

Alignments of PSAT/NMSQT Skill Categories and State Standards

PSAT/NMSQT Skill Category and Description of Skills	Utah Math : Core Curriculum 2007 and Intended Learning Outcomes 2007		
	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 1	a. Write algebraic expressions or equations to generalize visual patterns, numerical patterns, relations, data sets, or scatter plots.	2.2.a
	Algebra 1	b. Represent linear equations in slope-intercept form, $y = mx + b$, and standard form, $Ax + By = C$.	2.2.b
	Algebra 1	c. Distinguish between linear and non-linear functions by examining a table, equation, or graph.	2.2.c
	Algebra 1	d. Interpret the slope of a linear function as a rate of change in real-world situations.	2.2.d
	Algebra 1	a. Write the equation of a line when given two points or the slope and a point on the line.	2.3.a
	Algebra 1	b. Approximate the equation of a line given the graph of a line.	2.3.b
	Algebra 1	c. Identify the x- and y-intercepts from an equation or graph of a line or a table of values.	2.3.c
	Algebra 1	d. Graph linear relations and inequalities by plotting points, by finding x- and y-intercepts, or by using the slope and any point on the line.	2.3.d
	Algebra 1	a. Simplify and evaluate monomial expressions and formulas.	3.1.a
	Algebra 1	b. Add and subtract polynomials.	3.1.b
	Algebra 1	c. Multiply monomials by a polynomial.	3.1.c
	Algebra 1	d. Multiply binomials.	3.1.d
	Algebra 1	e. Simplify the quotient of monomials using positive exponents.	3.1.e
	Algebra 1	a. Solve single-variable linear equations and inequalities algebraically and graphically.	3.2.a
	Algebra 1	b. Solve real-world problems involving constant rates of change.	3.2.b
	Algebra 1	c. Solve equations for a specified variable.	3.2.c
	Algebra 1	d. Solve proportions that include algebraic first-degree expressions.	3.2.d
	Algebra 1	a. Solve systems of two linear equations graphically and algebraically with and without technology.	3.3.a

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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 1	b. Determine the number of possible solutions for a system of two linear equations.	3.3.b
	Algebra 1	c. Graph a system of linear inequalities and identify the solution.	3.3.c
	Algebra 1	a. Find the greatest common monomial factor of a polynomial.	3.4.a
	Algebra 1	b. Factor trinomials with integer coefficients of the form $x^2 + bx + c$.	3.4.b
	Algebra 1	c. Factor the difference of two squares and perfect square trinomials.	3.4.c
	Algebra 1	a. Solve quadratic equations that can be simplified to the form $x^2 = a$ where a is greater than or equal to 0 by taking square roots.	3.5.a
	Algebra 1	b. Solve quadratic equations using factoring.	3.5.b
	Algebra 1	c. Write a quadratic equation when given the solutions.	3.5.c
	Algebra 2	a. Solve and graph first-degree absolute value equations of a single variable.	1.1.a
	Algebra 2	b. Solve radical equations of a single variable, including those with extraneous roots.	1.1.b
	Algebra 2	c. Solve absolute value and compound inequalities of a single variable.	1.1.c
	Algebra 2	d. Add, subtract, multiply, and divide rational expressions and solve rational equations.	1.1.d
	Algebra 2	e. Simplify algebraic expressions involving negative and rational exponents.	1.1.e
	Algebra 2	a. Solve systems of linear, absolute value, and quadratic equations algebraically and graphically.	1.2.a
	Algebra 2	b. Graph the solutions of systems of linear, absolute value, and quadratic inequalities on the coordinate plane.	1.2.b
	Algebra 2	c. Solve application problems involving systems of equations and inequalities.	1.2.c
	Algebra 2	a. Simplify numerical expressions, including those with rational exponents.	1.3.a
	Algebra 2	a. Model real-world situations using quadratic equations.	1.4.a

