

Alignments of PSAT/NMSQT Skill Categories and State Standards

PSAT/NMSQT	North Carolina Math: Essential Standards 2008		
Skill Category and Description of Skills	Course/ Level	Standard	Standard ID
<b>Algebra and Functions</b>  Solve problems using algebraic expressions and symbols to represent relationships, patterns and functions of different types.	Math A	MA.A.1.1 Execute all operations with algebraic expressions (division by monomials only).	MA.A.1.1
	Math A	MA.A.1.2 Use associative, commutative and distributive properties to combine algebraic expressions.	MA.A.1.2
	Math A	MA.A.1.3 Analyze quadratic expressions to determine their factors.	MA.A.1.3
	Math A	MA.A.2.1 Use substitution strategies to solve equations involving direct and inverse variation.	MA.A.2.1
	Math A	MA.A.2.2 Use literal equations to represent direct and indirect variation.	MA.A.2.2
	Math A	MA.A.2.3 Explain the effect that an increase or decrease in one variable will have on the other variables.	MA.A.2.3
	Math A	MA.A.3.1 Differentiate between linear, quadratic and exponential patterns of change.	MA.A.3.1
	Math A	MA.A.3.2 Identify intervals of increase or decrease.	MA.A.3.2
	Math A	MA.A.3.3 Explain the rate of increase or decrease on an interval.	MA.A.3.3
	Math A	MA.A.4.1 Categorize relations as functions or "not functions".	MA.A.4.1
	Math A	MA.A.4.2 Use appropriate terminology and notation (function, domain, range and intercepts) associated with functions.	MA.A.4.2
	Math A	MA.A.4.3 Interpret the relationship of constants and coefficients for data presented in graphs, tables and equations.	MA.A.4.3
	Math A	MA.A.4.4 Represent linear functions in a variety of equivalent forms (including point-slope).	MA.A.4.4
	Math A	MA.A.4.5 Use graphs, tables and symbols to solve linear equations.	MA.A.4.5
	Math A	MA.A.4.6 Use tables and graphs to solve exponential equations.	MA.A.4.6
Math A	MA.A.4.7 Use graphs, tables, and properties to solve quadratic equations.	MA.A.4.7	
Math A	MA.A.5.1 Represent linear and exponential relationships in the form of models.	MA.A.5.1	

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<b>Algebra and Functions</b> Solve problems using algebraic expressions and symbols to represent relationships, patterns and functions of different types.	Math A	MA.A.5.2 Use strategies to solve systems of linear equations in two variables, graphically and symbolically.	MA.A.5.2
	Math A	MA.A.5.3 Use tables and graphs to solve pairs of linear inequalities in two variables.	MA.A.5.3
	Math A	MA.A.5.4 Use tables and graphs to solve systems with linear and exponential inequalities.	MA.A.5.4
	Math A	MA.N.2.2 Represent algebraic expressions with exponents in their simplest forms.	MA.N.2.2
	Math Advanced Functions and Modeling	AFM.A.1.1 Evaluate the appropriate use of each function.	AFM.A.1.1
	Math Advanced Functions and Modeling	AFM.A.1.2 Explain the significance each function has with respect to the data or problem situation being modeled.	AFM.A.1.2
	Math BC	MBC.A.1.1 Represent absolute value, step and piecewise linear functions, and quadratic functions using models.	MBC.A.1.1
	Math BC	MBC.A.1.2 Use graphs, symbols and tables to represent functions.	MBC.A.1.2
	Math BC	MBC.A.10.1 Compare different types of functions.	MBC.A.10.1
	Math BC	MBC.A.10.2 Determine horizontal and vertical shifts as well as the stretching and shrinking of a function in comparison to the parent function.	MBC.A.10.2
	Math BC	MBC.A.2.2 Use appropriate strategies to solve systems of combinations of equations or inequalities, interpreting their solutions.	MBC.A.2.2
	Math BC	MBC.A.3.1 Represent transformations of absolute value, quadratic and exponential functions in a coordinate plane.	MBC.A.3.1
	Math BC	MBC.A.3.2 Illustrate translations, reflections and dilations.	MBC.A.3.2
	Math BC	MBC.A.4.1 Use arithmetic operations to combine rational expressions.	MBC.A.4.1
Math BC	MBC.A.4.2 Use arithmetic algorithms to simplify rational expressions.	MBC.A.4.2	

