



**SAT[®] SUITE
OF ASSESSMENTS**

Alignment to Texas Standards

**COLLEGE BOARD AND
TEXAS**

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Executive Summary

While College Board’s SAT® Suite of Assessments was not designed to assess the attainment of any single set of academic content standards, its tests measure knowledge and skills that the best available evidence shows are essential for college and career readiness and success. The SAT Suite, which includes the SAT, PSAT/NMSQT® and PSAT™ 10, and PSAT™ 8/9, provides students and their families, educators, and states, districts, and schools with a longitudinal, evidence-based assessment system that measures growth in relation to essential college and career readiness and success outcomes from grade 8 through grade 12. College Board is committed to ensuring that students are ready to make successful transitions to college and workforce training by the time they leave high school.

The key features of the SAT Suite’s English language arts/literacy-related assessments are

- the use of a specified range of text complexity consistent with college and workforce training requirements;
- an emphasis on source analysis and use of evidence;
- the inclusion of data and informational graphics, which students must analyze in conjunction with text;
- a focus on words in context and on word choice for rhetorical effect;
- attention to a core set of important Standard Written conventions and to effective written expression more generally; and
- the requirement that students work and demonstrate facility with texts across a wide range of disciplines, including literature, history/social studies, science, and the humanities.

The key features of the SAT Suite’s math assessments are

- a strong focus on the content that matters most for college and career readiness and success;
- an emphasis on rich applied problems in real-life settings in which the use of mathematical practices is integrated with the content;
- a balance of fluency, conceptual understanding, and application items within and across all content topics;
- an emphasis on problem-solving and data analysis; and
- the inclusion of both calculator and no-calculator portions as well as attention to the strategic use of a calculator as a tool.

Based on a thorough review of the Texas Mathematics and English Language Arts and Reading standards, we find that the SAT Suite **strongly aligns** with Texas’s standards and thereby supports Texas students’ progress toward educational and workplace success. In this report, we examine the alignment of both the Texas College and Career Readiness Standards as well as the Texas Essential Knowledge and Skills to the SAT Suite. Considering alignment matches of over 50% as “strong,” and matches greater than 75% as “very strong,” our team found the following:

College Board Assessment	Texas Standards	Degree of Alignment
SAT	College and Career Readiness Standards for Mathematics	Strong
SAT	College and Career Readiness Standards for English/Language Arts	Strong
SAT, PSAT/NMSQT and PSAT 10	Texas Essential Knowledge and Skills for Mathematics (high school)	Very Strong
PSAT 8/9	Texas Essential Knowledge and Skills for Mathematics (middle school)	Very Strong
SAT Suite	Texas Essential Knowledge and Skills for English Language Arts and Reading	Strong

In the sections that follow, we offer an overview of the SAT Suite, the evidentiary foundations that support the SAT Suite, a description of our alignment methodology, and a detailed summary of our findings in each content area. Appendices to this document provide standard-by-standard alignment tables in each grade/course and subject area.

Section 1: The SAT Suite of Assessments

The SAT Suite of Assessments (consisting of the SAT, PSAT/NMSQT, PSAT 10, and PSAT 8/9) focuses on the knowledge and skills that high-quality research shows are essential for college and career readiness and success. The assessments also reflect the work students are doing in secondary classrooms across the country, meaning that students are rewarded for the hard work they are already doing in school and that they can focus their practice for the SAT Suite assessments on developing durable knowledge and skills rather than on short-term test prep of limited value.

The SAT Suite makes it easier for students to navigate a path through high school, college, and workforce training by providing unmatched benefits to students and their families, educators, and states, districts, and schools, including

- focused, clear, and useful assessments that reflect the knowledge and skills that research shows are essential for college and career readiness and success;
- free, personalized, focused practice resources for all students;
- college opportunities through scholarships, fee waivers, and AP[®] credit; and
- career opportunities through powerful career-planning partnerships and a focus on coding and STEM.

The assessments in the SAT Suite are scored on the same underlying scale, which provides a powerful tool for measuring growth. Taken together, these assessments provide benchmarks and consistent feedback, showing student progress over time and allowing teachers to accelerate students who are ahead and appropriately support those who are behind.

PSAT 8/9. Taken in the fall or spring of eighth or ninth grade, the PSAT 8/9 serves as a foundation for student progress in high school and helps ensure students are on target for being college and career ready by the time they leave high school.

PSAT/NMSQT and PSAT 10. Students take the PSAT/NMSQT in the fall of tenth or eleventh grade (though only eleventh graders are eligible for the National Merit Scholarship Program); some schools may instead deliver the PSAT 10 in the spring of students' tenth-grade year. Both assessments cover the same content domain and serve as a "check-in" on student progress and to pinpoint areas for development.

SAT. The SAT is offered throughout the school year and provides a powerful connection to college. Most students take the SAT for the first time during the spring of their junior year and a second time during the fall of their senior year.

Section 2: Evidentiary Foundation

This section summarizes the evidence base undergirding several key elements of the design of the SAT Suite’s Evidence-Based Reading and Writing (ERW) and Math sections and the SAT Essay. A fuller treatment of the ERW/Essay evidence base is available via a collection of expert-authored essays on the topics discussed below (as well as on helping all English learners attain college and career readiness)

(<https://collegereadiness.collegeboard.org/pdf/sat-suite-classroom-practice-english-language-arts-literacy.pdf>).

English Language Arts/Literacy

Text Complexity

Text complexity has become an increasingly recognized factor in college and career readiness. State standards as well as assessment systems have established text complexity requirements, reflecting the understanding that by no later than the end of high school, students must be able to read complex text (i.e., text at the level typically read in common credit-bearing, entry-level postsecondary courses in a variety of disciplines) proficiently and independently in order to be ready for college and workforce training.

Text complexity is a key consideration on the SAT Suite Reading and SAT Suite Writing and Language Tests and on the optional SAT Essay.

Students taking the Reading Test and the Writing and Language Test are presented with passages of a consistent range of text complexity, as measured quantitatively and qualitatively. The SAT versions of the tests contain passages in the grades 9–10, grades 11–CCR (college and career readiness), and early postsecondary text complexity bands. (Passages in the last range have a complexity comparable to that of texts frequently assigned in common first-year, credit-bearing postsecondary courses.) The PSAT/ NMSQT® and PSAT™ 10 Reading and Writing and Language Tests contain passages in the grades 9–10 and grades 11–CCR bands. The PSAT™ 8/9 tests include passages in the upper end of the grades 6–8 band as well as passages in the grades 9–10 band. The SAT Essay includes passages in the high school (grades 9–12) text complexity range.

Text complexity consistency in each testing program (SAT, PSAT/NMSQT and PSAT 10, and PSAT 8/9) ensures that students are presented with passages of comparable difficulty regardless of when or how they take the test. The increasing average complexity of passages as one moves from PSAT 8/9 to PSAT/ NMSQT and PSAT 10 to SAT is consistent with the research outlined in this chapter as well as the general goal of assessing students’ readiness or progress toward readiness for success in college and workforce training programs.

Close Reading, Textual Evidence, and Source Analysis

Close reading, the use of textual evidence, and source analysis are a cluster of related skills the mastery of which facilitates students’ acquisition of information and ideas from text, especially the complex text they will encounter in postsecondary coursework. Close reading involves attending carefully to a text, or a portion of a text, to determine the text’s message as well as how the author has constructed the message. Instructionally, this approach typically involves making multiple passes through a text (initially for gist, and then for other features, such as vocabulary or word choice), asking and answering text-dependent questions, and potentially other activities, such as annotating, summarizing, and producing a written response. Many close reading activities are best situated in collaborative social environments, in which all students, but especially those with less-developed reading abilities, can learn from each other. In the course of close reading and other reading (and speaking and presenting) activities, students make use of textual evidence—facts, details, quotations, data, and the like—to

support their interpretations of text and to answer their own and others' questions about text. One common instructional activity that calls on close reading skills and facility with textual evidence is source-based analytical writing. In this activity, students pay careful attention to what a text says and how it says it, using textual evidence to support their interpretation, in order to mount an effective argument about or convey a cogent explanation regarding the text's message and rhetoric. When this work focuses on the rhetorical aspects of text, students pay particular attention to how an author's choices in terms of purpose, structure, perspective, syntax, word choice, and stylistic and persuasive elements, among other features, shape the message, tone, and aesthetics.

Close reading, use of textual evidence, and source analysis are foundational to the SAT Suite Reading Tests and the optional SAT Essay. On the SAT Suite Reading Tests, students are expected to closely read a range of appropriately challenging passages (sources) drawn from a variety of subject areas and to determine what the authors of these passages say directly and imply. Numerous questions on the Reading Tests also ask students to determine the best textual evidence either for the answer to another question or for an inference supplied by the evidence question itself; these questions are collectively a major contributor to the Command of Evidence subscore. The SAT Essay is a rich and authentic source-analysis task. Students must read an appropriately challenging argumentative passage, analyze the passage to ascertain how the author builds the argument to persuade the audience, and write a clear and cogent response demonstrating their reading comprehension, presenting their analysis of the passage, and exhibiting their writing and language skills and knowledge. Students taking the Essay receive separate Reading, Analysis, and Writing scores, which help them more easily identify strengths and weaknesses in their capabilities.

Vocabulary and Knowledge

Vocabulary and knowledge have significant, sometimes underappreciated roles in both reading comprehension and in college and career readiness more generally. The breadth and depth of students' vocabularies—that is, how many words and phrases students know and how much they know about them—are both important to proficient reading comprehension, especially when students are faced with challenging texts that make extensive use of high-utility academic (tier two) words and phrases. These words and phrases are commonly encountered in texts (and more frequently in complex texts than in simpler ones) across a range of subjects but are relatively uncommon in speech. They differ from the kinds of words and phrases that young listeners typically pick up through conversation at a relatively early age and also from the sorts of technical language specific to particular disciplines, such as science. Knowledge, too, is a powerful factor in reading comprehension. Indeed, research has shown that readers who are highly knowledgeable about a subject can make up for shortcomings in their reading abilities when reading texts about that subject. One tie that binds vocabulary and knowledge is that both operate reciprocally with reading comprehension: strong vocabularies and deep and broad knowledge bases facilitate reading comprehension; in turn, the act of reading bolsters vocabularies and yields knowledge.