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Algebra and Functions Solve problems using algebraic expressions and symbols to represent relationships, patterns and functions of different types.	Algebra 2	b. Approximate the real solutions of quadratic equations graphically.	1.4.b
	Algebra 2	c. Solve quadratic equations of a single variable over the set of complex numbers by factoring, completing the square, and using the quadratic formula.	1.4.c
	Algebra 2	d. Solve quadratic inequalities of a single variable.	1.4.d
	Algebra 2	e. Write a quadratic equation when given the solutions of the equation.	1.4.e
	Algebra 2	a. Model real-world relationships with functions.	2.1.a
	Algebra 2	b. Describe a pattern using function notation.	2.1.b
	Algebra 2	c. Determine when a relation is a function.	2.1.c
	Algebra 2	d. Determine the domain and range of relations.	2.1.d
	Algebra 2	a. Find the value of a function at a given point.	2.2.a
	Algebra 2	b. Compose functions when possible.	2.2.b
	Algebra 2	c. Add, subtract, multiply, and divide functions.	2.2.c
	Algebra 2	d. Determine whether or not a function has an inverse, and find the inverse when it exists.	2.2.d
	Algebra 2	e. Identify the domain and range of a function resulting from the combination or composition of functions.	2.2.e
	Algebra 2	a. Define exponential functions as functions of the form $y = ab$ to the x power, $b > 0$, $b \neq 1$.	2.3.a
	Algebra 2	b. Model problems of growth and decay using exponential functions.	2.3.b
	Algebra 2	c. Graph exponential functions.	2.3.c
	Algebra 2	d. Solve exponential and logarithmic equations.	2.4.d
	Algebra 2	f. Solve problems involving growth and decay.	2.4.f

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Algebra and Functions Solve problems using algebraic expressions and symbols to represent relationships, patterns and functions of different types.	Geometry	b. Find the distance between two given points and find the coordinates of the midpoint.	2.1.b
	Geometry	c. Write an equation of a line perpendicular or a line parallel to a line through a given point.	2.1.c
	Geometry	a. Graph a circle given the equation in the form $(x - h)^2 + (y - k)^2 = r^2$, and write the equation when given the graph.	2.2.a
	Geometry	b. Determine whether points in a set are collinear.	2.2.b
Communication Express mathematical ideas precisely and communicate them coherently and clearly in the language and notation of mathematics.	Algebra 1	a. Define a rational number as a point on the number line that can be expressed as the ratio of two integers, and points that cannot be so expressed as irrational.	1.1.a
	Algebra 1	b. Classify numbers as rational or irrational, knowing that rational numbers can be expressed as terminating or repeating decimals and irrational numbers can be expressed as non-terminating, non-repeating decimals.	1.1.b
	Algebra 1	c. Classify pi and square roots of non-perfect square numbers as irrational.	1.1.c
	Algebra 1	a. Identify the slope of a line when given points, a graph, or an equation.	2.1.a
	Algebra 1	b. Identify horizontal and vertical lines given the equations or slopes.	2.1.b
	Algebra 1	c. Distinguish between linear and non-linear functions by examining a table, equation, or graph.	2.2.c
	Algebra 1	c. Identify the x- and y-intercepts from an equation or graph of a line or a table of values.	2.3.c
	Algebra 2	b. Describe a pattern using function notation.	2.1.b
	Algebra 2	e. Identify the domain and range of a function resulting from the combination or composition of functions.	2.2.e
	Algebra 2	a. Define exponential functions as functions of the form $y = ab$ to the x power, $b > 0$, $b \neq 1$.	2.3.a
Algebra 2	a. Identify the domain and range of the absolute value, quadratic, radical, sine, and cosine functions.	3.1.a	
Algebra 2	a. Distinguish between permutations and combinations and identify situations in which each is appropriate.	4.1.a	

