

Alignments of PSAT/NMSQT Skill Categories and State Standards

PSAT/NMSQT Skill Category and Description of Skills	South Dakota Math: Content Standards (without Supporting Skills) 2004		
	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.	Grades: 9-12	9-12.A.1.1A. Students are able to write equivalent forms of rational algebraic expressions using properties of real numbers.	A.9-12.A.1.1A
	Grades: 9-12	9-12.A.2.1A. Students are able to determine solutions of quadratic equations.	A.9-12.A.2.1A
	Grades: 9-12	9-12.A.2.2A. Students are able to determine the solution of systems of equations and systems of inequalities.	A.9-12.A.2.2A
	Grades: 9-12	9-12.A.2.3A. Students are able to determine solutions to absolute value statements.	A.9-12.A.2.3A
	Grades: 9-12	9-12.A.3.1A. Students are able to distinguish between linear, quadratic, inverse variation, and exponential models.	A.9-12.A.3.1A
	Grades: 9-12	9-12.A.3.2A. Students are able to create formulas to model relationships that are algebraic, geometric, trigonometric, and exponential.	A.9-12.A.3.2A
	Grades: 9-12	9-12.A.3.3A. Students are able to use sequences and series to model relationships.	A.9-12.A.3.3A
	Grades: 9-12	9-12.A.4.1A. Students are able to determine the domain, range, and intercepts of a function.	A.9-12.A.4.1A
	Grades: 9-12	9-12.A.4.2A. Students are able to describe the behavior of a polynomial, given the leading coefficient, roots, and degree.	A.9-12.A.4.2A
	Grades: 9-12	9-12.A.4.3A. Students are able to apply transformations to graphs and describe the results.	A.9-12.A.4.3A
	Grades: 9-12	9-12.A.4.4A. Students are able to apply properties and definitions of trigonometric, exponential, and logarithmic expressions.	A.9-12.A.4.4A
	Grades: 9-12	9-12.A.4.5A. Students are able to describe characteristics of nonlinear functions and relations.	A.9-12.A.4.5A
	Grades: 9-12	9-12.A.4.6A. Students are able to graph solutions to linear inequalities.	A.9-12.A.4.6A
	Grades: 9-12	9-12.A.1.1. Students are able to write equivalent forms of algebraic expressions using properties of the set of real numbers.	C.9-12.A.1.1
Grades: 9-12	9-12.A.2.1. Students are able to use algebraic properties to transform multi-step, single-variable, first-degree equations.	C.9-12.A.2.1	