Vocabulary is a critical component of the SAT Suite Reading and SAT Suite Writing and Language Tests and the optional SAT Essay. The Reading and the Writing and Language Tests maintain a strong focus on tier two ("high-utility academic") words and phrases—the powerful, versatile vocabulary that's critical for unlocking the meaning of texts (especially complex texts) across the curriculum and for college and career readiness and success more generally. Questions associated with each Reading Test passage will ask students to determine the meaning of a word or phrase in context, analyze an author's word choice in context, or both. Questions associated with each Writing and Language Test passage will ask students to make revisions that improve the precision and concision of language, establish or maintain contextually appropriate style and tone, and combine sentences or parts of sentences to enhance meaning and flow. Students' performance on these Reading and Writing and Language questions determines their Words in Context subscore. On the Essay, students' Writing scores are based in part on the degree to which their responses exhibit sentence variety, precision of word choice, and a formal style and objective tone.

The SAT Suite Reading, SAT Suite Writing and Language, and SAT Essay tests measure students' reading, analysis, writing, and language skills and knowledge. While these tests aren't measures of students' knowledge in the subject areas they sample (e.g., history/social studies, science), they do call on students' developed abilities to read and comprehend appropriately challenging texts in these areas, to use critical reasoning and analytical skills developed in subject area courses, and to apply their skills and knowledge to questions and tasks commonly associated with the various subjects. Knowledge building in the subject areas thus lays the foundation for success on the tests and, more importantly, for the post-high school educational opportunities the tests' requirements mirror.

Standard English Conventions

Facility with the conventions of Standard English—the spoken and written language varieties that are viewed as most prestigious in the United States and that are expected in most institutional contexts, such as government and schools—is a highly valuable capacity for college and career readiness and success. Such facility is not really a matter of writing or speaking “correctly”—the “rules” of language are, in any case, more in the nature of widely accepted (and not always observed) patterns that change over time and are only situationally, not intrinsically, valuable—but rather operates as knowledge of a set of standardized practices enabling clear and rhetorically effective formalized communication to and with a broad audience. Calling attention as we do here to the place of Standard English in communication isn't intended to diminish the value or significance of vernacular or nonstandard dialects; such language varieties, including Appalachian English, African American English, and Chicano English, are as complete and grammatical as Standard English, and decades of research have shown that valuing, discussing, and building on students' home languages and dialects benefits their language and literacy learning. Nonetheless, skill with Standard English remains important to settings, such as K–12 and college classes and workforce training programs, where this variety of English is typically used.

Rhetorically effective language use and the conventions of Standard Written English are important areas of emphasis on the SAT Suite Writing and Language Tests and on the optional SAT Essay. The Writing and Language Tests on the SAT, PSAT/NMSQT, PSAT 10, and PSAT 8/9 are assessments of students' developed ability to revise and edit well-written multi-paragraph passages on a range of subject areas, including history/social studies, the humanities, and science, as well as on career-related topics. The tests measure, in part, to what extent students can use language precisely and concisely, employ a consistent and effective style and tone, and combine sentences to enhance clarity and cohesion or to achieve other rhetorical aims. The tests also include numerous questions associated with a defined set of Standard English conventions concerning grammar, usage, and punctuation. Students aren't expected to demonstrate the rote recall of conventions-related “rules” or to apply conventions knowledge in context-free ways; instead, students must call on their understanding of grammar, usage, and punctuation as well as specific passage contexts in order to make decisions about how (or whether) to edit passages at particular, indicated points.

The SAT Essay is an optional task that requires students to produce a clear, cogent written response to a prompt. Students taking the Essay must read and analyze a provided source text in order to explain how the author builds an argument to persuade the audience. Students are evaluated, in part, on the extent to which they are able to produce a response that uses language precisely, maintains a formal style and objective tone, contains various sentence structures, and shows control of the conventions of Standard Written English.

The language-related skills and knowledge noted above are useful not only on the Writing and Language Tests and in crafting an Essay response but also in reading and analyzing the challenging passages that appear on the SAT Suite Reading Tests as well as the source text associated with the Essay prompt. These passages convey substantial amounts of information and ideas in ways that can be subtle or complex, such as through sophisticated sentence structures that require careful attention to follow.

Disciplinary Literacy

Disciplinary literacy refers generally to a set of practices facilitating readers' (and writers' and speakers') interactions with print and nonprint texts in various fields and subfields of study. Understanding of the norms and conventions regarding how the various disciplines construct and communicate information and ideas is critical for K–12 and postsecondary success, especially as the texts with which students engage become more complex and more specialized by subject. It's important here to distinguish disciplinary knowledge from content knowledge. Content knowledge refers to an awareness or understanding of information on a particular topic. Disciplinary knowledge, by contrast, encompasses an awareness of a discipline's purposes and methodologies: how and why experts do their work, what constitutes a reasonable claim, and how one can appropriately refute such claims. It's this disciplinary knowledge that underlies a discipline's literate practices, and students must have such knowledge if they're to read and write appropriately within a discipline.

The requirements of literacy in the disciplines deeply inform SAT Reading Test and SAT Writing and Language Test passages and questions. Reading Test passages, which are excerpted or minimally adapted from previously published, high-quality sources, are selected in part to reflect the demands of reading in the disciplines of literature, history/social studies, and science. Reading Test science and social science passages, for example, discuss hypotheses, methodology, data, conclusions, and implications and are often accompanied by informational graphics (tables, graphs, and the like) that display associated data and otherwise complement the information and ideas conveyed in words. Writing and Language Test passages, which are written for the test, address topics in the content areas of history/social studies, the humanities, and science and may also be accompanied by informational graphics. As much as possible, questions on both tests ask students to respond in ways appropriate to the various disciplines—for example, by locating and interpreting data in science or social science informational graphics and by considering theme, motivation, and word choice in literature passages.

Math

The overall aim of the SAT Suite Math Tests is to assess students' fluency with, understanding of, and ability to apply the mathematical concepts, skills, and practices that are most strongly prerequisite for and useful across a range of college majors and careers. As will become clear below, the SAT Suite Math Tests reward a strong command of a relatively few topics most strongly prerequisite for college and career readiness and success. To succeed on the SAT Suite Math assessments, students need to exhibit command of mathematical practices, fluency with mathematical procedures, and conceptual understanding of mathematical ideas. In keeping with the evidence, the exams provide opportunities for rich applied problems.

Focus on the Math That Matters Most

There is a major disconnect today in mathematics between the K–12 and higher education systems. In one national survey (ACT 2009), high school teachers and postsecondary instructors were asked whether students were leaving high school prepared for college-level mathematics. Almost 90 percent of high school teachers said yes. Almost 75 percent of postsecondary instructors said no.

The results of this disconnect can be seen in the high remediation rates that are common in postsecondary institutions. In remedial classes, students often must pay out of their own pocket to learn what they ought to have learned in the K–12 school system. Students in remedial classes also face lower odds of finishing their desired degree program.

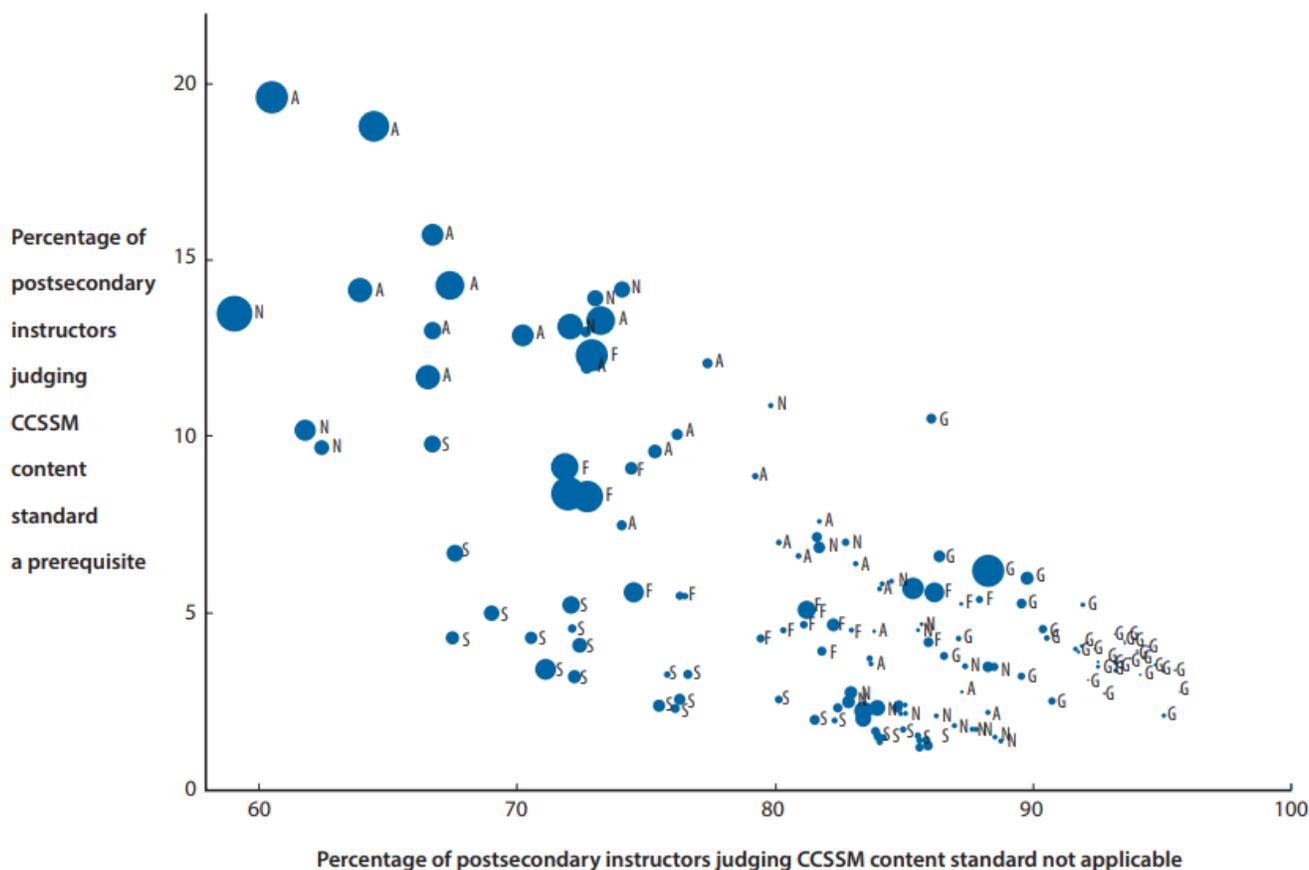
One of the most important ways the SAT Suite Math Tests address the gap between postsecondary and K–12 expectations is through the exams' concentrated focus on the content that matters most for postsecondary education.