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Communication Express mathematical ideas precisely and communicate them coherently and clearly in the language and notation of mathematics.	Algebra 2	d. Define simple discrete random variables.	4.1.d
	Algebra 2	c. Use percentiles to summarize the distribution of a numerical variable.	4.2.c
	Geometry	c. Classify angle pairs formed by two lines and a transversal.	1.2.c
	Geometry	a. Use examples and counterexamples to classify subsets of quadrilaterals.	1.4.a
	Geometry	a. Identify and classify prisms, pyramids, cylinders and cones based on the shape of their base(s).	1.6.a
	Geometry	c. Describe the symmetries of three-dimensional figures.	1.6.c
	Geometry	d. Describe relationships between the faces, edges, and vertices of polyhedra.	1.6.d
	Geometry	a. Verify the classifications of geometric figures using coordinate geometry to find lengths and slopes.	2.1.a
Connections Connect ideas from different areas of mathematics (particularly geometry and algebra) to state or solve abstract or applied problems.	Algebra 1	d. Interpret the slope of a linear function as a rate of change in real-world situations.	2.2.d
	Algebra 2	b. Graph the solutions of systems of linear, absolute value, and quadratic inequalities on the coordinate plane.	1.2.b
	Algebra 2	a. Model real-world relationships with functions.	2.1.a
	Grades: 7-12	5. Make connections between mathematical ideas, between mathematics and other disciplines, and to life.	5
Data, Statistics, and Probability Analyze data, understand descriptive statistics, make inferences and determine the likelihood that certain events will occur.	Algebra 1	a. Collect, record, organize, and display a set of data with at least two variables.	4.1.a
	Algebra 1	b. Determine whether the relationship between two variables is approximately linear or non-linear by examination of a scatter plot.	4.1.b
	Algebra 1	c. Characterize the relationship between two linear related variables as having positive, negative, or approximately zero correlation.	4.1.c
	Algebra 1	a. Estimate the equation of a line of best fit to make and test conjectures.	4.2.a

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Data, Statistics, and Probability Analyze data, understand descriptive statistics, make inferences and determine the likelihood that certain events will occur	Algebra 1	b. Interpret the slope and y-intercept of a line through data.	4.2.b
	Algebra 1	c. Predict y-values for given x-values when appropriate using a line fitted to bivariate numerical data.	4.2.c
	Algebra 2	a. Distinguish between permutations and combinations and identify situations in which each is appropriate.	4.1.a
	Algebra 2	b. Calculate probabilities using permutations and combinations to count events.	4.1.b
	Algebra 2	c. Compute conditional and unconditional probabilities in various ways, including by definitions, the general multiplication rule, and probability trees.	4.1.c
	Algebra 2	d. Define simple discrete random variables.	4.1.d
	Algebra 2	a. Compute different measures of spread, including the range, standard deviation, and interquartile range.	4.2.a
	Algebra 2	b. Compare the effectiveness of different measures of spread, including the range, standard deviation, and interquartile range in specific situations.	4.2.b
	Algebra 2	c. Use percentiles to summarize the distribution of a numerical variable.	4.2.c
	Algebra 2	d. Use histograms to obtain percentiles.	4.2.d
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 1	d. Calculate the measures of the sides of a right triangle using the Pythagorean Theorem.	1.2.d
	Algebra 1	a. Identify the slope of a line when given points, a graph, or an equation.	2.1.a
	Algebra 1	b. Identify horizontal and vertical lines given the equations or slopes.	2.1.b
	Algebra 1	c. Determine the effect of changes in slope or y-intercept in $y = mx + b$.	2.1.c
	Algebra 1	d. Determine and explain the meaning of slopes and intercepts using real-world examples.	2.1.d

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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 2	a. Identify the domain and range of the absolute value, quadratic, radical, sine, and cosine functions.	3.1.a
	Algebra 2	b. Graph the absolute value, quadratic, radical, sine, and cosine functions.	3.1.b
	Algebra 2	c. Graph functions using transformations of parent functions.	3.1.c
	Algebra 2	d. Write an equation of a parabola in the form $y = a(x - h)^2 + k$ when given a graph or an equation..	3.1.d
	Algebra 2	a. Convert angle measurements between radians and degrees.	3.2.a
	Algebra 2	c. Find the length of an arc using radian measure.	3.3.c
	Algebra 2	d. Find the area of a sector in a circle using radian measure.	3.3.d
	Geometry	a. Write conditional statements, converses, and inverses, and determine the truth value of these statements.	1.1.a
	Geometry	b. Formulate conjectures using inductive reasoning.	1.1.b
	Geometry	c. Prove a statement false by using a counterexample.	1.1.c
	Geometry	a. Use accepted geometric notation for lines, segments, rays, angles, similarity, and congruence.	1.2.a
	Geometry	b. Identify and determine relationships in adjacent, complementary, supplementary, or vertical angles and linear pairs.	1.2.b
	Geometry	c. Classify angle pairs formed by two lines and a transversal.	1.2.c
	Geometry	d. Prove relationships in angle pairs.	1.2.d
	Geometry	e. Prove lines parallel or perpendicular using slope or angle relationships.	1.2.e
	Geometry	a. Prove congruency and similarity of triangles using postulates and theorems.	1.3.a