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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.	Grades: 9-12	9-12.A.2.2. Students are able to use algebraic properties to transform multi-step, single-variable, first-degree inequalities and represent solutions using a number line.	C.9-12.A.2.2
	Grades: 9-12	9-12.A.3.1. Students are able to create linear models to represent problem situations.	C.9-12.A.3.1
	Grades: 9-12	9-12.A.3.2. Students are able to distinguish between linear and nonlinear models.	C.9-12.A.3.2
	Grades: 9-12	9-12.A.4.1. Students are able to use graphs, tables, and equations to represent linear functions.	C.9-12.A.4.1
<b>Communication</b> Express mathematical ideas precisely and communicate them coherently and clearly in the language and notation of mathematics.	Grades: 9-12	9-12.A.3.1A. Students are able to distinguish between linear, quadratic, inverse variation, and exponential models.	A.9-12.A.3.1A
	Grades: 9-12	9-12.A.4.2A. Students are able to describe the behavior of a polynomial, given the leading coefficient, roots, and degree.	A.9-12.A.4.2A
	Grades: 9-12	9-12.A.4.5A. Students are able to describe characteristics of nonlinear functions and relations.	A.9-12.A.4.5A
	Grades: 9-12	9-12.A.3.2. Students are able to distinguish between linear and nonlinear models.	C.9-12.A.3.2
	Grades: 9-12	9-12.M.1.2. Students are able to use suitable units when describing rate of change.	C.9-12.M.1.2
	Grades: 9-12	9-12.N.1.1. Students are able to identify multiple representations of a real number.	C.9-12.N.1.1
	Grades: 9-12	9-12.N.3.2. Students are able to select alternative computational strategies and explain the chosen strategy.	C.9-12.N.3.2
<b>Connections</b> Connect ideas from different areas of mathematics (particularly geometry and algebra) to state or solve abstract or applied problems.	Grades: 9-12	9-12.A.4.4A. Students are able to apply properties and definitions of trigonometric, exponential, and logarithmic expressions.	A.9-12.A.4.4A
	Grades: 9-12	9-12.G.1.3A. Students are able to apply properties associated with circles.	A.9-12.G.1.3A
	Grades: 9-12	9-12.G.2.1. Students are able to recognize the relationship between a three-dimensional figure and its two-dimensional representation.	C.9-12.G.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.	Grades: 9-12	9-12.S.1.1A. Students are able to analyze and evaluate the design of surveys and experiments.	A.9-12.S.1.1A
	Grades: 9-12	9-12.S.1.2A. Students are able to analyze and evaluate graphical displays of data.	A.9-12.S.1.2A
	Grades: 9-12	9-12.S.1.3A. Students are able to compare multiple one-variable data sets, using standard deviation and variance.	A.9-12.S.1.3A
	Grades: 9-12	9-12.S.1.5A. Students are able to use scatterplots, best-fit lines, and correlation coefficients to model data and support conclusions.	A.9-12.S.1.5A
	Grades: 9-12	9-12.S.2.1A. Students are able to use probabilities to solve problems.	A.9-12.S.2.1A
	Grades: 9-12	9-12.S.2.2A. Students are able to determine probability of compound, complementary, independent, and mutually exclusive events.	A.9-12.S.2.2A
	Grades: 9-12	9-12.S.2.3A. Students are able to generate data and use the data to determine empirical (experimental) probabilities.	A.9-12.S.2.3A
	Grades: 9-12	9-12.S.1.1. Students are able to draw conclusions from a set of data.	C.9-12.S.1.1
	Grades: 9-12	9-12.S.1.2. Students are able to compare multiple one-variable data sets, using range, interquartile range, mean, mode, and median.	C.9-12.S.1.2
	Grades: 9-12	9-12.S.1.3. Represent a set of data in a variety of graphical forms and draw conclusions.	C.9-12.S.1.3
<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.	Grades: 9-12	9-12.G.1.1A. Students are able to justify properties of geometric figures.	A.9-12.G.1.1A
	Grades: 9-12	9-12.G.1.3A. Students are able to apply properties associated with circles.	A.9-12.G.1.3A
	Grades: 9-12	9-12.G.1.4A. Students are able to use formulas for surface area and volume to solve problems involving three-dimensional figures.	A.9-12.G.1.4A

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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.	Grades: 9-12	9-12.G.2.1A. Students are able to use Cartesian coordinates to verify geometric properties.	A.9-12.G.2.1A
	Grades: 9-12	9-12.M.1.1A. Students are able to use dimensional analysis to check answers and determine units of a problem solution.	A.9-12.M.1.1A
	Grades: 9-12	9-12.M.1.2A. Students are able to use indirect measurement in problem situations that defy direct measurement.	A.9-12.M.1.2A
	Grades: 9-12	9-12.G.1.1. Students are able to apply the properties of triangles and quadrilaterals to find unknown parts.	C.9-12.G.1.1
	Grades: 9-12	9-12.G.1.2. Students are able to identify and apply relationships among triangles.	C.9-12.G.1.2
	Grades: 9-12	9-12.G.2.1. Students are able to recognize the relationship between a three-dimensional figure and its two-dimensional representation.	C.9-12.G.2.1
	Grades: 9-12	9-12.G.2.2. Students are able to reflect across vertical or horizontal lines, and translate two-dimensional figures.	C.9-12.G.2.2
	Grades: 9-12	9-12.G.2.3. Students are able to use proportions to solve problems.	C.9-12.G.2.3
	Grades: 9-12	9-12.M.1.1. Students are able to choose appropriate unit label, scale, and precision.	C.9-12.M.1.1
	Grades: 9-12	9-12.M.1.2. Students are able to use suitable units when describing rate of change.	C.9-12.M.1.2
<b>Number and Operations</b>  Understand types of numbers (integers, fractions, decimals), their properties and the correct order of operations. Perform computations correctly.	Grades: 9-12	Note: Skills for this indicator have been subsumed within applications to advanced skills by the time students reach advanced high school mathematics.	A.
	Grades: 9-12	9-12.N.1.2A. Students are able to apply properties and axioms of the real number system to various subsets, e.g., axioms of order, closure.	A.9-12.N.1.2A
	Grades: 9-12	9-12.N.2.1A. Students are able to add, subtract, multiply, and divide real numbers including rational exponents.	A.9-12.N.2.1A
	Grades: 9-12	9-12.N.1.1. Students are able to identify multiple representations of a real number.	C.9-12.N.1.1