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<b>Algebra and Functions</b> Solve problems using algebraic expressions and symbols to represent relationships, patterns and functions of different types.	Math BC	MBC.A.5.1 Use function notation to find the sum, difference, product and quotient of two or more functions.	MBC.A.5.1
	Math BC	MBC.A.5.2 Use tables, graphs and symbols to find the inverse of a function.	MBC.A.5.2
	Math BC	MBC.A.5.3 Explain how the composition of a function and its inverse returns the identity function, $f(f^{-1}(x)) = x$ .	MBC.A.5.3
	Math BC	MBC.A.7.1 Use graphs, tables, factoring and the quadratic formula to solve quadratic equations with real number coefficients, interpreting the solutions.	MBC.A.7.1
	Math BC	MBC.A.7.2 Represent rational equations with linear and quadratic denominators, in their simplest forms, identifying restrictions.	MBC.A.7.2
	Math BC	MBC.A.7.3 Use graphs, tables and appropriate properties to solve rational equations with linear and quadratic denominators.	MBC.A.7.3
	Math BC	MBC.A.7.4 Use appropriate properties to solve exponential and logarithmic equations symbolically, numerically and graphically.	MBC.A.7.4
	Math BC	MBC.A.8.1 Determine the theoretical and practical domain and range.	MBC.A.8.1
	Math BC	MBC.A.8.2 Determine the zeros, extremes and intercepts.	MBC.A.8.2
	Math BC	MBC.A.8.3 Identify intervals for which the function is continuous and/or discontinuous, increasing and/or decreasing.	MBC.A.8.3
	Math BC	MBC.A.8.4 Determine end behavior.	MBC.A.8.4
	Math BC	MBC.A.8.5 Analyze connections among functions represented in numeric, symbolic, graphical and verbal forms.	MBC.A.8.5
	Math BC	MBC.A.9.1 Represent problems involving repeated motion as a function of time with models and graphs.	MBC.A.9.1
	Math BC	MBC.A.9.2 Represent varying parameters of starting point, distance, rate and repetitions when modeling.	MBC.A.9.2
Math BC	MBC.N.1.2 Represent algebraic expressions with exponents in their simplest forms.	MBC.N.1.2	

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<b>Algebra and Functions</b> Solve problems using algebraic expressions and symbols to represent relationships, patterns and functions of different types.	Math Discrete	MD.A.1.1 Calculate the sum of a finite sequence.	MD.A.1.1
	Math Discrete	MD.A.1.2 Calculate the sum of an infinite sequence.	MD.A.1.2
	Math Discrete	MD.A.1.3 Differentiate between the convergence or divergence of a given series.	MD.A.1.3
	Math Discrete	MD.A.1.4 Use iterative processes to write explicit definitions and formulas for arithmetic and geometric sequences.	MD.A.1.4
	Math Discrete	MD.A.1.5 Evaluate explicit definitions using inductive proofs.	MD.A.1.5
	Math Discrete	MD.A.3.5 Use trees to represent problems involving decision making.	MD.A.3.5
<b>Communication</b> Express mathematical ideas precisely and communicate them coherently and clearly in the language and notation of mathematics.	Math A	MA.A.2.3 Explain the effect that an increase or decrease in one variable will have on the other variables.	MA.A.2.3
	Math A	MA.A.3.2 Identify intervals of increase or decrease.	MA.A.3.2
	Math A	MA.A.3.3 Explain the rate of increase or decrease on an interval.	MA.A.3.3
	Math A	MA.A.4.1 Categorize relations as functions or "not functions".	MA.A.4.1
	Math A	MA.G.1.2 Use geometric properties to identify geometric shapes.	MA.G.1.2
	Math A	MA.N.1.2 Select appropriate units and explain the result based on the problem being solved.	MA.N.1.2
	Math A	MA.S.1.1 Explain the effect of an outlier on the mean, median and range of various graphical displays.	MA.S.1.1
	Math A	MA.S.2.2 Infer trends in bivariate data displayed in scatter plots to determine informally if the data is best fit with a linear, exponential or quadratic model.	MA.S.2.2
Math Advanced Functions and Modeling	AFM.A.1.2 Explain the significance each function has with respect to the data or problem situation being modeled.	AFM.A.1.2	