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<p>Geometry and Measurement</p> <p>Solve problems based on understanding the properties of shapes, such as triangles and circles, and the spatial relationships between angles and lines.</p>	Geometry	b. Prove the Pythagorean Theorem in multiple ways, find missing sides of right triangles using the Pythagorean Theorem, and determine whether a triangle is a right triangle using the converse of the Pythagorean Theorem.	1.3.b
	Geometry	c. Prove and apply theorems involving isosceles triangles.	1.3.c
	Geometry	d. Apply triangle inequality theorems.	1.3.d
	Geometry	e. Identify medians, altitudes, and angle bisectors of a triangle, and the perpendicular bisectors of the sides of a triangle, and justify the concurrency theorems.	1.3.e
	Geometry	a. Use examples and counterexamples to classify subsets of quadrilaterals.	1.4.a
	Geometry	b. Prove properties of quadrilaterals using triangle congruence relationships, postulates, and theorems.	1.4.b
	Geometry	c. Derive, justify, and use formulas for the number of diagonals, lines of symmetry, angle measures, perimeter, and area of regular polygons.	1.4.c
	Geometry	d. Define radius, diameter, chord, secant, arc, sector, central angle, inscribed angle, and tangent of a circle, and solve problems using their properties.	1.4.d
	Geometry	e. Show the relationship between intercepted arcs and inscribed or central angles, and find their measures.	1.4.e
	Geometry	a. Investigate geometric relationships using constructions.	1.5.a
	Geometry	b. Copy and bisect angles and segments.	1.5.b
	Geometry	c. Construct perpendicular and parallel lines.	1.5.c
	Geometry	d. Justify procedures used to construct geometric figures.	1.5.d
	Geometry	e. Discover and investigate conjectures about geometric properties using constructions.	1.5.e
	Geometry	a. Identify and classify prisms, pyramids, cylinders and cones based on the shape of their base(s).	1.6.a

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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	b. Identify three-dimensional objects from different perspectives using nets, cross-sections, and two-dimensional views.	1.6.b
	Geometry	c. Describe the symmetries of three-dimensional figures.	1.6.c
	Geometry	d. Describe relationships between the faces, edges, and vertices of polyhedra.	1.6.d
	Geometry	a. Verify the classifications of geometric figures using coordinate geometry to find lengths and slopes.	2.1.a
	Geometry	a. Solve problems using the properties of special right triangles, e.g., 30°, 60°, 90° or 45°, 45°, 90°.	3.1.a
	Geometry	a. Find linear and angle measures in real-world situations using appropriate tools or technology.	4.1.a
	Geometry	b. Develop surface area and volume formulas for polyhedra, cones, and cylinders.	4.1.b
	Geometry	c. Determine perimeter, area, surface area, lateral area, and volume for prisms, cylinders, pyramids, cones, and spheres when given the formulas.	4.1.c
	Geometry	d. Calculate or estimate the area of an irregular region.	4.1.d
	Geometry	e. Find the length of an arc and the area of a sector when given the angle measure and radius.	4.1.e
	Geometry	a. Solve problems using the Pythagorean Theorem and its converse.	4.2.a
	Geometry	b. Solve problems using the distance formula.	4.2.b
	Geometry	d. Solve problems involving geometric probability.	4.2.d
	Number and Operations Understand types of numbers (integers, fractions, decimals), their properties and the correct order of operations. Perform computations correctly.	Algebra 1	a. Define a rational number as a point on the number line that can be expressed as the ratio of two integers, and points that cannot be so expressed as irrational.
Algebra 1		b. Classify numbers as rational or irrational, knowing that rational numbers can be expressed as terminating or repeating decimals and irrational numbers can be expressed as non-terminating, non-repeating decimals.	1.1.b