Surveys of postsecondary faculty and studies of entry-level postsecondary course demands have repeatedly pointed to the conclusion that postsecondary instructors value greater command of a smaller set of prerequisites over shallow exposure to a wide array of topics. The former allows students to build on what they know and to apply this knowledge to solve substantive problems (Conley 2003). As one survey noted:

Because the postsecondary survey results indicate that a more rigorous treatment of fundamental content knowledge and skills needed for credit-bearing college courses would better prepare students for postsecondary school and work, states would likely benefit from examining their state standards and, where necessary, reducing them to focus only on the knowledge and skills that research shows are essential to college and career readiness and postsecondary success (ACT 2009, 6-7).

More recently, in a national survey published in 2011 by David Conley and his colleagues, more than 1,800 postsecondary instructors from a wide range of content areas and institutional types rated the importance of each high school content standard in the Common Core State Standards for Mathematics. The results of this survey reinforce the conclusion that some content areas require much stronger emphasis than others. The distinctive importance of algebra is unmistakable based on Conley's data, as shown in the figure that follows. Other math domains have a more mixed profile, typically including more material that is not as relevant to most postsecondary work and/or not a prerequisite for most postsecondary work. The data from this study directly support the content choices made for the SAT Suite.

POSTSECONDARY SURVEY: DIFFERENTIAL IMPORTANCE OF COMMON CORE STATE STANDARDS IN MATH (CCSSM)



The horizontal axis plots postsecondary (two- and four-year) instructor evaluation of the applicability of the CCSSM content standard to introductory college courses, ranging from most applicable (left) to least (right). The vertical axis plots the percentage of postsecondary instructors judging the importance of the CCSSM content standard as a prerequisite to introductory college courses. Bubbles are larger or smaller, according to importance. Legend: N = Number and Quantity; A = Algebra; F = Functions; G = Geometry; S = Statistics and Probability.

In October 2013, the Council of Chief State School Officers released a set of summative assessment principles for English language arts/literacy and mathematics assessments aligned to college and career readiness standards. These assessment principles are meant to form the basis for states' evaluations of their assessment systems. The principles greatly stress the importance of focusing summative assessments on what matters most. The very first alignment principle in mathematics is that of "focusing strongly on the content most needed for success in later mathematics." As the document notes, "In a [college- and career-ready]-aligned assessment system . . . high school focuses on widely applicable prerequisites for careers and postsecondary education" (Council of Chief State School Officers 2013). The SAT Suite Math Tests embrace this principle.

Problem-Solving and Data Analysis

There is ample evidence that problem-solving and data analysis—the ability to create a representation of a problem, consider the units involved, attend to the meaning of quantities, and know and use different properties of operations and objects—are important for college, work, and life. However, the U.S. results on the Programme for International Student Assessment (PISA) exam, which includes a test of mathematical literacy, show that our

schools aren't doing well in producing quantitatively literate graduates. Quantitative literacy is part of participation in a democracy; it's important to employers, who need employees who can use mathematics outside of the classroom. In a survey of 318 employers asked about the necessary skills for a college graduate in today's economy, 90% responded that higher education should continue to emphasize or increase the emphasis on a student's ability to work with numbers and understand statistics (Hart Research Associates 2013).

Also supporting the emphasis of the SAT Suite Math Tests on problem-solving and data analysis is a study by the National Center on Education and the Economy (2013), which analyzed the actual mathematical demands of course syllabi and assignments in two-year institutions. The study found that students pursuing two-year degree programs must be able to work with multistep problems involving ratios, proportional relationships, percentages, unit conversions, and complex measurement problems.

Such problems are an ideal connection point for science and for college and career readiness because so many of the quantities in applied science involve proportional relationships and/or are formed by division (such as rates, densities, and gradients). Consequently, much elementary applied science amounts to thinking proportionally and combining proportions (Conley 2003). Consider, for example, a problem in which students use reference data to determine the energy cost of different fuels, drawing on proportional relationships, unit conversion, and other skills. Practical, career-related contexts, such as scale drawings of diesel mechanics and construction estimating, are dense with unit rates, proportional relationships, percentages, and the like.

The problem-solving and data analysis elements of the SAT Suite Math Tests contain multipart problems. These problems allow students to explore a rich situation at length. That, in turn, allows the SAT Suite Math Tests to incorporate mathematical modeling and other mathematical practices. This feature of the SAT Suite Math Tests also reflects the structure of the PISA exam, which is administered in sets, each consisting of several items.

The Strategic Use of the Calculator

The data are clear that postsecondary instructors expect students to be fluent in rational number arithmetic (ACT 2007, 2009; Conley 2003). Having a no-calculator portion on the SAT Suite Math Tests helps assure postsecondary instructors that students who earn high scores don't lack the basic prerequisites.

A calculator is a tool, and decisions about when and when not to use it involve a variety of considerations. For example, consider a problem where the main goal is to choose a mathematical model for a complex situation, perform some calculations with the model, and then relate the results of these calculations back to the original situation. On the one hand, using a calculator enables the student to focus on the efficacy of the model and the evaluation of its conclusions. On the other hand, a robust sense of problem-solving and data analysis is crucial to monitoring the calculations, and a strong feeling for algebraic structure guides wise choices in constructing the model and executing its procedures. It's possible to rely too much on the computational abilities of the calculator at the expense of paying attention to the abstract and quantitative reasoning that undergirds the math. Conversely, it's also possible to get bogged down in numerical and algebraic calculations that are best handled by technology.

Questions in the calculator portion of the exams are designed to probe students' ability to make wise choices between these two extremes. For some questions, the calculator lends efficiency; for others, the ability to make use of structure or to reason abstractly leads to the most rapid solution. The calculator portion contains both sorts of questions; notably, not all questions in this portion will be best solved using a calculator.

Section 3: The SAT Suite Elements and Essay Scoring Dimensions

This section provides additional information about the elements of the multiple-choice SAT Suite assessments as well as the scoring dimensions of the SAT Essay. The SAT, PSAT/NMSQT, PSAT 10, and PSAT 8/9 each include three components: a Reading Test, a Writing and Language Test, and a Math Test. The SAT also includes a fourth, optional direct-writing task, the Essay. The following tables provide more detail about the construct each component measures.

Reading Test

The Reading Test is a carefully constructed, challenging assessment of comprehension and reasoning skills with an unmistakable focus on careful reading of appropriately difficult passages in a wide array of subject areas. The table that follows provides descriptions of the elements of the Reading Test.

Reading Test Element	Description
Text Complexity	<p>For SAT: The passages/pair on the SAT Reading Test represent a specified range of text complexities from grades 9–10 to postsecondary entry.</p> <p>For PSAT/NMSQT and PSAT 10: The passages/pair on the PSAT/NMSQT and PSAT 10 Reading Tests represent a specified range of text complexities from grades 9 to 12.</p> <p>For PSAT 8/9: The passages/pair on the PSAT 8/9 Reading Test represent a specified range of text complexities from grades 6 to 10.</p>
Information and Ideas	These questions focus on the informational content of text.
Reading closely	These questions focus on the explicit and implicit meaning of text and on extrapolating beyond the information and ideas in a text.
Determining explicit meanings	The student will identify information and ideas explicitly stated in text.
Determining implicit meanings	The student will draw reasonable inferences and logical conclusions from text.
Using analogical reasoning	The student will extrapolate in a reasonable way from the information and ideas in a text or apply information and ideas in a text to a new, analogous situation.
Citing textual evidence	The student will cite the textual evidence that best supports a given claim or point.
Determining central ideas and themes	The student will identify explicitly stated central ideas or themes in text and determine implicit central ideas or themes from text.
Summarizing	The student will identify a reasonable summary of a text or of key information and ideas in text.

Reading Test Element	Description
Understanding relationships	The student will identify explicitly stated relationships or determine implicit relationships between and among individuals, events, or ideas (e.g., cause-effect, comparison-contrast, sequence).
Interpreting words and phrases in context	The student will determine the meaning of words and phrases in context.
Rhetoric	These questions focus on the rhetorical analysis of text.
Analyzing word choice	The student will determine how the selection of specific words and phrases or the use of patterns of words and phrases shapes meaning and tone in text.
Analyzing text structure	These questions focus on the overall structure of a text and on the relationship between a particular part of a text and the whole text.
Analyzing overall text structure	The student will describe the overall structure of a text.
Analyzing part-whole relationships	The student will analyze the relationship between a particular part of a text (e.g., a sentence) and the whole text.
Analyzing point of view	The student will determine the point of view or perspective from which a text is related or the influence this point of view or perspective has on content and style.
Analyzing purpose	The student will determine the main or most likely purpose of a text or of a particular part of a text (typically, one or more paragraphs).
Analyzing arguments	These questions focus on analyzing arguments for their content and structure.
Analyzing claims and counterclaims	The student will identify claims and counterclaims explicitly stated in text or determine implicit claims and counterclaims from text.
Assessing reasoning	The student will assess an author's reasoning for soundness.
Analyzing evidence	The student will assess how an author uses or fails to use evidence to support a claim or counterclaim.
Synthesis	These questions focus on synthesizing multiple sources of information.
Analyzing multiple texts	The student will synthesize information and ideas from paired texts. (Note: All of the skills listed above may be tested with either single or paired passages.)
Analyzing quantitative information	The student will analyze information presented quantitatively in such forms as graphs, tables, and charts and/or relate that information to information presented in text.

Writing and Language Test

The Writing and Language Test measures students' ability to apply knowledge of words, phrases, and language in general in the context of extended prose passages. The table that follows provides descriptions of the elements of the Writing and Language Test.

Writing and Language Test Element	Description
Text Complexity	<p>For SAT: The passages on the SAT Writing and Language Test represent a specified range of text complexities from grades 9–10 to postsecondary entry.</p> <p>For PSAT/NMSQT and PSAT 10: The passages on the PSAT/NMSQT and PSAT 10 Writing and Language Tests represent a specified range of text complexities from grades 9 to 12.</p> <p>For PSAT 8/9: The passages on the PSAT 8/9 Writing and Language Test represent a specified range of text complexities from grades 6 to 10.</p>
Expression of Ideas	These questions focus on revision of text for topic development, accuracy (consistency between text and graphic[s]), logic, cohesion, and rhetorically effective use of language.
Development	These questions focus on revising text in relation to rhetorical purpose. (Prior knowledge of the topic is not assessed, though consistency of the material within a passage may be.)
Proposition	The student will add, revise, or retain central ideas, main claims, counterclaims, topic sentences, and the like to structure text and convey arguments, information, and ideas clearly and effectively.
Support	The student will add, revise, or retain information and ideas (e.g., details, facts, statistics) intended to support claims or points in text.
Focus	The student will add, revise, retain, or delete information and ideas in text for the sake of relevance to topic and purpose.
Quantitative information	The student will relate information presented quantitatively in such forms as graphs, charts, and tables to information presented in text.
Organization	These questions focus on revision of text to improve the logic and cohesion of text at the sentence, paragraph, and whole-text levels.
Logical sequence	The student will revise text as needed to ensure that information and ideas are presented in the most logical order.
Introductions, conclusions, and transitions	The student will revise text as needed to improve the beginning or ending of a text or paragraph and to ensure that transition words, phrases, or sentences are used effectively to connect information and ideas.