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<b>Communication</b> Express mathematical ideas precisely and communicate them coherently and clearly in the language and notation of mathematics.	Math Advanced Functions and Modeling	AFM.S.1.4 Identify when arguments based on data confuse correlation with causation.	AFM.S.1.4
	Math BC	MBC.A.5.3 Explain how the composition of a function and its inverse returns the identity function, $f(f^{-1}(x)) = x$ .	MBC.A.5.3
	Math BC	MBC.A.8.3 Identify intervals for which the function is continuous and/or discontinuous, increasing and/or decreasing.	MBC.A.8.3
	Math BC	MBC.G.1.4 Summarize the structure and relationships between undefined terms, defined terms, axioms/postulates, methods of reasoning and theorems.	MBC.G.1.4
	Math BC	MBC.G.2.3 Explain the relationships among angles formed by perpendicular lines and transversals of parallel lines.	MBC.G.2.3
	Math BC	MBC.G.3.2 Identify the conditions that are sufficient to guarantee similarity of polygons with more than three sides.	MBC.G.3.2
	Math BC	MBC.S.2.4 Infer trends in bivariate data displayed in scatter plots, and best fit lines.	MBC.S.2.4
	Math Discrete	MD.S.1.5 Interpret graphical displays of data.	MD.S.1.5
	Math Discrete	MD.S.1.6 Compare distributions of data.	MD.S.1.6
<b>Connections</b> Connect ideas from different areas of mathematics (particularly geometry and algebra) to state or solve abstract or applied problems.	Math A	MA.G.2.1 Recognize examples of chord, tangent and secant in visual displays.	MA.G.2.1
	Math BC	MBC.A.3.2 Illustrate translations, reflections and dilations.	MBC.A.3.2
	Math BC	MBC.G.9.2 Use the 3:2:1 relationship among volumes of circular cylinders, hemispheres and cones with the same height and circular base and 3:1 relationship between the volume of a prism and pyramid with the same base area and height.	MBC.G.9.2
<b>Data, Statistics, and Probability</b> Analyze data, understand descriptive statistics, make inferences and determine the likelihood that certain events will occur.	Math A	MA.S.1.1 Explain the effect of an outlier on the mean, median and range of various graphical displays.	MA.S.1.1
	Math A	MA.S.1.2 Compare shape, center, and spread of univariate data using graphical displays, quartiles, percentiles, outliers, means and standard deviations.	MA.S.1.2
	Math A	MA.S.2.1 Use formal strategies for placement of lines of best fit to model bivariate data.	MA.S.2.1

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<b>Data, Statistics, and Probability</b> Analyze data, understand descriptive statistics, make inferences and determine the likelihood that certain events will occur.	Math A	MA.S.2.2 Infer trends in bivariate data displayed in scatter plots to determine informally if the data is best fit with a linear, exponential or quadratic model.	MA.S.2.2
	Math Advanced Functions and Modeling	AFM.S.1.1 Interpret the constants, coefficients and bases in the context of the data.	AFM.S.1.1
	Math Advanced Functions and Modeling	AFM.S.1.3 Evaluate sets of data considering the source and the design of the study.	AFM.S.1.3
	Math Advanced Functions and Modeling	AFM.S.1.4 Identify when arguments based on data confuse correlation with causation.	AFM.S.1.4
	Math Advanced Functions and Modeling	AFM.S.2.1 Apply methods of data collection.	AFM.S.2.1
	Math Advanced Functions and Modeling	AFM.S.2.2 Apply statistical principles and methods in sample surveys.	AFM.S.2.2
	Math Advanced Functions and Modeling	AFM.S.2.4 Interpret graphical displays of univariate data.	AFM.S.2.4
	Math Advanced Functions and Modeling	AFM.S.2.5 Compare distributions of univariate data.	AFM.S.2.5
	Math Advanced Functions and Modeling	AFM.S.3.1 Use addition and multiplication principles.	AFM.S.3.1
	Math Advanced Functions and Modeling	AFM.S.3.3 Generate simulations of probability models.	AFM.S.3.3
Math Advanced Functions and Modeling	AFM.S.3.4 Calculate expected values and determine fairness.	AFM.S.3.4	