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Number and Operations Understand types of numbers (integers, fractions, decimals), their properties and the correct order of operations. Perform computations correctly.	Algebra 1	c. Classify pi and square roots of non-perfect square numbers as irrational.	1.1.c
	Algebra 1	d. Place rational and irrational numbers on a number line between two integers.	1.1.d
	Algebra 1	a. Simplify, add, subtract, multiply, and divide expressions with square roots.	1.2.a
	Algebra 1	b. Evaluate and simplify numerical expressions containing rational numbers and square roots using the order of operations.	1.2.b
	Algebra 1	c. Compute solutions to problems, represent answers in exact form, and determine the reasonableness of answers.	1.2.c
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 1	a. Simplify, add, subtract, multiply, and divide expressions with square roots.	1.2.a
	Algebra 1	b. Evaluate and simplify numerical expressions containing rational numbers and square roots using the order of operations.	1.2.b
	Algebra 1	c. Compute solutions to problems, represent answers in exact form, and determine the reasonableness of answers.	1.2.c
	Algebra 1	d. Calculate the measures of the sides of a right triangle using the Pythagorean Theorem.	1.2.d
	Algebra 1	c. Determine the effect of changes in slope or y-intercept in $y = mx + b$.	2.1.c
	Algebra 1	b. Approximate the equation of a line given the graph of a line.	2.3.b
	Algebra 1	d. Graph linear relations and inequalities by plotting points, by finding x- and y-intercepts, or by using the slope and any point on the line.	2.3.d
	Algebra 1	a. Simplify and evaluate monomial expressions and formulas.	3.1.a
	Algebra 1	b. Add and subtract polynomials.	3.1.b
	Algebra 1	c. Multiply monomials by a polynomial.	3.1.c

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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 1	d. Multiply binomials.	3.1.d
	Algebra 1	e. Simplify the quotient of monomials using positive exponents.	3.1.e
	Algebra 1	a. Solve single-variable linear equations and inequalities algebraically and graphically.	3.2.a
	Algebra 1	b. Solve real-world problems involving constant rates of change.	3.2.b
	Algebra 1	c. Solve equations for a specified variable.	3.2.c
	Algebra 1	d. Solve proportions that include algebraic first-degree expressions.	3.2.d
	Algebra 1	a. Solve systems of two linear equations graphically and algebraically with and without technology.	3.3.a
	Algebra 1	b. Determine the number of possible solutions for a system of two linear equations.	3.3.b
	Algebra 1	a. Find the greatest common monomial factor of a polynomial.	3.4.a
	Algebra 1	b. Factor trinomials with integer coefficients of the form $x^2 + bx + c$.	3.4.b
	Algebra 1	c. Factor the difference of two squares and perfect square trinomials.	3.4.c
	Algebra 1	a. Solve quadratic equations that can be simplified to the form $x^2 = a$ where a is greater than or equal to 0 by taking square roots.	3.5.a
	Algebra 1	b. Solve quadratic equations using factoring.	3.5.b
	Algebra 1	b. Determine whether the relationship between two variables is approximately linear or non-linear by examination of a scatter plot.	4.1.b
	Algebra 1	c. Characterize the relationship between two linear related variables as having positive, negative, or approximately zero correlation.	4.1.c
	Algebra 2	a. Solve and graph first-degree absolute value equations of a single variable.	1.1.a

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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 2	b. Solve radical equations of a single variable, including those with extraneous roots.	1.1.b
	Algebra 2	c. Solve absolute value and compound inequalities of a single variable.	1.1.c
	Algebra 2	d. Add, subtract, multiply, and divide rational expressions and solve rational equations.	1.1.d
	Algebra 2	e. Simplify algebraic expressions involving negative and rational exponents.	1.1.e
	Algebra 2	a. Solve systems of linear, absolute value, and quadratic equations algebraically and graphically.	1.2.a
	Algebra 2	c. Solve application problems involving systems of equations and inequalities.	1.2.c
	Algebra 2	a. Simplify numerical expressions, including those with rational exponents.	1.3.a
	Algebra 2	a. Model real-world situations using quadratic equations.	1.4.a
	Algebra 2	b. Approximate the real solutions of quadratic equations graphically.	1.4.b
	Algebra 2	c. Solve quadratic equations of a single variable over the set of complex numbers by factoring, completing the square, and using the quadratic formula.	1.4.c
	Algebra 2	d. Solve quadratic inequalities of a single variable.	1.4.d
	Algebra 2	c. Determine when a relation is a function.	2.1.c
	Algebra 2	d. Determine the domain and range of relations.	2.1.d
	Algebra 2	a. Find the value of a function at a given point.	2.2.a
	Algebra 2	b. Compose functions when possible.	2.2.b
	Algebra 2	c. Add, subtract, multiply, and divide functions.	2.2.c
	Algebra 2	d. Determine whether or not a function has an inverse, and find the inverse when it exists.	2.2.d