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	Course/ Level	Standard	Standard ID
<b>Number and Operations</b> Understand types of numbers (integers, fractions, decimals), their properties and the correct order of operations. Perform computations correctly.	Grades: 9-12	9-12.N.1.2. Students are able to apply the concept of place value, magnitude, and relative magnitude of real numbers.	C.9-12.N.1.2
	Grades: 9-12	9-12.N.2.1. Students are able to add, subtract, multiply, and divide real numbers including integral exponents.	C.9-12.N.2.1
	Grades: 9-12	9-12.N.3.1. Students are able to use estimation strategies in problem situations to predict results and to check the reasonableness of results.	C.9-12.N.3.1
	Grades: 9-12	9-12.N.3.2. Students are able to select alternative computational strategies and explain the chosen strategy.	C.9-12.N.3.2
<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.	Grades: 9-12	9-12.A.2.1A. Students are able to determine solutions of quadratic equations.	A.9-12.A.2.1A
	Grades: 9-12	9-12.A.2.2A. Students are able to determine the solution of systems of equations and systems of inequalities.	A.9-12.A.2.2A
	Grades: 9-12	9-12.A.2.3A. Students are able to determine solutions to absolute value statements.	A.9-12.A.2.3A
	Grades: 9-12	9-12.A.3.3A. Students are able to use sequences and series to model relationships.	A.9-12.A.3.3A
	Grades: 9-12	9-12.A.4.1A. Students are able to determine the domain, range, and intercepts of a function.	A.9-12.A.4.1A
	Grades: 9-12	9-12.A.4.3A. Students are able to apply transformations to graphs and describe the results.	A.9-12.A.4.3A
	Grades: 9-12	9-12.A.4.6A. Students are able to graph solutions to linear inequalities.	A.9-12.A.4.6A
	Grades: 9-12	9-12.G.1.4A. Students are able to use formulas for surface area and volume to solve problems involving three-dimensional figures.	A.9-12.G.1.4A
	Grades: 9-12	9-12.M.1.1A. Students are able to use dimensional analysis to check answers and determine units of a problem solution.	A.9-12.M.1.1A
	Grades: 9-12	9-12.M.1.2A. Students are able to use indirect measurement in problem situations that defy direct measurement.	A.9-12.M.1.2A
	Grades: 9-12	9-12.N.2.1A. Students are able to add, subtract, multiply, and divide real numbers including rational exponents.	A.9-12.N.2.1A
	Grades: 9-12	9-12.S.2.1A. Students are able to use probabilities to solve problems.	A.9-12.S.2.1A