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<b>Data, Statistics, and Probability</b> Analyze data, understand descriptive statistics, make inferences and determine the likelihood that certain events will occur.	Math Advanced Functions and Modeling	AFM.S.3.5 Apply discrete random variables to solve problems.	AFM.S.3.5
	Math BC	MBC.S.1.1 Use the sizes of partitioned regions within regular geometric figures to solve probability problems.	MBC.S.1.1
	Math BC	MBC.S.2.4 Infer trends in bivariate data displayed in scatter plots, and best fit lines.	MBC.S.2.4
	Math BC	MBC.S.3.1 Analyze two-stage experiments in terms of sample spaces.	MBC.S.3.1
	Math BC	MBC.S.3.2 Use diagrams and the multiplication rule for probability to calculate probabilities.	MBC.S.3.2
	Math BC	MBC.S.3.3 Compare independent and dependent compound events in terms of their probabilities.	MBC.S.3.3
	Math Discrete	MA.D.1.4 Apply mathematical concepts and strategies related to information processing, particularly on the internet with a focus on access, security, accuracy and efficiency.	MA.D.1.4
	Math Discrete	MD.D.1.1 Apply properties of fair division.	MD.D.1.1
	Math Discrete	MD.S.1.1 Apply methods of data collection.	MD.S.1.1
	Math Discrete	MD.S.1.2 Apply statistical principles and methods in sample surveys.	MD.S.1.2
	Math Discrete	MD.S.1.3 Calculate measures of central tendency and spread.	MD.S.1.3
	Math Discrete	MD.S.1.5 Interpret graphical displays of data.	MD.S.1.5
	Math Discrete	MD.S.1.6 Compare distributions of data.	MD.S.1.6
	Math Discrete	MD.S.2.1 Use addition and multiplication principles.	MD.S.2.1
	Math Discrete	MD.S.2.2 Calculate permutations and combinations.	MD.S.2.2
	Math Discrete	MD.S.2.3 Generate simulations for probability models.	MD.S.2.3
	Math Discrete	MD.S.2.4 Calculate expected values and determine fairness.	MD.S.2.4
	Math Discrete	MD.S.2.5 Use discrete random variables to solve problems.	MD.S.2.5

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<b>Geometry and Measurement</b> Solve problems based on understanding the properties of shapes, such as triangles and circles, and the spatial relationships between angles and lines.	Math A	MA.G.1.1 Use strategies to calculate the slope, distance between points, coordinates of the midpoints and the distance from a point to a line.	MA.G.1.1
	Math A	MA.G.1.2 Use geometric properties to identify geometric shapes.	MA.G.1.2
	Math A	MA.G.2.1 Recognize examples of chord, tangent and secant in visual displays.	MA.G.2.1
	Math A	MA.G.2.2 Use formulas to solve problems involving the areas of polygons.	MA.G.2.2
	Math A	MA.G.2.3 Understand the 3:1 relationship between volumes of right circular cylinders and cones with the same height and circular base and between the volume of a prism and pyramid with the same base area and height.	MA.G.2.3
	Math A	MA.G.2.4 Use formulas to solve problems involving volume of right prisms, pyramids, circular cylinders and right circular cones.	MA.G.2.4
	Math A	MA.G.2.5 Represent the relationship between the surface area of prisms, cylinders and pyramids to the sum of the area(s) of their base(s) and lateral surfaces using planar nets to illustrate and sum the relevant measures.	MA.G.2.5
	Math BC	MBC.G.1.2 Infer conclusions from given information.	MBC.G.1.2
	Math BC	MBC.G.1.4 Summarize the structure and relationships between undefined terms, defined terms, axioms/postulates, methods of reasoning and theorems.	MBC.G.1.4
	Math BC	MBC.G.1.5 Use paper-folding techniques, compasses and straight edges and dynamic geometric software to make connections among geometric relationships.	MBC.G.1.5
	Math BC	MBC.G.2.1 Generate conjectures which can be verified by informal arguments or reject by counterexample.	MBC.G.2.1
	Math BC	MBC.G.2.2 Generate direct and indirect arguments and identify inconsistencies.	MBC.G.2.2
	Math BC	MBC.G.2.3 Explain the relationships among angles formed by perpendicular lines and transversals of parallel lines.	MBC.G.2.3
Math BC	MBC.G.2.4 Use available information and geometric principles to prove similarity and congruence among triangles, noting that congruence is a special case of similarity.	MBC.G.2.4	

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<b>Geometry and Measurement</b> Solve problems based on understanding the properties of shapes, such as triangles and circles, and the spatial relationships between angles and lines.	Math BC	MBC.G.3.1 Use properties of similarity and congruency to determine or calculate the measures of corresponding parts of similar figures.	MBC.G.3.1
	Math BC	MBC.G.3.2 Identify the conditions that are sufficient to guarantee similarity of polygons with more than three sides.	MBC.G.3.2
	Math BC	MBC.G.3.3 Apply properties of similarity and congruency to other polygons.	MBC.G.3.3
	Math BC	MBC.G.4.2 Understand the relationship of rigidity to congruence and that of dilations to similarity.	MBC.G.4.2
	Math BC	MBC.G.5.1 Represent circles as equations based on the center and the radius, the center and a point on the circle and the endpoints of the diameter.	MBC.G.5.1
	Math BC	MBC.G.6.1 Construct arguments that prove conjectures and theorems or disprove conjectures related to:	MBC.G.6.1.a
	Math BC	MBC.G.6.1 Construct arguments that prove conjectures and theorems or disprove conjectures related to:	MBC.G.6.1.b
	Math BC	MBC.G.6.1 Construct arguments that prove conjectures and theorems or disprove conjectures related to:	MBC.G.6.1.c
	Math BC	MBC.G.6.1 Construct arguments that prove conjectures and theorems or disprove conjectures related to:	MBC.G.6.1.d
	Math BC	MBC.G.6.1 Construct arguments that prove conjectures and theorems or disprove conjectures related to:	MBC.G.6.1.e
	Math BC	MBC.G.6.1 Construct arguments that prove conjectures and theorems or disprove conjectures related to:	MBC.G.6.1.f
	Math BC	MBC.G.6.2 Construct arguments to prove the Pythagorean Theorem and its converse in multiple ways.	MBC.G.6.2
	Math BC	MBC.G.6.3 Construct arguments to prove properties of special quadrilaterals.	MBC.G.6.3
Math BC	MBC.G.7.1 Calculate the measure of central angles, inscribed angles and circumscribed angles.	MBC.G.7.1	
Math BC	MBC.G.7.2 Calculate arc measure and arc length within a circle.	MBC.G.7.2	

