

Alignments of PSAT/NMSQT Skill Categories and State Standards

PSAT/NMSQT Skill Category and Description of Skills	Nevada Math: Academic Standards 2006		
	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	Use algebraic expressions to identify and describe the n th term of a sequence.	2.12.1.1
	Grades: 9-12	Isolate any variable in given equations, inequalities, proportions, and formulas to use in mathematical and practical situations.	2.12.2.1
	Grades: 9-12	Add, subtract, multiply, and factor 1st and 2nd degree polynomials connecting the arithmetic and algebraic processes.	2.12.3.1
	Grades: 9-12	Simplify algebraic expressions, including exponents and radicals.	2.12.3.2
	Grades: 9-12	Determine the domain and range of functions, including linear, quadratic, and absolute value, algebraically and graphically.	2.12.4.1
	Grades: 9-12	Solve absolute value equations and inequalities both algebraically and graphically.	2.12.4.2
	Grades: 9-12	Solve systems of two linear equations algebraically and graphically and verify solutions (with and without technology).	2.12.5.1
Communication Express mathematical ideas precisely and communicate them coherently and clearly in the language and notation of mathematics.	Grades: 9-12	Communicate and evaluate mathematical thinking based on the use of definitions, properties, rules, and symbols in problem solving	B.4
	Grades: 9-12	Evaluate written and oral presentations in mathematics.	B.2
	Grades: 9-12	Model and explain mathematical relationships using oral, written, graphic, and algebraic methods	B.3
	Grades: 9-12	Use everyday language, both orally and in writing, communicate strategies and solutions to problems using appropriate mathematical language	B.5
	Grades: 9-12	Isolate any variable in given equations, inequalities, proportions, and formulas to use in mathematical and practical situations.	2.12.2.1
	Grades: 9-12	Justify, communicate, and differentiate between precision, error, and tolerance in practical problems.	3.12.2.1
	Grades: 9-12	Interpret and apply consumer data presented in charts, tables, and graphs to make informed financial decisions related to practical applications.	3.12.4.1

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Communication Express mathematical ideas precisely and communicate them coherently and clearly in the language and notation of mathematics.	Grades: 9-12	Distinguish between a sample and a census.	5.12.3.1
	Grades: 9-12	Identify sources of bias and their effect on data representations and statistical conclusions.	5.12.3.2
	Grades: 9-12	Design, conduct, analyze, and effectively communicate the results of multi-stage probability experiments.	5.12.5.2
	Grades: 9-12	Design, construct, analyze, and select an appropriate type of graphical representations to communicate the results of a statistical experiment.	5.12.6.1
Connections Connect ideas from different areas of mathematics (particularly geometry and algebra) to state or solve abstract or applied problems.	Grades: 9-12	Apply mathematical thinking and modeling to solve problems that arise in other disciplines, such as rhythm in music and motion in science	D.4
	Grades: 9-12	Explain the relationship between concepts and procedures	D.2
	Grades: 9-12	Identify, explain, and apply mathematics in everyday life	D.5
	Grades: 9-12	Use mathematical ideas from one area of mathematics to explain an idea from another area of mathematics	D.1
	Grades: 9-12	Use the connections among mathematical topics to develop multiple approaches to problems	D.3
	Grades: 9-12	Determine the slope of lines using coordinate geometry and algebraic techniques.	4.12.5.1
	Grades: 9-12	Identify parallel, perpendicular, and intersecting lines by slope.	4.12.5.2
	Grades: 9-12	Graph linear equations and find possible solutions to those equations using coordinate geometry.	4.12.5.3
Data, Statistics, and Probability Analyze data, understand descriptive statistics, make inferences and determine the likelihood that certain events will occur.	Grades: 9-12	Organize statistical data through the use of tables, graphs, and matrices (with and without technology).	5.12.1.1
	Grades: 9-12	Select and apply appropriate statistical measures in mathematical and practical situations.	5.12.2.1
	Grades: 9-12	Distinguish between a sample and a census.	5.12.3.1
	Grades: 9-12	Identify sources of bias and their effect on data representations and statistical conclusions.	5.12.3.2

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Data, Statistics, and Probability Analyze data, understand descriptive statistics, make inferences and determine the likelihood that certain events will occur.	Grades: 9-12	Use the shape of a normal distribution to compare and analyze data from a sample.	5.12.3.3
	Grades: 9-12	Apply permutations and combinations to mathematical and practical situations, including the Fundamental Counting Principle.	5.12.4.1
	Grades: 9-12	Determine the probability of an event with and without replacement using sample spaces.	5.12.5.1
	Grades: 9-12	Design, conduct, analyze, and effectively communicate the results of multi-stage probability experiments.	5.12.5.2
	Grades: 9-12	Design, construct, analyze, and select an appropriate type of graphical representations to communicate the results of a statistical experiment.	5.12.6.1
	Grades: 9-12	Formulate and justify inferences based on a valid data sample.	5.12.6.2
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	Estimate and convert between customary and metric systems.	3.12.1.1
	Grades: 9-12	Justify, communicate, and differentiate between precision, error, and tolerance in practical problems.	3.12.2.1
	Grades: 9-12	Select and use appropriate measurement tools, techniques, and formulas to solve problems in mathematical and practical situations.	3.12.3.1
	Grades: 9-12	Interpret and apply consumer data presented in charts, tables, and graphs to make informed financial decisions related to practical applications.	3.12.4.1
	Grades: 9-12	Determine the measure of unknown dimensions, angles, areas, and volumes using relationships and formulas to solve problems.	3.12.5.1
	Grades: 9-12	Identify and use the parts of a circle to solve mathematical and practical problems.	4.12.1.1
	Grades: 9-12	Identify and apply properties of interior and exterior angles of polygons to solve mathematical and practical problems.	4.12.1.2
	Grades: 9-12	Determine the slope of lines using coordinate geometry and algebraic techniques.	4.12.5.1
	Grades: 9-12	Identify parallel, perpendicular, and intersecting lines by slope.	4.12.5.2