Writing and Language Test	
Element	Description
Effective language use	These questions focus on revision of text to improve the use of language to accomplish particular rhetorical purposes.
Precision	The student will revise text as needed to improve the exactness or content appropriateness of word choice.
Concision	The student will revise text as needed to improve the economy of word choice (i.e., to eliminate wordiness and redundancy).
Style and tone	The student will revise text as necessary to ensure consistency of style and tone within a text or to improve the match of style and tone to purpose.
Syntax	The student will use various sentence structures to accomplish needed rhetorical purposes.
Standard English Conventions	These questions focus on editing text to ensure conformity to the conventions of Standard Written English sentence structure, usage, and punctuation.
Sentence structure	These questions focus on editing text to correct problems in sentence formation and inappropriate shifts in construction within and between sentences.
Sentence formation	These questions focus on editing text to correct problems with forming grammatically complete and standard sentences.
<i>Sentence boundaries</i>	The student will recognize and correct grammatically incomplete sentences (e.g., rhetorically inappropriate fragments and run-ons).
<i>Subordination and coordination</i>	The student will recognize and correct problems in coordination and subordination in sentences.
<i>Parallel structure</i>	The student will recognize and correct problems in parallel structure in sentences.
<i>Modifier placement</i>	The student will recognize and correct problems in modifier placement (e.g., misplaced or dangling modifiers).
Inappropriate shifts in construction	These questions focus on editing text to correct inappropriate shifts in verb tense, voice, and mood and pronoun person and number.
<i>Verb tense, mood, and voice</i>	The student will recognize and correct inappropriate shifts in verb tense, voice, and mood within and between sentences.
<i>Pronoun person and number</i>	The student will recognize and correct inappropriate shifts in pronoun person and number within and between sentences.
Conventions of Usage	These questions focus on editing text to ensure conformity to the conventions of Standard Written English usage.
Pronouns	These questions focus on the proper use of pronouns.
<i>Pronoun clarity</i>	The student will recognize and correct pronouns with unclear or ambiguous antecedents.
Possessive determiners	The student will recognize and correct cases in which possessive determiners (its, your, their), contractions (<i>it's, you're, they're</i>), and adverbs (<i>there</i>) are confused with each other.
Agreement	These questions focus on ensuring grammatical agreement.

Writing and Language Test	
Element	Description
<i>Pronoun-antecedent agreement</i>	The student will recognize and correct lack of agreement between pronoun and antecedent.
<i>Subject-verb agreement</i>	The student will recognize and correct lack of agreement between subject and verb.
<i>Noun agreement</i>	The student will recognize and correct lack of agreement between nouns.
Frequently confused words	The student will recognize and correct instances in which a word or phrase is confused with another (e.g., <i>accept/except, allusion/illusion</i>).
Logical comparison	The student will recognize and correct cases in which unlike terms are compared.
Conventional expression	The student will recognize and correct cases in which a given expression is inconsistent with Standard Written English.
Conventions of Punctuation	These questions focus on editing text to ensure conformity to the conventions of Standard Written English punctuation.
End-of-sentence punctuation	The student will recognize and correct inappropriate uses of ending punctuation in cases in which the context makes the intent clear.
Within-sentence punctuation	The student will correctly use and recognize and correct inappropriate uses of colons, semicolons, and dashes to indicate sharp breaks in thought within sentences.
Possessive nouns and pronouns	The student will recognize and correct inappropriate uses of possessive nouns and pronouns as well as differentiate between possessive and plural forms.
Items in a series	The student will correctly use and recognize and correct inappropriate uses of punctuation (commas and sometimes semicolons) to separate items in a series.
Nonrestrictive and parenthetical elements	The student will correctly use punctuation (commas, parentheses, dashes) to set off nonrestrictive and parenthetical sentence elements as well as recognize and correct cases in which restrictive or essential sentence elements are inappropriately set off with punctuation.
Unnecessary punctuation	The student will recognize and correct cases in which unnecessary punctuation appears in a sentence.

Essay (optional; SAT only)

The basic aim of the SAT's optional Essay is to determine whether students can demonstrate college and career readiness proficiency in reading, writing, and analysis by comprehending a high-quality source text and producing a cogent and clear written analysis of that text supported by critical reasoning and evidence drawn from the source. The table that follows provides descriptions of the three scoring dimensions of the Essay.

SAT Essay Scoring Dimension	Description
Reading	Comprehension of the source text Understanding of central ideas, important details, and their interrelationship Accuracy in representation of the source text (i.e., no errors of fact or interpretation introduced) Use of textual evidence (quotations, paraphrases, or both) to demonstrate understanding of the source text
Analysis	Analysis of the source text and understanding of the analytical task Evaluation of the author's use of evidence, reasoning, and/or stylistic and persuasive elements, and/or features chosen by the student Support for claims or points made in the response Focus on features of the text most relevant to addressing the task
Writing	Use of a central claim Use of effective organization and progression of ideas Use of varied sentence structures Employment of precise word choice Maintenance of a consistent, appropriate style and tone Command of the conventions of Standard Written English

Math Test

Like the ELAL components of the SAT Suite, the Math Test has been designed to assess what research shows students need to know and be able to do in order to be prepared for college and careers. The Math Test focuses on fluency, conceptual understanding, and application within the following four domains:

- Heart of Algebra
- Problem Solving and Data Analysis
- Passport to Advanced Math
- Additional Topics in Math

While all assessments in the SAT Suite are based on the same principles and design, there are some differences in content to adjust for grade-level appropriateness. The tables that follow describe each content dimension on the math tests and delineate the ways in which the tests differ across programs.

Math Test Element	SAT Description	PSAT/NMSQT and PSAT 10 Description	PSAT 8/9 Description
Heart of Algebra			
Heart of Algebra: Linear equations in one variable	1. Create and use linear equations in one variable to solve problems in a variety of contexts. 2. Create a linear equation in one variable, and when in context interpret solutions in terms of the context. 3. Solve a linear equation in one variable, making strategic use of algebraic structure. 4. For a linear equation in one variable, a. interpret a constant, variable, factor, or term in a context; b. determine the conditions under which the equation has no solution, a unique solution, or infinitely many solutions. 5. Fluently solve a linear equation in one variable.	1. Create and use linear equations in one variable to solve problems in a variety of contexts. 2. Create a linear equation in one variable, and when in context interpret solutions in terms of the context. 3. Solve a linear equation in one variable making strategic use of algebraic structure. 4. For a linear equation in one variable, a. interpret a constant, variable, factor, or term in a context; b. determine the conditions under which the equation has no solution, a unique solution, or infinitely many solutions. 5. Fluently solve a linear equation in one variable.	1. Create and use linear equations in one variable to solve problems in a variety of contexts. 2. Create a linear equation in one variable, and when in context interpret solutions in terms of the context. 3. Solve a linear equation in one variable making strategic use of algebraic structure. 4. For a linear equation in one variable interpret a constant, variable, factor or term in a context. 5. Fluently solve a linear equation in one variable.

Math Test Element	SAT Description	PSAT/NMSQT and PSAT 10 Description	PSAT 8/9 Description
Heart of Algebra: Linear functions	<p>Algebraically, a linear function can be defined by a linear expression in one variable or by a linear equation in two variables. In the first case, the variable is the input and the value of the expression is the output. In the second case, one of the variables is designated as the input and determines a unique value of the other variable, which is the output.</p>		
	<p>1. Create and use linear functions to solve problems in a variety of contexts.</p> <p>2. Create a linear function to model a relationship between two quantities.</p> <p>3. For a linear function that represents a context,</p> <ul style="list-style-type: none"> a. interpret the meaning of an input/output pair, constant, variable, factor, or term based on the context, including situations where seeing structure provides an advantage; b. given an input value, find and/or interpret the output value using the given representation; c. given an output value, find and/or interpret the input value using the given representation, if it exists. <p>4. Make connections between verbal, tabular, algebraic, and graphical representations of a linear function by</p> <ul style="list-style-type: none"> a. deriving one representation from the other; b. identifying features of one representation given another representation; c. determining how a graph is affected by a change to its equation. 	<p>1. Create and use linear functions to solve problems in a variety of contexts.</p> <p>2. Create a linear function to model a relationship between two quantities.</p> <p>3. For a linear function that represents a context,</p> <ul style="list-style-type: none"> a. interpret the meaning of an input/output pair, constant, variable, factor, or term based on the context, including situations where seeing structure provides an advantage; b. given an input value, find and/or interpret the output value using the given representation; c. given an output value, find and/or interpret the input value using the given representation, if it exists. <p>4. Make connections between verbal, tabular, algebraic, and graphical representations of a linear function by</p> <ul style="list-style-type: none"> a. deriving one representation from the other; b. identifying features of one representation given another representation; c. determining how a graph is affected by a change to its equation. 	<p>1. Create and use linear functions to solve problems in a variety of contexts.</p> <p>2. Create a linear function to model a relationship between two quantities.</p> <p>3. For a linear function that represents a context,</p> <ul style="list-style-type: none"> a. interpret the meaning of an input/output pair, constant, variable, factor, or term based on the context, including situations where seeing structure provides an advantage; b. given an input value, find and/or interpret the output value using the given representation; c. given an output value, find and/or interpret the input value using the given representation, if it exists. <p>4. Make connections between verbal, tabular, algebraic, and graphical representations of a linear function by</p> <ul style="list-style-type: none"> a. deriving one representation from the other; b. identifying features of one representation given another representation; c. determining how a graph is affected by a change to its equation.