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<b>Geometry and Measurement</b> Solve problems based on understanding the properties of shapes, such as triangles and circles, and the spatial relationships between angles and lines.	Math BC	MBC.G.8.1 Use the Pythagorean Theorem to solve problems in two- and three-dimensional settings.	MBC.G.8.1
	Math BC	MBC.G.8.3 Use properties of special right triangles to solve problems.	MBC.G.8.3
	Math BC	MBC.G.9.1 Use formulas and strategies to solve problems involving volume and surface area of cones, spheres and composite figures.	MBC.G.9.1
	Math BC	MBC.G.9.2 Use the 3:2:1 relationship among volumes of circular cylinders, hemispheres and cones with the same height and circular base and 3:1 relationship between the volume of a prism and pyramid with the same base area and height.	MBC.G.9.2
<b>Number and Operations</b> Understand types of numbers (integers, fractions, decimals), their properties and the correct order of operations. Perform computations correctly.	Math A	MA.N.1.1 Use proportions to solve problems.	MA.N.1.1
	Math A	MA.N.1.2 Select appropriate units and explain the result based on the problem being solved.	MA.N.1.2
	Math A	MA.N.2.1 Represent numerical expressions with exponents in their simplest forms.	MA.N.2.1
	Math A	MA.N.2.3 Use strategies to compute square roots and cube roots of numbers that are not perfect squares or perfect cubes.	MA.N.2.3
	Math Advanced Functions and Modeling	AFM.S.3.2 Calculate permutations and combinations.	AFM.S.3.2
	Math BC	MBC.N.1.1 Translate numbers with rational exponents, limited to exponents in the form $1/n$ , into expressions with $n$ th roots.	MBC.N.1.1
<b>Problem Solving</b> Solve abstract and practical problems, applying and adapting a variety of strategies. Monitor progress and evaluate answers in terms of questions asked.	Math A	MA.A.1.1 Execute all operations with algebraic expressions (division by monomials only).	MA.A.1.1
	Math A	MA.A.1.2 Use associative, commutative and distributive properties to combine algebraic expressions.	MA.A.1.2
	Math A	MA.A.2.1 Use substitution strategies to solve equations involving direct and inverse variation.	MA.A.2.1
	Math A	MA.A.4.5 Use graphs, tables and symbols to solve linear equations.	MA.A.4.5
	Math A	MA.A.4.6 Use tables and graphs to solve exponential equations.	MA.A.4.6

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<b>Problem Solving</b> Solve abstract and practical problems, applying and adapting a variety of strategies. Monitor progress and evaluate answers in terms of questions asked.	Math A	MA.A.4.7 Use graphs, tables, and properties to solve quadratic equations.	MA.A.4.7
	Math A	MA.A.5.2 Use strategies to solve systems of linear equations in two variables, graphically and symbolically.	MA.A.5.2
	Math A	MA.A.5.3 Use tables and graphs to solve pairs of linear inequalities in two variables.	MA.A.5.3
	Math A	MA.A.5.4 Use tables and graphs to solve systems with linear and exponential inequalities.	MA.A.5.4
	Math A	MA.G.1.1 Use strategies to calculate the slope, distance between points, coordinates of the midpoints and the distance from a point to a line.	MA.G.1.1
	Math A	MA.G.2.2 Use formulas to solve problems involving the areas of polygons.	MA.G.2.2
	Math A	MA.G.2.4 Use formulas to solve problems involving volume of right prisms, pyramids, circular cylinders and right circular cones.	MA.G.2.4
	Math A	MA.N.1.1 Use proportions to solve problems.	MA.N.1.1
	Math A	MA.N.2.3 Use strategies to compute square roots and cube roots of numbers that are not perfect squares or perfect cubes.	MA.N.2.3
	Math Advanced Functions and Modeling	AFM.S.3.1 Use addition and multiplication principles.	AFM.S.3.1
	Math Advanced Functions and Modeling	AFM.S.3.2 Calculate permutations and combinations.	AFM.S.3.2
	Math Advanced Functions and Modeling	AFM.S.3.3 Generate simulations of probability models.	AFM.S.3.3
	Math Advanced Functions and Modeling	AFM.S.3.4 Calculate expected values and determine fairness.	AFM.S.3.4

