

Alignments of PSAT/NMSQT Skill Categories and State Standards

PSAT/NMSQT Skill Category and Description of Skills	Colorado Math: Model Content Standards 2005 Course/ Level Standard Standard ID		
Algebra and Functions Solve problems using algebraic expressions and symbols to represent relationships, patterns and functions of different types.	Grades: 9-12	1. model real-world phenomena (for example, distance-versus-time relationships, compound interest, amortization tables, mortality rates) using functions, equations, inequalities, and matrices;	2.1
	Grades: 9-12	2. represent functional relationships using written explanations, tables, equations, and graphs, and describing the connections among these representations;	2.2
	Grades: 9-12	3. solve problems involving functional relationships using graphing calculators and/or computers as well as appropriate paper-and-pencil techniques;	2.3
	Grades: 9-12	4. analyze and explain the behaviors, transformations, and general properties of types of equations and functions (for example, linear, quadratic, exponential); and	2.4
	Grades: 9-12	5. interpret algebraic equations and inequalities geometrically and describing geometric relationships algebraically.	2.5
	Honors/Distinction	use rational, polynomial, trigonometric, and inverse functions to model real-world phenomena;	2.1
	Honors/Distinction	describe the concept of continuity of a function;	2.4
	Honors/Distinction	perform operations on and between functions; and	2.5
Communication Express mathematical ideas precisely and communicate them coherently and clearly in the language and notation of mathematics.	Grades: 9-12	1. demonstrate meanings for real numbers, absolute value, and scientific notation using physical materials and technology in problem-solving situations;	1.1
	Grades: 9-12	1. design and conduct a statistical experiment to study a problem, and interpret and communicate the results using the appropriate technology (for example, graphing calculators, computer software);	3.1
	Grades: 9-12	4. demonstrate the meanings of area under a curve and length of an arc.	5.4
	Grades: 9-12	3. describe the limitations of estimation, and assess the amount of error resulting from estimation within acceptable limits.	6.3
	Honors/Distinction	explain relationships among real numbers, complex numbers, and vectors using models.	1.2
	Honors/Distinction	describe the concept of continuity of a function;	2.4

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<p>Communication</p> <p>Express mathematical ideas precisely and communicate them coherently and clearly in the language and notation of mathematics.</p>	Honors/Distinction	describe, analyze, and extend patterns produced by processes of geometric change (for example, limits and fractals).	4.3
<p>Connections</p> <p>Connect ideas from different areas of mathematics (particularly geometry and algebra) to state or solve abstract or applied problems.</p>	Grades: 9-12	5. interpret algebraic equations and inequalities geometrically and describing geometric relationships algebraically.	2.5
<p>Data, Statistics, and Probability</p> <p>Analyze data, understand descriptive statistics, make inferences and determine the likelihood that certain events will occur.</p>	Grades: 9-12	1. design and conduct a statistical experiment to study a problem, and interpret and communicate the results using the appropriate technology (for example, graphing calculators, computer software);	3.1
	Grades: 9-12	2. analyze statistical claims for erroneous conclusions or distortions;	3.2
	Grades: 9-12	3. fit curves to scatter plots, using informal methods or appropriate technology, to determine the strength of the relationship between two data sets and to make predictions;	3.3
	Grades: 9-12	4. draw conclusions about distributions of data based on analysis of statistical summaries (for example, the combination of mean and standard deviation, and differences between the mean and median);	3.4
	Grades: 9-12	5. use experimental and theoretical probability to represent and solve problems involving uncertainty (for example, the chance of playing professional sports if a student is a successful high school athlete); and	3.5
	Grades: 9-12	6. solve real-world problems with informal use of combinations and permutations (for example, determining the number of possible meals at a restaurant featuring a given number of side dishes).	3.6
	Honors/Distinction	test hypotheses using appropriate statistics;	3.2
	Honors/Distinction	explore the effect of sample size on the results of statistical surveys using experiments and simulations; and	3.3
	Honors/Distinction	solve real-world problems with formal use of combinations and permutations.	3.4