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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	Graph linear equations and find possible solutions to those equations using coordinate geometry.	4.12.5.3
	Grades: 9-12	Find possible solution sets of systems of equations whose slopes indicate parallel, perpendicular, or intersecting lines.	4.12.5.4
	Grades: 9-12	Solve problems using complementary and supplementary angles, congruent angles, vertical angles, angles formed when parallel lines are cut by a transversal and angles in polygons.	4.12.6.1
	Grades: 9-12	Apply the Pythagorean Theorem and its converse in mathematical and practical situations.	4.12.7.1
	Grades: 9-12	Solve problems by drawing and/or constructing geometric figures to demonstrate geometric relationships.	4.12.8.1
	Grades: 9-12	Formulate, evaluate, and justify arguments using inductive and deductive reasoning in mathematical and practical situations.	4.12.9.1
Number and Operations Understand types of numbers (integers, fractions, decimals), their properties and the correct order of operations. Perform computations correctly.	Grades: 9-12	Determine an approximate value of radical and exponential expressions using a variety of methods.	1.12.6.1
	Grades: 9-12	Solve mathematical problems involving exponents and roots.	1.12.7.1
	Grades: 9-12	Identify and apply real number properties to solve problems.	1.12.8.1
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	Apply combinations of proven strategies and previous knowledge to solve non-routine problems	A.8
	Grades: 9-12	Apply problem solving strategies until a solution is found or it is clear that no solution exists	A.3
	Grades: 9-12	Apply technology as a tool in problem solving situations	A.7
	Grades: 9-12	Check the reasonableness of a solution	A.6
	Grades: 9-12	Determine an efficient strategy, verify, interpret, and evaluate the results with respect to the original problem	A.2
	Grades: 9-12	Generalize solutions and apply previous knowledge to new problem solving situations	A.1

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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.	Grades: 9-12	Identify necessary and extraneous information	A.5
	Grades: 9-12	Interpret and solve a variety of mathematical problems by paraphrasing	A.4
	Grades: 9-12	Use a variety of techniques to solve mathematical problems	B.1
	Grades: 9-12	Determine an approximate value of radical and exponential expressions using a variety of methods.	1.12.6.1
	Grades: 9-12	Solve mathematical problems involving exponents and roots.	1.12.7.1
	Grades: 9-12	Identify and apply real number properties to solve problems.	1.12.8.1
	Grades: 9-12	Add, subtract, multiply, and factor 1st and 2nd degree polynomials connecting the arithmetic and algebraic processes.	2.12.3.1
	Grades: 9-12	Determine the domain and range of functions, including linear, quadratic, and absolute value, algebraically and graphically.	2.12.4.1
	Grades: 9-12	Solve absolute value equations and inequalities both algebraically and graphically.	2.12.4.2
	Grades: 9-12	Solve systems of two linear equations algebraically and graphically and verify solutions (with and without technology).	2.12.5.1
	Grades: 9-12	Solve mathematical and practical problems involving linear and quadratic equations with a variety of methods, including discrete methods (with and without technology).	2.12.6.1
	Grades: 9-12	Select and use appropriate measurement tools, techniques, and formulas to solve problems in mathematical and practical situations.	3.12.3.1
	Grades: 9-12	Determine the measure of unknown dimensions, angles, areas, and volumes using relationships and formulas to solve problems.	3.12.5.1
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	Grades: 9-12	Find possible solution sets of systems of equations whose slopes indicate parallel, perpendicular, or intersecting lines.	4.12.5.4
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	Grades: 9-12	Determine the probability of an event with and without replacement using sample spaces	5.12.5.1
Reasoning Develop and use mathematical arguments and proofs to explore the truth of conjectures and justify conclusions.	Grades: 9-12	Construct a valid argument	C.5
	Grades: 9-12	Justify the validity of an argument	C.4
	Grades: 9-12	Make and test conjectures about algebraic and geometric properties based on mathematical principles	C.3
	Grades: 9-12	Recognize and apply deductive and inductive reasoning	C.1
	Grades: 9-12	Review and refine the assumptions and steps used to derive conclusions in mathematical arguments	C.2
	Grades: 9-12	Formulate, evaluate, and justify arguments using inductive and deductive reasoning in mathematical and practical situations.	4.12.9.1

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	Grades: 9-12	Use the shape of a normal distribution to compare and analyze data from a sample.	5.12.3.3
	Grades: 9-12	Formulate and justify inferences based on a valid data sample.	5.12.6.2
Representation Use and translate among representations including verbal, numerical, symbolic and graphical to communicate mathematical ideas and solve problems.	Grades: 9-12	Use algebraic expressions to identify and describe the nth term of a sequence.	2.12.1.1
	Grades: 9-12	Simplify algebraic expressions, including exponents and radicals.	2.12.3.2
	Grades: 9-12	Estimate and convert between customary and metric systems.	3.12.1.1
	Grades: 9-12	Organize statistical data through the use of tables, graphs, and matrices (with and without technology).	5.12.1.1

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.