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<p><b>Problem Solving</b></p> <p>Solve abstract and practical problems, applying and adapting a variety of strategies. Monitor progress and evaluate answers in terms of questions asked.</p>	Math Advanced Functions and Modeling	AFM.S.3.5 Apply discrete random variables to solve problems.	AFM.S.3.5
	Math BC	MBC.A.10.2 Determine horizontal and vertical shifts as well as the stretching and shrinking of a function in comparison to the parent function.	MBC.A.10.2
	Math BC	MBC.A.2.2 Use appropriate strategies to solve systems of combinations of equations or inequalities, interpreting their solutions.	MBC.A.2.2
	Math BC	MBC.A.4.1 Use arithmetic operations to combine rational expressions.	MBC.A.4.1
	Math BC	MBC.A.4.2 Use arithmetic algorithms to simplify rational expressions.	MBC.A.4.2
	Math BC	MBC.A.5.1 Use function notation to find the sum, difference, product and quotient of two or more functions.	MBC.A.5.1
	Math BC	MBC.A.5.2 Use tables, graphs and symbols to find the inverse of a function.	MBC.A.5.2
	Math BC	MBC.A.7.1 Use graphs, tables, factoring and the quadratic formula to solve quadratic equations with real number coefficients, interpreting the solutions.	MBC.A.7.1
	Math BC	MBC.A.7.3 Use graphs, tables and appropriate properties to solve rational equations with linear and quadratic denominators.	MBC.A.7.3
	Math BC	MBC.A.7.4 Use appropriate properties to solve exponential and logarithmic equations symbolically, numerically and graphically.	MBC.A.7.4
	Math BC	MBC.A.8.1 Determine the theoretical and practical domain and range.	MBC.A.8.1
	Math BC	MBC.A.8.2 Determine the zeros, extremes and intercepts.	MBC.A.8.2
	Math BC	MBC.A.8.4 Determine end behavior.	MBC.A.8.4
	Math BC	MBC.G.3.1 Use properties of similarity and congruency to determine or calculate the measures of corresponding parts of similar figures.	MBC.G.3.1
	Math BC	MBC.G.7.1 Calculate the measure of central angles, inscribed angles and circumscribed angles.	MBC.G.7.1

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<b>Problem Solving</b> Solve abstract and practical problems, applying and adapting a variety of strategies. Monitor progress and evaluate answers in terms of questions asked.	Math BC	MBC.G.7.2 Calculate arc measure and arc length within a circle.	MBC.G.7.2
	Math BC	MBC.G.8.1 Use the Pythagorean Theorem to solve problems in two- and three-dimensional settings.	MBC.G.8.1
	Math BC	MBC.G.8.3 Use properties of special right triangles to solve problems.	MBC.G.8.3
	Math BC	MBC.G.9.1 Use formulas and strategies to solve problems involving volume and surface area of cones, spheres and composite figures.	MBC.G.9.1
	Math BC	MBC.S.1.1 Use the sizes of partitioned regions within regular geometric figures to solve probability problems.	MBC.S.1.1
	Math BC	MBC.S.3.2 Use diagrams and the multiplication rule for probability to calculate probabilities.	MBC.S.3.2
	Math Discrete	MD.A.1.1 Calculate the sum of a finite sequence.	MD.A.1.1
	Math Discrete	MD.A.1.2 Calculate the sum of an infinite sequence.	MD.A.1.2
	Math Discrete	MD.S.1.3 Calculate measures of central tendency and spread.	MD.S.1.3
	Math Discrete	MD.S.2.1 Use addition and multiplication principles.	MD.S.2.1
	Math Discrete	MD.S.2.2 Calculate permutations and combinations.	MD.S.2.2
	Math Discrete	MD.S.2.3 Generate simulations for probability models.	MD.S.2.3
	Math Discrete	MD.S.2.4 Calculate expected values and determine fairness.	MD.S.2.4
	Math Discrete	MD.S.2.5 Use discrete random variables to solve problems.	MD.S.2.5
<b>Reasoning</b> Develop and use mathematical arguments and proofs to explore the truth of conjectures and justify conclusions.	Math A	MA.A.1.3 Analyze quadratic expressions to determine their factors.	MA.A.1.3
	Math A	MA.A.4.3 Interpret the relationship of constants and coefficients for data presented in graphs, tables and equations.	MA.A.4.3
	Math A	MA.G.2.3 Understand the 3:1 relationship between volumes of right circular cylinders and cones with the same height and circular base and between the volume of a prism and pyramid with the same base area and height.	MA.G.2.3