Math Test Element	SAT Description	PSAT/NMSQT and PSAT 10 Description	PSAT 8/9 Description
Heart of Algebra: Linear functions (continued)	5. Write the rule for a linear function given two input/output pairs or one input/output pair and the rate of change.	5. Write the rule for a linear function given two input/output pairs or one input/output pair and the rate of change.	5. Write the rule for a linear function given two input/output pairs or one input/output pair and the rate of change.
Heart of Algebra: Linear equations in two variables	<p>A linear equation in two variables can be used to represent a constraint or condition on two variable quantities in situations where neither of the variables is regarded as an input or an output. A linear equation can also be used to represent a straight line in the coordinate plane.</p> <p>1. Create and use a linear equation in two variables to solve problems in a variety of contexts.</p> <p>2. Create a linear equation in two variables to model a constraint or condition on two quantities.</p> <p>3. For a linear equation in two variables that represents a context,</p> <ul style="list-style-type: none"> a. interpret a solution, constant, variable, factor, or term based on the context, including situations where seeing structure provides an advantage; b. given a value of one quantity in the relationship, find a value of the other, if it exists. <p>4. Make connections between tabular, algebraic, and graphical representations of a linear equation in two variables by</p> <ul style="list-style-type: none"> a. deriving one representation from the other; b. identifying features of one representation given the other representation; c. determining how a graph is affected by a change to its equation. 	<p>1. Create and use a linear equation in two variables to solve problems in a variety of contexts.</p> <p>2. Create a linear equation in two variables to model a constraint or condition on two quantities.</p> <p>3. For a linear equation in two variables that represents a context,</p> <ul style="list-style-type: none"> a. interpret a solution, constant, variable, factor, or term based on the context, including situations where seeing structure provides an advantage; b. given a value of one quantity in the relationship, find a value of the other, if it exists. <p>4. Make connections between tabular, algebraic, and graphical representations of a linear equation in two variables by</p> <ul style="list-style-type: none"> a. deriving one representation from the other; b. identifying features of one representation given the other representation; c. determining how a graph is affected by a change to its equation. 	<p>1. Create and use a linear equation in two variables to solve problems in a variety of contexts.</p> <p>2. Create a linear equation in two variables to model a constraint or condition on two quantities.</p> <p>3. For a linear equation in two variables that represents a context,</p> <ul style="list-style-type: none"> a. interpret a solution, constant, variable, factor, or term based on the context, including situations where seeing structure provides an advantage; b. given a value of one quantity in the relationship, find a value of the other, if it exists. <p>4. Make connections between tabular, algebraic, and graphical representations of a linear equation in two variables by</p> <ul style="list-style-type: none"> a. deriving one representation from the other; b. identifying features of one representation given the other representation; c. determining how a graph is affected by a change to its equation.

Math Test Element	SAT Description	PSAT/NMSQT and PSAT 10 Description	PSAT 8/9 Description
Heart of Algebra: Linear equations in two variables <i>(continued)</i>	5. Write an equation for a line given two points on the line, one point and the slope of the line, or one point and a parallel or perpendicular line.	5. Write an equation for a line given two points on the line, one point and the slope of the line, or one point and a parallel or perpendicular line.	5. Write an equation for a line given two points on the line, one point and the slope of the line, or one point and a parallel or perpendicular line.
Heart of Algebra: Systems of two linear equations in two variables	<p>1. Create and use a system of two linear equations in two variables to solve problems in a variety of contexts.</p> <p>2. Create a system of linear equations in two variables, and when in context interpret solutions in terms of the context.</p> <p>3. Make connections between tabular, algebraic, and graphical representations of the system by deriving one representation from the other.</p> <p>4. Solve a system of two linear equations in two variables, making strategic use of algebraic structure.</p> <p>5. For a system of linear equations in two variables,</p> <ul style="list-style-type: none"> a. interpret a solution, constant, variable, factor, or term based on the context, including situations where seeing structure provides an advantage; b. determine the conditions under which the system has no solution, a unique solution, or infinitely many solutions. <p>6. Fluently solve a system of linear equations in two variables.</p>	<p>1. Create and use a system of two linear equations in two variables to solve problems in a variety of contexts.</p> <p>2. Create a system of linear equations in two variables, and when in context interpret solutions in terms of the context.</p> <p>3. Make connections between tabular, algebraic, and graphical representations of the system by deriving one representation from the other.</p> <p>4. Solve a system of two linear equations in two variables, making strategic use of algebraic structure.</p> <p>5. For a system of linear equations in two variables,</p> <ul style="list-style-type: none"> a. interpret a solution, constant, variable, factor, or term based on the context, including situations where seeing structure provides an advantage; b. determine the conditions under which the system has no solution, a unique solution, or infinitely many solutions. <p>6. Fluently solve a system of linear equations in two variables.</p>	<p>1. Create and use a system of two linear equations in two variables to solve problems in a variety of contexts.</p> <p>2. Create a system of linear equations in two variables, and when in context interpret solutions in terms of the context.</p> <p>3. Make connections between tabular, algebraic, and graphical representations of the system by deriving one representation from the other.</p> <p>4. Solve a system of two linear equations in two variables, making strategic use of algebraic structure.</p> <p>5. For a system of linear equations in two variables, interpret a solution, constant, variable, factor, or term based on the context, including situations where seeing structure provides an advantage.</p> <p>6. Fluently solve a system of linear equations in two variables.</p>

Math Test Element	SAT Description	PSAT/NMSQT and PSAT 10 Description	PSAT 8/9 Description
Heart of Algebra: Linear inequalities in one or two variables	1. Create and use linear inequalities in one or two variables to solve problems in a variety of contexts. 2. Create linear inequalities in one or two variables, and when in context interpret the solutions in terms of the context. 3. For linear inequalities in one or two variables, interpret a constant, variable, factor, or term, including situations where seeing structure provides an advantage. 4. Make connections between tabular, algebraic, and graphical representations of linear inequalities in one or two variables by deriving one from the other. 5. Given a linear inequality or system of linear inequalities, interpret a point in the solution set.	1. Create and use linear inequalities in one variable to solve problems in a variety of contexts. 2. Create linear inequalities in one or two variables, and when in context interpret the solutions in terms of the context. 3. For linear inequalities in one or two variables, interpret a constant, variable, factor, or term, including situations where seeing structure provides an advantage. 4. Make connections between tabular, algebraic, and graphical representations of linear inequalities in one or two variables by deriving one from the other. 5. Given a linear inequality or system of linear inequalities, interpret a point in the solution set.	1. Create and use linear inequalities in one variable to solve problems in a variety of contexts. 2. Create linear inequalities in one or two variables, and when in context interpret the solutions in terms of the context. 3. For linear inequalities in one or two variables, interpret a constant, variable, factor, or term, including situations where seeing structure provides an advantage. 4. Given a linear inequality, interpret a point in the solution set.

Math Test Element	SAT Description	PSAT/NMSQT and PSAT 10 Description	PSAT 8/9 Description
Problem Solving and Data Analysis			
Problem Solving and Data Analysis: Ratios, rates, proportional relationships, and units	<p>Items will require students to solve problems by using a proportional relationship between quantities, calculating or using a ratio or rate, and/or using units, derived units, and unit conversion.</p> <p>1. Apply proportional relationships, ratios, rates, and units in a wide variety of contexts. Examples include but are not limited to scale drawings and problems in the natural and social sciences.</p> <p>2. Solve problems involving</p> <p>a. derived units, including those that arise from products (e.g., kilowatt-hours) and quotients (e.g., population per square kilometer);</p> <p>b. unit conversion, including currency exchange and conversion between different measurement systems.</p> <p>3. Understand and use the fact that when two quantities are in a proportional relationship, if one changes by a scale factor, then the other also changes by the same scale factor.</p>	<p>1. Apply proportional relationships, ratios, rates, and units in a wide variety of contexts. Examples include but are not limited to scale drawings and problems in the natural and social sciences.</p> <p>2. Solve problems involving</p> <p>a. derived units, including those that arise from products (e.g., kilowatt-hours) and quotients (e.g., population per square kilometer);</p> <p>b. unit conversion, including currency exchange and conversion between different measurement systems.</p> <p>3. Understand and use the fact that when two quantities are in a proportional relationship, if one changes by a scale factor, then the other also changes by the same scale factor.</p>	<p>1. Apply proportional relationships, ratios, rates, and units in a wide variety of contexts. Examples include but are not limited to scale drawings and problems in the natural and social sciences.</p> <p>2. Solve problems involving</p> <p>a. derived units, including those that arise from quotients (e.g., population per square kilometer);</p> <p>b. unit conversion, including currency exchange and conversion between different measurement systems.</p> <p>3. Understand and use the fact that when two quantities are in a proportional relationship, if one changes by a scale factor, then the other also changes by the same scale factor.</p>
Problem Solving and Data Analysis: Percentages	<p>1. Use percentages to solve problems in a variety of contexts. Examples include, but are not limited to, discounts, interest, taxes, tips, and percent increases and decreases for many different quantities.</p> <p>2. Understand and use the relationship between percent change and growth factor (5% and 1.05, for example); include percentages greater than or equal to 100%.</p>	<p>1. Use percentages to solve problems in a variety of contexts. Examples include, but are not limited to, discounts, interest, taxes, tips, and percent increases and decreases for many different quantities.</p> <p>2. Understand and use the relationship between percent change and growth factor (5% and 1.05, for example); include percentages greater than or equal to 100%.</p>	<p>1. Use percentages to solve problems in a variety of contexts. Examples include, but are not limited to, discounts, interest, taxes, tips, and percent increases and decreases for many different quantities.</p> <p>2. Understand and use the relationship between percent change and growth factor (5% and 1.05, for example); include percentages greater than or equal to 100%.</p>

Math Test Element	SAT Description	PSAT/NMSQT and PSAT 10 Description	PSAT 8/9 Description
Problem Solving and Data Analysis: One-variable data: distributions and measures of center and spread	1. Choose an appropriate graphical representation for a given data set. 2. Interpret information from a given representation of data in context. 3. Analyze and interpret numerical data distributions represented with frequency tables, histograms, dot plots, and boxplots. 4. For quantitative variables, calculate, compare, and interpret mean, median, and range. Interpret (but don't calculate) standard deviation. 5. Compare distributions using measures of center and spread, including distributions with different means and the same standard deviations and ones with the same mean and different standard deviations. 6. Understand and describe the effect of outliers on mean and median. 7. Given an appropriate data set, calculate the mean.	1. Choose an appropriate graphical representation for a given data set. 2. Interpret information from a given representation of data in context. 3. Analyze and interpret numerical data distributions represented with frequency tables, histograms, dot plots, and boxplots. 4. For quantitative variables, calculate, compare, and interpret mean, median, and range. Interpret (but don't calculate) standard deviation. 5. Compare distributions using measures of center and spread, including distributions with different means and the same standard deviations and ones with the same mean and different standard deviations. 6. Understand and describe the effect of outliers on mean and median. 7. Given an appropriate data set, calculate the mean.	1. Choose an appropriate graphical representation for a given data set. 2. Interpret information from a given representation of data in context. 3. Analyze and interpret numerical data distributions represented with frequency tables, histograms, dot plots, and boxplots. 4. For quantitative variables, calculate, compare, and interpret mean, median, and range. 5. Compare distributions using measures of center and spread, including distributions with different means and the same standard deviations. 6. Understand and describe the effect of outliers on mean and median. 7. Given an appropriate data set, calculate the mean.

