAS) report¹. SOAS reports summarize performance on test sections, skill categories, and individual test questions, and compare local results to the state or nation. Using SOAS and the alignment information provided in this report, schools and districts can develop remediation strategies to help students improve their college readiness skills, future SAT scores, and performance on state assessments.

Mathematics: Alignment Approach and Findings

- There are nine Skills Categories in Mathematics, representing both content and process skills: *Number and Operations; Algebra and Functions; Geometry and Measurement; Data, Statistics and Probability; Problem Solving; Representation; Reasoning; Connections and Communication*.
- Only standards for grades 9-12 were considered for these alignments. Within grades 9-12, the areas with the greatest concentration of alignments are the Number and Operations, Algebra and Geometry strands of the state standards. In most cases, Precalculus and Trigonometry were excluded from the alignment study.
- The organization and hierarchy of standards varies on a state-by-state basis. During the alignment process, the College Board aligned the PSAT/NMSQT skills to the most specific level of the state's standards.
- States often integrate process and content standards. In such cases, the state standard received an alignment to both a process skill category and a content skill category.
- Generally, there is strong correspondence between the PSAT/NMSQT Skills Categories in Mathematics and state standards. Coverage of the Skills Categories across a state standards document is dependent upon the specific state standards and on the degree of specificity of language employed within the standards.
- The PSAT/NMSQT is administered to students in grades 10 and 11; consequently, the strongest areas of alignment are in the content categories of *Number and Operations, Algebra and Functions* and *Geometry and Measurement* and in the process categories of *Problem Solving, Reasoning* and *Representations*. Considering the design and purpose of the PSAT/NMSQT, extensive alignments in upper levels of high school mathematics standards, including Trigonometry, are not intended or expected.

¹ Using the access code printed on the PSAT/NMSQT *Roster of Student Scores and Plans*, SOAS reports can be downloaded from www.collegeboard.com/reports beginning in the first week of January.

- The College Board content specialists who conducted the alignments have a deep understanding of the PSAT/NMSQT test specifications. Therefore, although multiple Skills Categories might link to a particular standard, these alignments display only the strongest and most appropriate matches.

English Language Arts: Alignment Approach and Findings

- Reading and Writing each have five PSAT/NMSQT Skills Categories. In Reading, the categories are *Determining the Meaning of Words*, *Author’s Craft*, *Reasoning and Inferencing*, *Organization and Ideas* and *Understanding Literary Elements*. In Writing, the categories are *Manage Word Choice and Grammatical Relationships Between Words*, *Manage Grammatical Structures Used to Modify or Compare*, *Manage Phrases and Clauses in a Sentence*; *Recognize Correctly Formed Sentences* and *Manage Order and Relationships of Sentences and Paragraphs*.
- The PSAT/NMSQT is administered to students in grades 10 and 11, and the College Board targeted the English Language Arts alignments at these specific grade levels. In states where the standards are organized by grade band (grades 9-10, 11-12) or by one high school band (grades 9-12), the College Board aligned to all high school grade levels.
- Given the purpose and design of the PSAT/NMSQT, the English Language Arts alignment is focused on the areas of reading and writing and does not include state standards in speaking, listening, or media literacy. Additionally, these alignments excluded genre-specific state standards (such as those related to American, British, or World literature), although the essential PSAT/NMSQT skills in Reading can be used to support instruction in literature.
- The organization and hierarchy of standards varies on a state-by-state basis. During the alignment process, the College Board aligned the PSAT/NMSQT skills to the most specific level of the state’s standards. Coverage of the Skills Categories across a state standards document is dependent upon the specific state standards and on the degree of specificity of language employed within the standards.
- In Writing, generally there is strong correspondence between the PSAT/NMSQT Skills Categories and state standards that focus on grammar, usage, language conventions, and the role of editing and revising in writing.
- In Reading, there is strong correspondence between the PSAT/NMSQT Skills Categories and state standards in the essential areas of vocabulary development (determine the meaning of unfamiliar words or of words with multiple meanings by understanding context and by analyzing roots, prefixes, and suffixes) and reading comprehension (determine the main idea and supporting details; understand the organization of passages; analyze the various elements of an author’s craft, including purpose, perspective, word choice, and use of rhetorical and literary devices and understand literary elements such as plot, characterization, and setting).

Summary

In summary, the PSAT/NMSQT Skills Categories correspond well to state standards. Educators can use these alignments to connect the PSAT/NMSQT to their local curricula and state standards to monitor student learning and to build a coherent instructional plan for their students.