Alignments of PSAT/NMSQT Skill Categories and State Standards

PSAT/NMSQT	North Carolina Math: Essential Standards 2008		
Skill Category and Description of Skills	Course/ Level	Standard	Standard ID
<b>Reasoning</b> Develop and use mathematical arguments and proofs to explore the truth of conjectures and justify conclusions.	Math A	MA.S.1.2 Compare shape, center, and spread of univariate data using graphical displays, quartiles, percentiles, outliers, means and standard deviations.	MA.S.1.2
	Math Advanced Functions and Modeling	AFM.A.1.1 Evaluate the appropriate use of each function.	AFM.A.1.1
	Math Advanced Functions and Modeling	AFM.S.1.1 Interpret the constants, coefficients and bases in the context of the data.	AFM.S.1.1
	Math Advanced Functions and Modeling	AFM.S.1.3 Evaluate sets of data considering the source and the design of the study.	AFM.S.1.3
	Math Advanced Functions and Modeling	AFM.S.2.1 Apply methods of data collection.	AFM.S.2.1
	Math Advanced Functions and Modeling	AFM.S.2.2 Apply statistical principles and methods in sample surveys.	AFM.S.2.2
	Math Advanced Functions and Modeling	AFM.S.2.4 Interpret graphical displays of univariate data.	AFM.S.2.4
	Math Advanced Functions and Modeling	AFM.S.2.5 Compare distributions of univariate data.	AFM.S.2.5
	Math BC	MBC.A.10.1 Compare different types of functions.	MBC.A.10.1
	Math BC	MBC.A.8.5 Analyze connections among functions represented in numeric, symbolic, graphical and verbal forms.	MBC.A.8.5
Math BC	MBC.G.1.2 Infer conclusions from given information.	MBC.G.1.2	
Math BC	MBC.G.2.1 Generate conjectures which can be verified by informal arguments or reject by counterexample.	MBC.G.2.1	

Alignments of PSAT/NMSQT Skill Categories and State Standards

PSAT/NMSQT	North Carolina Math: Essential Standards 2008		
Skill Category and Description of Skills	Course/ Level	Standard	Standard ID
<b>Reasoning</b> Develop and use mathematical arguments and proofs to explore the truth of conjectures and justify conclusions.	Math BC	MBC.G.2.2 Generate direct and indirect arguments and identify inconsistencies.	MBC.G.2.2
	Math BC	MBC.G.2.4 Use available information and geometric principles to prove similarity and congruence among triangles, noting that congruence is a special case of similarity.	MBC.G.2.4
	Math BC	MBC.G.3.3 Apply properties of similarity and congruency to other polygons.	MBC.G.3.3
	Math BC	MBC.G.4.2 Understand the relationship of rigidity to congruence and that of dilations to similarity.	MBC.G.4.2
	Math BC	MBC.G.6.1 Construct arguments that prove conjectures and theorems or disprove conjectures related to:	MBC.G.6.1.a
	Math BC	MBC.G.6.1 Construct arguments that prove conjectures and theorems or disprove conjectures related to:	MBC.G.6.1.b
	Math BC	MBC.G.6.1 Construct arguments that prove conjectures and theorems or disprove conjectures related to:	MBC.G.6.1.c
	Math BC	MBC.G.6.1 Construct arguments that prove conjectures and theorems or disprove conjectures related to:	MBC.G.6.1.d
	Math BC	MBC.G.6.1 Construct arguments that prove conjectures and theorems or disprove conjectures related to:	MBC.G.6.1.e
	Math BC	MBC.G.6.1 Construct arguments that prove conjectures and theorems or disprove conjectures related to:	MBC.G.6.1.f
	Math BC	MBC.G.6.2 Construct arguments to prove the Pythagorean Theorem and its converse in multiple ways.	MBC.G.6.2
	Math BC	MBC.G.6.3 Construct arguments to prove properties of special quadrilaterals.	MBC.G.6.3
	Math BC	MBC.S.3.1 Analyze two-stage experiments in terms of sample spaces.	MBC.S.3.1
	Math BC	MBC.S.3.3 Compare independent and dependent compound events in terms of their probabilities.	MBC.S.3.3
	Math Discrete	MA.D.1.4 Apply mathematical concepts and strategies related to information processing, particularly on the internet with a focus on access, security, accuracy and efficiency.	MA.D.1.4