Math Test Element	SAT Description	PSAT/NMSQT and PSAT 10 Description	PSAT 8/9 Description
Problem Solving and Data Analysis: Two-variable data: models and scatterplots	1. Using a model that fits the data in a scatterplot, compare values predicted by the model to values given in the data set.	1. Using a model that fits the data in a scatterplot, compare values predicted by the model to values given in the data set.	1. Using a model that fits the data in a scatterplot, compare values predicted by the model to values given in the data set.
	2. Interpret the slope and intercepts of the line of best fit in context.	2. Interpret the slope and intercepts of the line of best fit in context.	2. Interpret the slope and intercepts of the line of best fit in context.
	3. Given a relationship between two quantities, read and interpret graphs and tables modeling the relationship.	3. Given a relationship between two quantities, read and interpret graphs and tables modeling the relationship.	3. Given a relationship between two quantities, read and interpret graphs and tables modeling the relationship.
	4. Analyze and interpret data represented in a scatterplot or line graph; fit linear, quadratic, and exponential models.	4. Analyze and interpret data represented in a scatterplot or line graph; fit linear models.	4. Analyze and interpret data represented in a scatterplot or line graph; fit linear models.
	5. Select a graph that represents a context, identify a value on a graph, or interpret information on the graph.	5. Select a graph that represents a context, identify a value on a graph, or interpret information on the graph.	5. Select a graph that represents a context, identify a value on a graph, or interpret information on the graph.
	6. For a given function type (linear, quadratic, exponential), choose the function of that type that best fits given data.	6. For a given function type (linear, quadratic, exponential), choose the function of that type that best fits given data.	6. Estimate the line of best fit for a given scatterplot; use the line to make predictions.
	7. Compare linear and exponential growth.	7. Compare linear and exponential growth.	
	8. Estimate the line of best fit for a given scatterplot; use the line to make predictions.	8. Estimate the line of best fit for a given scatterplot; use the line to make predictions.	
Problem Solving and Data Analysis: Probability and conditional probability	Use one- and two-way tables, tree diagrams, area models, and other representations to find relative frequency, probabilities, and conditional probabilities.		
	1. Compute and interpret probability and conditional probability in simple contexts.	1. Compute and interpret probability and conditional probability in simple contexts.	1. Compute and interpret probability and conditional probability in simple contexts.
	2. Understand formulas for probability and conditional probability in terms of frequency.		

Math Test Element	SAT Description	PSAT/NMSQT and PSAT 10 Description	PSAT 8/9 Description
Problem Solving and Data Analysis: Inference from sample statistics and margin of error	1. Use sample mean and sample proportion to estimate population mean and population proportion. Utilize, but do not calculate, margin of error.	1. Use sample mean and sample proportion to estimate population mean and population proportion.	1. Use sample mean and sample proportion to estimate population mean and population proportion.
	2. Interpret margin of error; understand that a larger sample size generally leads to a smaller margin of error.		
Problem Solving and Data Analysis: Evaluating statistical claims: observational studies and experiments	1. With random samples, describe which population the results can be extended to.		
	2. Given a description of a study with or without random assignment, determine whether there is evidence for a causal relationship.		
	3. Understand why random assignment provides evidence for a causal relationship.		
	4. Understand why a result can be extended only to the population from which the sample was selected.		
Passport to Advanced Math			
Passport to Advanced Math: Equivalent expressions	1. Make strategic use of algebraic structure and the properties of operations to identify and create equivalent expressions, including <ul style="list-style-type: none"> a. rewriting simple rational expressions; b. rewriting expressions with rational exponents and radicals; c. factoring polynomials. 	1. Make strategic use of algebraic structure and the properties of operations to identify and create equivalent expressions, including factoring polynomials.	1. Make strategic use of algebraic structure and the properties of operations to identify and create equivalent expressions, including factoring polynomials.
	2. Fluently add, subtract, and multiply polynomials.	2. Fluently add, subtract, and multiply polynomials.	2. Fluently add, subtract, and multiply polynomials.

Math Test Element	SAT Description	PSAT/NMSQT and PSAT 10 Description	PSAT 8/9 Description
Passport to Advanced Math: Nonlinear equations in one variable and systems of equations in two variables	<p>1. Make strategic use of algebraic structure, the properties of operations, and reasoning about equality to</p> <ul style="list-style-type: none"> a. solve quadratic equations in one variable presented in a wide variety of forms; determine the conditions under which a quadratic equation has no real solutions, one real solution, or two real solutions; b. solve simple rational and radical equations in one variable; c. identify when the procedures used to solve a simple rational or radical equation in one variable lead to an equation with solutions that do not satisfy the original equation (extraneous solutions); d. solve polynomial equations in one variable that are written in factored form; e. solve linear absolute value equations in one variable; f. solve systems of linear and nonlinear equations in two variables, including relating the solutions to the graphs of the equations in the system. <p>2. Given a nonlinear equation in one variable that represents a context, interpret a solution, constant, variable, factor, or term based on the context, including situations where seeing structure provides an advantage.</p>	<p>1. Make strategic use of algebraic structure, the properties of operations, and reasoning about equality to</p> <ul style="list-style-type: none"> a. solve quadratic equations in one variable presented in a wide variety of forms; determine the conditions under which a quadratic equation has no real solutions, one real solution, or two real solutions; b. solve simple rational and radical equations in one variable; c. solve linear absolute value equations in one variable; d. solve systems of linear and nonlinear equations in two variables, including relating the solutions to the graphs of the equations in the system. <p>2. Given a nonlinear equation in one variable that represents a context, interpret a solution, constant, variable, factor, or term based on the context, including situations where seeing structure provides an advantage.</p>	<p>1. Make strategic use of algebraic structure, the properties of operations, and reasoning about equality to</p> <ul style="list-style-type: none"> a. solve quadratic equations in one variable presented in a wide variety of forms; b. solve systems of linear and nonlinear equations in two variables, including relating the solutions to the graphs of the equations in the system. <p>2. Given a nonlinear equation in one variable that represents a context, interpret a solution, constant, variable, factor, or term based on the context, including situations where seeing structure provides an advantage.</p>

Math Test Element	SAT Description	PSAT/NMSQT and PSAT 10 Description	PSAT 8/9 Description
Passport to Advanced Math: Nonlinear equations in one variable and systems of equations in two variables <i>(continued)</i>	3. Given an equation or formula in two or more variables that represents a context, view it as an equation in a single variable of interest where the other variables are parameters and solve for the variable of interest.	3. Given an equation or formula in two or more variables that represents a context, view it as an equation in a single variable of interest where the other variables are parameters and solve for the variable of interest.	3. Given an equation or formula in two or more variables that represents a context, view it as an equation in a single variable of interest where the other variables are parameters and solve for the variable of interest.
	4. Fluently solve quadratic equations in one variable, written as a quadratic expression in standard form equal to zero, where using the quadratic formula or completing the square is the most efficient method for solving the equation.	4. Fluently solve quadratic equations in one variable, written as a quadratic expression in standard form equal to zero, where using the quadratic formula or completing the square is the most efficient method for solving the equation.	4. Fluently solve quadratic equations in one variable, written as a quadratic expression in standard form equal to zero, where using the quadratic formula or completing the square is the most efficient method for solving the equation.
Passport to Advanced Math: Nonlinear functions	1. Create and use quadratic or exponential functions to solve problems in a variety of contexts.	1. Create and use quadratic or exponential functions to solve problems in a variety of contexts.	1. For a quadratic or exponential function, <ol style="list-style-type: none"> a. use function notation to represent and interpret input/output pairs in terms of a context and points on the graph; b. for a function that represents a context, interpret the meaning of an input/output pair, constant, variable, factor, or term based on the context, including situations where seeing structure provides an advantage; c. make connections between tabular, algebraic, and graphical representations of the function, by <ol style="list-style-type: none"> i. given one representation, selecting another representation; and ii. identifying features of one representation given another representation.

Math Test Element	SAT Description	PSAT/NMSQT and PSAT 10 Description	PSAT 8/9 Description
Passport to Advanced Math: Nonlinear functions <i>(continued)</i>	2. For a quadratic or exponential function, <ol style="list-style-type: none"> a. identify or create an appropriate function to model a relationship between quantities; b. use function notation to represent and interpret input/output pairs in terms of a context and points on the graph; c. for a function that represents a context, interpret the meaning of an input/output pair, constant, variable, factor, or term based on the context, including situations where seeing structure provides an advantage; d. determine the most suitable form of the expression representing the output of the function to display key features of the context, including <ol style="list-style-type: none"> i. selecting the form of a quadratic that displays the initial value, the zeros, or the extreme value; ii. selecting the form of an exponential that displays the initial value, the end-behavior (for exponential decay), or the doubling or halving time; 	2. For a quadratic or exponential function, <ol style="list-style-type: none"> a. identify or create an appropriate function to model a relationship between quantities; b. use function notation to represent and interpret input/output pairs in terms of a context and points on the graph; c. for a function that represents a context, interpret the meaning of an input/output pair, constant, variable, factor, or term based on the context, including situations where seeing structure provides an advantage; d. determine the most suitable form of the expression representing the output of the function to display key features of the context, including <ol style="list-style-type: none"> i. selecting the form of a quadratic that displays the initial value, the zeros, or the extreme value; ii. selecting the form of an exponential that displays the initial value, the end-behavior (for exponential decay), or the doubling or halving time; 	

Math Test Element	SAT Description	PSAT/NMSQT and PSAT 10 Description	PSAT 8/9 Description
Passport to Advanced Math: Nonlinear functions <i>(continued)</i>	e. make connections between tabular, algebraic, and graphical representations of the function by <ul style="list-style-type: none"> i. given one representation, selecting another representation; ii. identifying features of one representation given another representation, including maximum and minimum values of the function; iii. determining how a graph is affected by a change to its equation, including a vertical shift or scaling of the graph. 	e. make connections between tabular, algebraic, and graphical representations of the function by <ul style="list-style-type: none"> i. given one representation, selecting another representation; ii. identifying features of one representation given another representation, including maximum and minimum values of the function; iii. determining how a graph is affected by a change to its equation, including a vertical shift or scaling of the graph. 	
	3. For a factorable or factored polynomial or simple rational function, <ul style="list-style-type: none"> a. use function notation to represent and interpret input/output pairs in terms of a context and points on the graph; b. understand and use the fact that for the graph of $y = f(x)$, the solutions to $f(x) = 0$ correspond to x-intercepts of the graph and $f(0)$ corresponds to the y-intercept of the graph; interpret these key features in terms of a context; c. identify the graph given an algebraic representation of the function and an algebraic representation given the graph (with or without a context). 		