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	Course/ Level	Standard	Standard ID
<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.	Grades: 9-12	9-12.S.2.2A. Students are able to determine probability of compound, complementary, independent, and mutually exclusive events.	A.9-12.S.2.2A
	Grades: 9-12	9-12.S.2.3A. Students are able to generate data and use the data to determine empirical (experimental) probabilities.	A.9-12.S.2.3A
	Grades: 9-12	9-12.A.2.1. Students are able to use algebraic properties to transform multi-step, single-variable, first-degree equations.	C.9-12.A.2.1
	Grades: 9-12	9-12.G.1.1. Students are able to apply the properties of triangles and quadrilaterals to find unknown parts.	C.9-12.G.1.1
	Grades: 9-12	9-12.G.2.3. Students are able to use proportions to solve problems.	C.9-12.G.2.3
	Grades: 9-12	9-12.M.1.3. Students are able to use formulas to find perimeter, circumference, and area to solve problems involving common geometric figures.	C.9-12.M.1.3
	Grades: 9-12	9-12.N.2.1. Students are able to add, subtract, multiply, and divide real numbers including integral exponents.	C.9-12.N.2.1
	Grades: 9-12	9-12.N.3.1. Students are able to use estimation strategies in problem situations to predict results and to check the reasonableness of results.	C.9-12.N.3.1
<b>Reasoning</b> Develop and use mathematical arguments and proofs to explore the truth of conjectures and justify conclusions.	Grades: 9-12	Note: Skills for this indicator have been subsumed within applications to advanced skills by the time students reach advanced high school mathematics.	A.
	Grades: 9-12	9-12.G.1.1A. Students are able to justify properties of geometric figures.	A.9-12.G.1.1A
	Grades: 9-12	9-12.G.2.1A. Students are able to use Cartesian coordinates to verify geometric properties.	A.9-12.G.2.1A
	Grades: 9-12	9-12.N.1.2A. Students are able to apply properties and axioms of the real number system to various subsets, e.g., axioms of order, closure.	A.9-12.N.1.2A
	Grades: 9-12	9-12.S.1.1A. Students are able to analyze and evaluate the design of surveys and experiments.	A.9-12.S.1.1A
	Grades: 9-12	9-12.S.1.2A. Students are able to analyze and evaluate graphical displays of data.	A.9-12.S.1.2A
	Grades: 9-12	9-12.S.1.3A. Students are able to compare multiple one-variable data sets, using standard deviation and variance.	A.9-12.S.1.3A

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	Course/ Level	Standard	Standard ID
<b>Reasoning</b> Develop and use mathematical arguments and proofs to explore the truth of conjectures and justify conclusions.	Grades: 9-12	9-12.G.1.2. Students are able to identify and apply relationships among triangles.	C.9-12.G.1.2
	Grades: 9-12	9-12.N.1.2. Students are able to apply the concept of place value, magnitude, and relative magnitude of real numbers.	C.9-12.N.1.2
	Grades: 9-12	9-12.S.1.1. Students are able to draw conclusions from a set of data.	C.9-12.S.1.1
	Grades: 9-12	9-12.S.1.2. Students are able to compare multiple one-variable data sets, using range, interquartile range, mean, mode, and median.	C.9-12.S.1.2
	Grades: 9-12	9-12.S.2.2. Students are able to predict outcomes of simple events using given theoretical probabilities.	C.9-12.S.2.2
<b>Representation</b> Use and translate among representations including verbal, numerical, symbolic and graphical to communicate mathematical ideas and solve problems.	Grades: 9-12	9-12.A.1.1A. Students are able to write equivalent forms of rational algebraic expressions using properties of real numbers.	A.9-12.A.1.1A
	Grades: 9-12	9-12.A.3.2A. Students are able to create formulas to model relationships that are algebraic, geometric, trigonometric, and exponential.	A.9-12.A.3.2A
	Grades: 9-12	9-12.S.1.5A. Students are able to use scatterplots, best-fit lines, and correlation coefficients to model data and support conclusions.	A.9-12.S.1.5A
	Grades: 9-12	9-12.A.1.1. Students are able to write equivalent forms of algebraic expressions using properties of the set of real numbers.	C.9-12.A.1.1
	Grades: 9-12	9-12.A.2.2. Students are able to use algebraic properties to transform multi-step, single-variable, first-degree inequalities and represent solutions using a number line.	C.9-12.A.2.2
	Grades: 9-12	9-12.A.3.1. Students are able to create linear models to represent problem situations.	C.9-12.A.3.1
	Grades: 9-12	9-12.A.4.1. Students are able to use graphs, tables, and equations to represent linear functions.	C.9-12.A.4.1
	Grades: 9-12	9-12.G.2.2. Students are able to reflect across vertical or horizontal lines, and translate two-dimensional figures.	C.9-12.G.2.2
	Grades: 9-12	9-12.M.1.1. Students are able to choose appropriate unit label, scale, and precision.	C.9-12.M.1.1
Grades: 9-12	9-12.S.1.3. Represent a set of data in a variety of graphical forms and draw conclusions.	C.9-12.S.1.3	

# 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.