Alignments of PSAT/NMSQT Skill Categories and State Standards

PSAT/NMSQT	North Carolina Math: Essential Standards 2008		
Skill Category and Description of Skills	Course/ Level	Standard	Standard ID
<b>Reasoning</b> Develop and use mathematical arguments and proofs to explore the truth of conjectures and justify conclusions.	Math Discrete	MD.A.1.3 Differentiate between the convergence or divergence of a given series.	MD.A.1.3
	Math Discrete	MD.A.1.5 Evaluate explicit definitions using inductive proofs.	MD.A.1.5
	Math Discrete	MD.D.1.1 Apply properties of fair division.	MD.D.1.1
	Math Discrete	MD.S.1.1 Apply methods of data collection.	MD.S.1.1
	Math Discrete	MD.S.1.2 Apply statistical principles and methods in sample surveys.	MD.S.1.2
<b>Representation</b> Use and translate among representations including verbal, numerical, symbolic, and graphical to communicate mathematical ideas and solve problems.	Math A	MA.A.2.2 Use literal equations to represent direct and indirect variation.	MA.A.2.2
	Math A	MA.A.4.2 Use appropriate terminology and notation (function, domain, range and intercepts) associated with functions.	MA.A.4.2
	Math A	MA.A.4.4 Represent linear functions in a variety of equivalent forms (including point-slope).	MA.A.4.4
	Math A	MA.A.5.1 Represent linear and exponential relationships in the form of models.	MA.A.5.1
	Math A	MA.G.2.5 Represent the relationship between the surface area of prisms, cylinders and pyramids to the sum of the area(s) of their base(s) and lateral surfaces using planar nets to illustrate and sum the relevant measures.	MA.G.2.5
	Math A	MA.N.2.1 Represent numerical expressions with exponents in their simplest forms.	MA.N.2.1
	Math A	MA.N.2.2 Represent algebraic expressions with exponents in their simplest forms.	MA.N.2.2
	Math A	MA.S.2.1 Use formal strategies for placement of lines of best fit to model bivariate data.	MA.S.2.1
	Math BC	MBC.A.1.1 Represent absolute value, step and piecewise linear functions, and quadratic functions using models.	MBC.A.1.1
	Math BC	MBC.A.1.2 Use graphs, symbols and tables to represent functions.	MBC.A.1.2
Math BC	MBC.A.3.1 Represent transformations of absolute value, quadratic and exponential functions in a coordinate plane.	MBC.A.3.1	

Alignments of PSAT/NMSQT Skill Categories and State Standards

PSAT/NMSQT	North Carolina Math: Essential Standards 2008		
Skill Category and Description of Skills	Course/ Level	Standard	Standard ID
<b>Representation</b> Use and translate among representations including verbal, numerical, symbolic and graphical to communicate mathematical ideas and solve problems.	Math BC	MBC.A.7.2 Represent rational equations with linear and quadratic denominators, in their simplest forms, identifying restrictions.	MBC.A.7.2
	Math BC	MBC.A.9.1 Represent problems involving repeated motion as a function of time with models and graphs.	MBC.A.9.1
	Math BC	MBC.A.9.2 Represent varying parameters of starting point, distance, rate and repetitions when modeling.	MBC.A.9.2
	Math BC	MBC.G.1.5 Use paper-folding techniques, compasses and straight edges and dynamic geometric software to make connections among geometric relationships.	MBC.G.1.5
	Math BC	MBC.G.5.1 Represent circles as equations based on the center and the radius, the center and a point on the circle and the endpoints of the diameter.	MBC.G.5.1
	Math BC	MBC.N.1.1 Translate numbers with rational exponents, limited to exponents in the form $1/n$ , into expressions with $n$ th roots.	MBC.N.1.1
	Math BC	MBC.N.1.2 Represent algebraic expressions with exponents in their simplest forms.	MBC.N.1.2
	Math Discrete	MD.A.1.4 Use iterative processes to write explicit definitions and formulas for arithmetic and geometric sequences.	MD.A.1.4
	Math Discrete	MD.A.3.5 Use trees to represent problems involving decision making.	MD.A.3.5

# 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](http://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) report<sup>1</sup>. 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.

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<sup>1</sup> 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](http://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.