Math Test Element	SAT Description	PSAT/NMSQT and PSAT 10 Description	PSAT 8/9 Description
Additional Topics in Math			
Additional Topics in Math: Area and volume	1. Solve real-world and mathematical problems about a geometric figure or an object that can be modeled by a geometric figure using given information such as length, area, surface area, or volume. a. Apply knowledge that changing by a scale factor of k changes all lengths by a factor of k , changes all areas by a factor of k^2 , and changes all volumes by a factor of k^3 . b. Demonstrate procedural fluency by selecting the correct area or volume formula and correctly calculating a specified value.	1. Solve real-world and mathematical problems about a geometric figure or an object that can be modeled by a geometric figure using given information such as length, area, surface area, or volume. a. Apply knowledge that changing by a scale factor of k changes all lengths by a factor of k , changes all areas by a factor of k^2 , and changes all volumes by a factor of k^3 . b. Demonstrate procedural fluency by selecting the correct area or volume formula and correctly calculating a specified value.	

Math Test Element	SAT Description	PSAT/NMSQT and PSAT 10 Description	PSAT 8/9 Description
Additional Topics in Math: Lines, angles, and triangles	<p>1. Use concepts and theorems relating to congruence and similarity of triangles to solve problems.</p> <p>2. Determine which statements may be required to prove certain relationships or to satisfy a given theorem.</p> <p>3. Apply knowledge that changing by a scale factor of k changes all lengths by a factor of k, but angle measures remain unchanged.</p> <p>4. Know and directly apply relevant theorems such as</p> <ul style="list-style-type: none"> a. the vertical angle theorem; b. triangle similarity and congruence criteria; c. triangle angle sum theorem; d. the relationship of angles formed when a transversal cuts parallel lines. 	<p>1. Use concepts and theorems relating to congruence and similarity of triangles to solve problems.</p> <p>2. Determine which statements may be required to prove certain relationships or to satisfy a given theorem.</p> <p>3. Apply knowledge that changing by a scale factor of k changes all lengths by a factor of k, but angle measures remain unchanged.</p> <p>4. Know and directly apply relevant theorems such as</p> <ul style="list-style-type: none"> a. the vertical angle theorem; b. triangle similarity and congruence criteria; c. triangle angle sum theorem; d. the relationship of angles formed when a transversal cuts parallel lines. 	

Math Test Element	SAT Description	PSAT/NMSQT and PSAT 10 Description	PSAT 8/9 Description
<p>Additional Topics in Math: Right triangles and trigonometry</p>	<ol style="list-style-type: none"> 1. Solve problems in a variety of contexts using <ol style="list-style-type: none"> a. the Pythagorean theorem; b. right triangle trigonometry; c. properties of special right triangles. 2. Use similarity to calculate values of sine, cosine, and tangent. 3. Understand that when given one side length and one acute angle measure in a right triangle, the remaining values can be determined. 4. Solve problems using the relationship between sine and cosine of complementary angles. 5. Fluently apply properties of special right triangles to determine side lengths and calculate trigonometric ratios of 30, 45, and 60 degrees. 	<ol style="list-style-type: none"> 1. Solve problems in a variety of contexts using the Pythagorean theorem. 	

Math Test Element	SAT Description	PSAT/NMSQT and PSAT 10 Description	PSAT 8/9 Description
Additional Topics in Math: Circles	<ol style="list-style-type: none"> Use definitions, properties, and theorems relating to circles and parts of circles, such as radii, diameters, tangents, angles, arcs, arc lengths, and sector areas, to solve problems. Solve problems using <ol style="list-style-type: none"> radian measure; trigonometric ratios in the unit circle. Create an equation to represent a circle in the xy-plane. Describe how <ol style="list-style-type: none"> a change to the equation representing a circle in the xy-plane affects the graph of the circle; a change in the graph of the circle affects the equation of the circle. Understand that the ordered pairs that satisfy an equation of the form $(x - h)^2 + (y - k)^2 = r^2$ form a circle when plotted in the xy-plane. Convert between angle measures in degrees and radians. Complete the square in an equation representing a circle to determine properties of the circle when it is graphed in the xy-plane, and use the distance formula in problems related to circles. 		
Additional Topics in Math: Complex numbers	<ol style="list-style-type: none"> Apply knowledge and understanding of the complex number system to add, subtract, multiply, and divide with complex numbers and to solve problems. 		

Summary

All the tests that are part of the SAT Suite of Assessments are informed by evidence about essential requirements for college and career readiness and success and are designed to measure students' attainment of those key requirements. The assessments' Reading Tests, Writing and Language Tests, and (optional; SAT only) Essay share a focus on text—its complexity, its use of evidence, its relationship to data, its disciplinary roots—and on language, particularly its use in communicating information and ideas clearly and purposefully. The assessments also support sustained attention on a core of math concepts, skills, and understandings rather than encourage a race through a vast array of math soon forgotten. An important element of math education is that knowing a few things very well gives students a wide-ranging readiness. The math in the SAT Suite reflects what students can expect to see and use throughout a range of college courses and workforce training programs.

Section 4: The Alignment Approach

In his groundbreaking study of alignment, commissioned by the National Institute for Science Education and the Council of Chief State School Officers, Norman Webb defined alignment as “the degree to which expectations and assessments are in agreement and serve in conjunction with one another to guide the system toward students learning what they are expected to know and do” (Webb 1997).

A comprehensive alignment evaluation must consider multiple factors, including the claims about what a test measures and how those claims are ultimately translated into test items and scores. All aspects of a testing program—the test-development process, blueprints, performance-level descriptors, and reporting categories—must work within an overarching vision of what the assessment is meant to indicate about a student’s knowledge and skills (Forte 2017).

Point-by-point technical alignments between a testing program’s content domains and a state’s academic standards have been the centerpiece of traditional alignment studies. Such alignments are valuable in that they illustrate in detail how and to what extent specific elements of a state’s standards are assessed by an assessment program. Point-by-point alignments, however, tell only part of the story. While it is critical to know how well the elements of assessments and standards align, these types of studies often miss how well the broader aims and emphases of the assessment program and standards mesh. Even extensive overlap between the elements of assessments and standards is not a guarantee that the two are well aligned at a broad, conceptual level.

Several dominant themes emerge from in-depth study of educational standards and research literature on what knowledge and skills are most valuable in both postsecondary education and workforce training. For instance, a principal theme is that students are generally better served by learning core knowledge and skills in depth rather than undertaking a surface-level exploration of a wider range of topics. Therefore, it makes sense to identify the evidence-based core knowledge and skills on which college and career readiness and success rely and then to develop tests of that core. This has been College Board’s approach in the SAT Suite.

Another important theme is that, even for assessments (such as College Board’s) concentrated on measuring attainment of core knowledge and skills, it is a practical impossibility to assess every possible element in depth in a reasonable time frame. However, when each element belongs to a cohesive knowledge and skill domain, as is the case with the SAT Suite’s assessments, careful, strategic sampling of that domain permits valid and reliable inferences about an examinee’s level of learning. Careful domain sampling enables tests of reasonable length and time to render technically sound educational measurements.

The following alignment summaries provide a high-level overview of the alignment of the SAT Suite to Texas’s standards. This summary is designed to provide stakeholders in Texas with a general sense of the connection between the SAT Suite and Texas’s standards. A more specific standard-by-standard summary can be found in the appendices.

Section 5: Summary of the English Language Arts/Literacy Alignment

College Board’s Assessment Design and Development English Language Arts/Literacy team conducted an alignment study of the Texas College and Career Readiness standards (CCRS) as well as the Texas Essential Knowledge and Skills (TEKS) to the SAT Suite of Assessments.

Specifically, the team looked at the following alignments:

1. SAT aligned with the Texas CCRS (2018)
2. SAT aligned with the TEKS in English III and English IV (2017)
3. PSAT/NMSQT and PSAT 10 aligned with the TEKS in English I and English II (2017)
4. PSAT 8/9 aligned with the TEKS in Grade 8 (2017)

Overall, the alignment between the Texas English Language Arts and Reading (ELAR) standards and the SAT Suite is very strong. Like Texas’s ELAR standards, the SAT Suite emphasizes close, critical reading of complex texts, support of inferential thinking with analysis and evidence, and clear communication through logical organization and mastery of the conventions of Standard English. All elements in the SAT Suite are addressed directly by Texas’s standards. However, not all Texas standards are assessed by the SAT Suite. Specifically, standards related to speaking and listening as well as research and inquiry are not addressed by the SAT Suite. Also, Texas standards pertaining to reading in multiple genres do not fully align, as the assessment of paired passages on the SAT Suite Reading Tests is restricted to history/social studies and science texts.

While the SAT Suite is not designed to measure standards in oral communication and research—those perhaps best left to classroom evaluation—it does offer a valid, reliable assessment of Texas’s standards pertaining to foundational language skills, comprehension skills, reading in multiple genres, author’s craft and purpose, and written composition.

Below are College Board’s summaries of the alignment for each set of Texas standards.