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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 2	b. Model problems of growth and decay using exponential functions.	2.3.b
	Algebra 2	c. Graph exponential functions.	2.3.c
	Algebra 2	d. Solve exponential and logarithmic equations.	2.4.d
	Algebra 2	f. Solve problems involving growth and decay.	2.4.f
	Algebra 2	b. Graph the absolute value, quadratic, radical, sine, and cosine functions.	3.1.b
	Algebra 2	c. Graph functions using transformations of parent functions.	3.1.c
	Algebra 2	c. Find the length of an arc using radian measure.	3.3.c
	Algebra 2	d. Find the area of a sector in a circle using radian measure.	3.3.d
	Algebra 2	b. Calculate probabilities using permutations and combinations to count events.	4.1.b
	Algebra 2	c. Compute conditional and unconditional probabilities in various ways, including by definitions, the general multiplication rule, and probability trees.	4.1.c
	Algebra 2	a. Compute different measures of spread, including the range, standard deviation, and interquartile range.	4.2.a
	Geometry	a. Write conditional statements, converses, and inverses, and determine the truth value of these statements.	1.1.a
	Geometry	b. Identify and determine relationships in adjacent, complementary, supplementary, or vertical angles and linear pairs.	1.2.b
	Geometry	d. Define radius, diameter, chord, secant, arc, sector, central angle, inscribed angle, and tangent of a circle, and solve problems using their properties.	1.4.d
	Geometry	e. Show the relationship between intercepted arcs and inscribed or central angles, and find their measures.	1.4.e
Geometry	b. Copy and bisect angles and segments.	1.5.b	

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	Geometry	b. Find the distance between two given points and find the coordinates of the midpoint.	2.1.b
	Geometry	b. Determine whether points in a set are collinear.	2.2.b
	Geometry	a. Solve problems using the properties of special right triangles, e.g., 30°, 60°, 90° or 45°, 45°, 90°.	3.1.a
	Geometry	a. Find linear and angle measures in real-world situations using appropriate tools or technology.	4.1.a
	Geometry	c. Determine perimeter, area, surface area, lateral area, and volume for prisms, cylinders, pyramids, cones, and spheres when given the formulas.	4.1.c
	Geometry	d. Calculate or estimate the area of an irregular region.	4.1.d
	Geometry	e. Find the length of an arc and the area of a sector when given the angle measure and radius.	4.1.e
	Geometry	a. Solve problems using the Pythagorean Theorem and its converse.	4.2.a
	Geometry	b. Solve problems using the distance formula.	4.2.b
	Geometry	d. Solve problems involving geometric probability.	4.2.d
	Grades: 7-12	2. Become proficient problem-solvers by posing appropriate questions, selecting appropriate methods, employing a variety of strategies, and exploring alternative approaches.	2
Reasoning	Algebra 1	d. Determine and explain the meaning of slopes and intercepts using real-world examples.	2.1.d
Develop and use mathematical arguments and proofs to explore the truth of conjectures and justify conclusions.	Algebra 1	a. Estimate the equation of a line of best fit to make and test conjectures.	4.2.a
	Algebra 1	b. Interpret the slope and y-intercept of a line through data.	4.2.b
	Algebra 1	c. Predict y-values for given x-values when appropriate using a line fitted to bivariate numerical data.	4.2.c
	Algebra 2	b. Compare the effectiveness of different measures of spread, including the range, standard deviation, and interquartile range in specific situations.	4.2.b