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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.	Grades: 9-12	1. find and analyze relationships among geometric figures using transformations (for example, reflections, translations, rotations, dilations) in coordinate systems;	4.1
	Grades: 9-12	2. derive and use methods to measure perimeter, area, and volume of regular and irregular geometric figures;	4.2
	Grades: 9-12	3. make and test conjectures about geometric shapes and their properties, incorporating technology where appropriate; and	4.3
	Grades: 9-12	1. measure quantities indirectly using techniques of algebra, geometry, or trigonometry;	5.1
	Grades: 9-12	2. select and use appropriate techniques and tools to measure quantities in order to achieve specified degrees of precision, accuracy, and error (or tolerance) of measurements; and	5.2
	Grades: 9-12	3. determine the degree of accuracy of a measurement (for example, by understanding and using significant digits).	5.3
	Grades: 9-12	4. demonstrate the meanings of area under a curve and length of an arc.	5.4
	Honors/Distinction	apply transformations, coordinates, and vectors in problem-solving situations; and	4.2
	Honors/Distinction	describe, analyze, and extend patterns produced by processes of geometric change (for example, limits and fractals).	4.3
Number and Operations Understand types of numbers (integers, fractions, decimals), their properties and the correct order of operations (addition, multiplication, division). Perform computations correctly.	Grades: 9-12	1. demonstrate meanings for real numbers, absolute value, and scientific notation using physical materials and technology in problem-solving situations;	1.1
	Grades: 9-12	2. develop, test, and explain conjectures about properties of number systems and sets of numbers; and	1.2
	Grades: 9-12	3. use number sense to estimate and justify the reasonableness of solutions to problems involving real numbers.	1.3
	Grades: 9-12	1. use ratios, proportions, and percents in problem-solving situations;	6.1
	Grades: 9-12	2. select and use appropriate algorithms for computing with real numbers in problem-solving situations and determine whether the results are reasonable; and	6.2

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	Honors/Distinction	Explain relationships among real numbers, complex numbers, and vectors using models.	1.2
Problem Solving 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	3. use number sense to estimate and justify the reasonableness of solutions to problems involving real numbers.	1.3
	Grades: 9-12	3. solve problems involving functional relationships using graphing calculators and/or computers as well as appropriate paper-and-pencil techniques;	2.3
	Grades: 9-12	5. use experimental and theoretical probability to represent and solve problems involving uncertainty (for example, the chance of playing professional sports if a student is a successful high school athlete); and	3.5
	Grades: 9-12	6. solve real-world problems with informal use of combinations and permutations (for example, determining the number of possible meals at a restaurant featuring a given number of side dishes).	3.6
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Honors/Distinction	Perform operations on and between functions; and	2.5	

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<p>Problem Solving</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>	Honors/Distinction	solve real-world problems with formal use of combinations and permutations.	3.4
<p>Reasoning</p> <p>Develop and use mathematical arguments and proofs to explore the truth of conjectures and justify conclusions.</p>	Grades: 9-12	2. develop, test, and explain conjectures about properties of number systems and sets of numbers; and	1.2
	Grades: 9-12	4. analyze and explain the behaviors, transformations, and general properties of types of equations and functions (for example, linear, quadratic, exponential); and	2.4
	Grades: 9-12	2. analyze statistical claims for erroneous conclusions or distortions;	3.2
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	Grades: 9-12	1. find and analyze relationships among geometric figures using transformations (for example, reflections, translations, rotations, dilations) in coordinate systems;	4.1
	Grades: 9-12	3. make and test conjectures about geometric shapes and their properties, incorporating technology where appropriate; and	4.3
	Honors/Distinction	test hypotheses using appropriate statistics;	3.2
<p>Representation</p> <p>Use and translate among representations including verbal, numerical, symbolic and graphical to communicate mathematical ideas and solve problems.</p>	Grades: 9-12	1. model real-world phenomena (for example, distance-versus-time relationships, compound interest, amortization tables, mortality rates) using functions, equations, inequalities, and matrices;	2.1
	Grades: 9-12	2. represent functional relationships using written explanations, tables, equations, and graphs, and describing the connections among these representations;	2.2
	Honors/Distinction	use rational, polynomial, trigonometric, and inverse functions to model real-world phenomena;	2.1

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<p>Representation</p> <p>Use and translate among representations including verbal, numerical, symbolic and graphical to communicate mathematical ideas and solve problems.</p>	Honors/Distinction	apply transformations, coordinates, and vectors in problem-solving situations; and	4.2

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.