Alignments of PSAT/NMSQT Skill Categories and State Standards

PSAT/NMSQT Skill Category and Description of Skills	Utah Math : Core Curriculum 2007 and Intended Learning Outcomes 2007		
	Course/ Level	Standard	Standard ID
Reasoning Develop and use mathematical arguments and proofs to explore the truth of conjectures and justify conclusions.	Geometry	b. Formulate conjectures using inductive reasoning.	1.1.b
	Geometry	c. Prove a statement false by using a counterexample.	1.1.c
	Geometry	d. Prove relationships in angle pairs.	1.2.d
	Geometry	e. Prove lines parallel or perpendicular using slope or angle relationships.	1.2.e
	Geometry	a. Prove congruency and similarity of triangles using postulates and theorems.	1.3.a
	Geometry	b. Prove the Pythagorean Theorem in multiple ways, find missing sides of right triangles using the Pythagorean Theorem, and determine whether a triangle is a right triangle using the converse of the Pythagorean Theorem.	1.3.b
	Geometry	c. Prove and apply theorems involving isosceles triangles.	1.3.c
	Geometry	d. Apply triangle inequality theorems.	1.3.d
	Geometry	e. Identify medians, altitudes, and angle bisectors of a triangle, and the perpendicular bisectors of the sides of a triangle, and justify the concurrency theorems.	1.3.e
	Geometry	b. Prove properties of quadrilaterals using triangle congruence relationships, postulates, and theorems.	1.4.b
	Geometry	c. Derive, justify, and use formulas for the number of diagonals, lines of symmetry, angle measures, perimeter, and area of regular polygons.	1.4.c
	Geometry	a. Investigate geometric relationships using constructions.	1.5.a
	Geometry	d. Justify procedures used to construct geometric figures.	1.5.d
	Geometry	e. Discover and investigate conjectures about geometric properties using constructions.	1.5.e
	Grades: 7-12	3. Think logically, using inductive reasoning to formulate reasonable conjectures and using deductive reasoning for justification, formally and informally.	3

Alignments of PSAT/NMSQT Skill Categories and State Standards

PSAT/NMSQT Skill Category and Description of Skills	Utah Math : Core Curriculum 2007 and Intended Learning Outcomes 2007		
	Course/ Level	Standard	Standard ID
<p>Reasoning</p> <p>Develop and use mathematical arguments and proofs to explore the truth of conjectures and justify conclusions.</p>	Grades: 7-12	4. Cooperatively and independently explore mathematics, using inquiry and technological skills.	4
<p>Representation</p> <p>Use and translate among representations including verbal, numerical, symbolic and graphical to communicate mathematical ideas and solve problems.</p>	Algebra 1	d. Place rational and irrational numbers on a number line between two integers.	1.1.d
	Algebra 1	a. Write algebraic expressions or equations to generalize visual patterns, numerical patterns, relations, data sets, or scatter plots.	2.2.a
	Algebra 1	b. Represent linear equations in slope-intercept form, $y = mx + b$, and standard form, $Ax + By = C$.	2.2.b
	Algebra 1	a. Write the equation of a line when given two points or the slope and a point on the line.	2.3.a
	Algebra 1	c. Graph a system of linear inequalities and identify the solution.	3.3.c
	Algebra 1	c. Write a quadratic equation when given the solutions.	3.5.c
	Algebra 1	a. Collect, record, organize, and display a set of data with at least two variables.	4.1.a
	Algebra 2	e. Write a quadratic equation when given the solutions of the equation.	1.4.e
	Algebra 2	d. Write an equation of a parabola in the form $y = a(x - h)^2 + k$ when given a graph or an equation..	3.1.d
	Algebra 2	a. Convert angle measurements between radians and degrees.	3.2.a
	Algebra 2	d. Use histograms to obtain percentiles.	4.2.d
	Geometry	a. Use accepted geometric notation for lines, segments, rays, angles, similarity, and congruence.	1.2.a
	Geometry	c. Construct perpendicular and parallel lines.	1.5.c
	Geometry	b. Identify three-dimensional objects from different perspectives using nets, cross-sections, and two-dimensional views.	1.6.b
	Geometry	c. Write an equation of a line perpendicular or a line parallel to a line through a given point.	2.1.c

Alignments of PSAT/NMSQT Skill Categories and State Standards

PSAT/NMSQT	Utah Math : Core Curriculum 2007 and Intended Learning Outcomes 2007		
Skill Category and Description of Skills	Course/ Level	Standard	Standard ID
<p>Representation</p> <p>Use and translate among representations including verbal, numerical, symbolic and graphical to communicate mathematical ideas and solve problems.</p>	Geometry	a. Graph a circle given the equation in the form $(x - h)^2 + (y - k)^2 = r^2$, and write the equation when given the graph.	2.2.a
	Grades: 7-12	6. Communicate mathematics through verbal, written, and visual representations, using precise mathematical language and symbolic notation.	6

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.