- **Texas CCRS:** All five of the Texas CCRS standards (100%) in Writing are addressed in whole or in part on the SAT when the SAT Essay is included in the analysis. In Reading, eight of the eighteen College and Career Readiness Reading Standards (44%) are addressed in whole or in part. Unaligned standards include those requiring the use of text features (ELA.CCRS.II.A.2); analysis of genre features (ELA.CCRS.II.A.7); use of roots, affixes, and reference guides to infer and/or confirm the meanings of new words (ELA.CCRS.II.B.2, ELA.CCRS.II.B.3); analysis of literary and other texts in relationship to the texts’ historical and cultural contexts and—for myths, oral traditions, and classical literature—their influence on subsequent works (ELA.CCRS.II.C.1–3); and acquisition of insights about oneself, others, or the world (ELA.CCRS.II.D.1–3). These standards are outside the SAT Suite testing domains.
- **TEKS English III/IV:** Eight of the eleven TEKS English IV standards (73%) are addressed in whole or in part on the SAT. Unaligned standards involve oral language (ELAR.IV.1), self-sustained reading (ELAR.IV.3), and research (ELAR.IV.11), which are outside the testing domains. This is also true for TEKS English III, with eight of

the eleven standards (73%) addressed in whole or in part and no alignment to standards involving oral language (ELAR.III.1), self-sustained reading (ELAR.III.3), and research (ELAR.III.11).

- **TEKS English I/II:** Eight of the eleven TEKS English I/II standards (73%) are addressed in whole or in part on the PSAT/NMSQT and PSAT 10. As with English III/IV, unaligned standards involve oral language (ELAR.II.1, ELAR.I.1), self-sustained reading (ELAR.II.3, ELAR.I.3), and research (ELAR.II.11, ELAR.I.11).
- **TEKS Grade 8:** Nine of the twelve TEKS Grade 8 standards (75%) are addressed in whole or in part on the PSAT 8/9. As with the high school standards, there is no alignment to standards involving oral language (ELAR.8.1), self-sustained reading (ELAR.8.4), and research (ELAR.8.12).

The tables that follow provide a more detailed, standard-by-standard summary of alignment in an at-a-glance format. Readers who wish to see side-by-side comparisons that include the full language of each standard can find these in [Appendix A: Side-by-Side Alignment of ELAL Standards to SAT Suite](#).

SAT to Texas College and Career Readiness Standards	Writing					Reading												Speaking					Listening					Research													
	CCRS.I.A					CCRS.II.A						CCRS.II.B				CCRS.II.C			CCRS.II.D			CCRS.III.A					CCRS.IV.A					CCRS.V.A			CCRS.V.B			CCRS.V.C			
	1	2	3	4	5	1	2	3	4	5	6	7	8	1	2	3	4	1	2	3	1	2	3	1	2	3	4	5	1	2	3	4	5	1	2	3	1	2	3	1	2
SAT Essay																																									
Analysis																																									
Analysis of the source text and understanding of the analytical task	X	X	X			X		X	X	X	X																														
Evaluation of the author’s use of evidence, reasoning, and/or stylistic and persuasive elements, and/or features chosen by the student	X	X	X					X	X	X	X																														
Support for claims or points made in the response	X	X	X						X																																
Focus on features of the text most relevant to addressing the task	X	X	X																																						
Writing																																									
Use of a central claim	X	X	X																																						
Use of effective organization and progression of ideas	X		X																																						
Use of varied sentence structures	X																																								
Employment of precise word choice	X																																								
Maintenance of a consistent, appropriate style and tone	X																																								
Command of the conventions of standard written English																																									
Overall task																																									
Timed, on-demand writing task																																									

Section 6: Summary of the Math Alignment

College Board's Assessment Design and Development Math team conducted an alignment study of the Texas College and Career Readiness standards (CCRS) as well as the Texas Essential Knowledge and Skills (TEKS) to the SAT Suite of Assessments.

Specifically, the team looked at the following alignments:

1. SAT aligned with the Texas CCRS (2018)
2. SAT aligned with the TEKS in Algebra I (2012), Algebra II (2012), Geometry (2012), Mathematical Models with Applications (2012), Advanced Quantitative Reasoning (2012), Statistics (2015), and Algebraic Reasoning (2015)
3. PSAT/NMSQT and PSAT 10 aligned with the TEKS in Algebra I (2012), Algebra II (2012), Geometry (2012), Mathematical Models with Applications (2012), Advanced Quantitative Reasoning (2012), Statistics (2015), and Algebraic Reasoning (2015)
4. PSAT 8/9 aligned with the TEKS in Algebra I (2012), Algebra II (2012), Geometry (2012), Mathematical Models with Applications (2012), Advanced Quantitative Reasoning (2012), Statistics (2015), and Algebraic Reasoning (2015)
5. PSAT 8/9 aligned with the TEKS in Grades 6, 7, and 8 (2012)

Overall, the alignment between Texas's Mathematics standards and the SAT Suite is strong. Like Texas's Mathematics standards, the SAT Suite emphasizes problem-solving, modeling, using appropriate tools strategically, and looking for and making use of structure. While the SAT Suite does not measure every TEKS standard in mathematics, all knowledge and skills addressed in the SAT Suite appear in the TEKS. The alignment is especially strong in Algebra I and Algebra II. Additional SAT Suite content specifications are covered in Geometry, Mathematical Models with Applications, Advanced Quantitative Reasoning, Statistics, and Algebraic Reasoning courses.

While TEKS's Mathematical Process Standards (Standard 1, consisting of sections A–G), are not specifically called out in the alignment tables, these standards can be found interwoven throughout the SAT Suite. The process standards generally align well to the SAT Suite. Specifically, standards A, B, C, E, and F are evident throughout items on the SAT, as students must apply mathematics to real-life problems, analyze and use given information to solve problems, make strategic use of a calculator, create and use different representations of quantities in mathematical and real-world contexts, and connect mathematical ideas. Standards D and G, which require students to communicate, explain, display, and justify mathematical ideas are not assessed on the SAT Suite.

Below are College Board's summaries of the alignment for each set of Texas standards.

- **Texas CCRS:** Of the twenty-nine standards in the Texas CCRS for Mathematics, seventeen (59%) are represented in whole or in part on the SAT. The standards not assessed on the SAT are primarily those that call for students to explain, justify, and communicate mathematical concepts.
- **TEKS Algebra I:** All eleven of the TEKS Algebra I standards (100%) are represented in whole or in part on the SAT Suite.

- **TEKS Algebra II:** All seven of the TEKS Algebra II standards (100%) are represented in whole or in part on the SAT, PSAT/NMSQT, and PSAT 10. All of these standards are represented on the PSAT 8/9 as well with the exception of Standard 6: Cubic, Cube Root, Absolute Value and Rational Functions, Equations, and Inequalities.
- **TEKS Geometry:** Of TEKS's twelve High School Geometry standards, ten (83%) are represented in whole or in part on the SAT and on the PSAT/NMSQT and PSAT 10. Although the PSAT/NMSQT and PSAT 10 assessments include items on the Pythagorean theorem, they exclude right triangle trigonometry. Additionally, problem solving related to properties and theorems of circles is excluded. Most TEKS High School Geometry standards are assessed within the Additional Topics in Mathematics domain that is not a part of the PSAT 8/9, so the only TEKS High School Geometry standard assessed on the PSAT 8/9 is Standard 13: Probability.
- **TEKS Mathematical Models with Applications:** Of the nine TEKS Mathematical Models with Applications standards, five (56%) are represented in whole or in part on the SAT, PSAT/NMSQT, and PSAT 10. On the PSAT 8/9, four of these standards (44%) are represented. Across the SAT Suite, there is less alignment among the standards in personal finance and social sciences. However, there is a strong connection between TEKS modeling standards and modeling with linear, quadratic, and exponential functions, which are especially important in the Heart of Algebra and Passport to Advanced Math domains. Also, using models and other structures to predict and make decisions is strongly present in the SAT Suite's Problem Solving and Data Analysis domains.
- **TEKS Advanced Quantitative Reasoning:** All three of the TEKS Advanced Quantitative Reasoning standards (100%) are represented in whole or in part on the SAT, PSAT/NMSQT, and PSAT 10. The alignment is especially strong with Standard 4: Probabilistic and Statistical Reasoning. All of these standards are represented on the PSAT 8/9 as well, with the exception of Standard 2: Numeric Reasoning.
- **TEKS Statistics:** Of the six TEKS Statistics standards, five (83%) are represented in whole or in part on the SAT. Sub-standards in statistical process sampling and experimentation are the least represented, since several of these require students to design and conduct a study. Four of these standards (67%) are represented in whole or in part on the PSAT/NMSQT, PSAT 10, and PSAT 8/9, which do not assess evaluating statistical claims.
- **TEKS Algebraic Reasoning:** All six of the TEKS Algebraic Reasoning standards (100%) are represented in whole or in part on the SAT, PSAT/NMSQT, and PSAT 10. Five of these standards (83%) are represented in whole or in part on the PSAT 8/9, which does not assess Standard 2: Patterns and Structure.
- **TEKS Grades 6–8:** The alignment between the PSAT 8/9 and the TEKS for grades 6–8 is strong in problem-solving, application of mathematics in real-life skills, and in proportional reasoning, including working with ratios, rates, percentages, and units. The specific alignment for each grade is as follows:
 - Of the eleven TEKS standards in grade 8, seven (64%) are assessed on the PSAT 8/9. Standards not aligned primarily include those focusing on geometric concepts, which are not assessed until PSAT/NMSQT and PSAT 10.
 - Of the twelve TEKS standards in grade 7, nine (75%) are assessed on the PSAT 8/9. Standards not aligned primarily include those focusing on geometric concepts, which are not assessed until PSAT/NMSQT, and PSAT 10.
 - Of the thirteen TEKS standards in grade 6, twelve (92%) are assessed on the PSAT 8/9. The standard that does not appear on the PSAT 8/9 is Standard 14: Personal Financial Literacy.

The tables that follow provide a more detailed, standard-by-standard summary of alignment in an at-a-glance format. Readers who wish to see side-by-side comparisons that include the full language of each standard can find these in [Appendix B: Side-by-Side Alignment of Math Standards to SAT Suite](#).

Table 10: SAT Aligned to TEKS in Advanced Quantitative Reasoning

SAT to Texas Essential Knowledge and Skills: Advanced Quantitative Reasoning	Numeric Reasoning								Algebraic Reasoning								Probabilistic and Statistical Reasoning																					
	2								3								4																					
	a	b	c	d	e	f	g	h	a	b	c	d	e	f	g	h	a	b	c	d	e	f	g	h	i	j	k	l	m	n	o	p	q	r	s	t		
SAT HEART OF ALGEBRA																																						
Linear Equations in One Variable																																						
Linear Functions											X																											
Linear equations in two variables																																						
Systems of two linear equations in two variables																																						
Linear inequalities in one or two variables																																						
SAT PROBLEM SOLVING AND DATA ANALYSIS																																						
Ratios, rates, proportional relationships, and units																																						
Percentages																																						
One variable data: Distributions and measures of center and spread																																						
Two-variable data: Models and scatterplots									X																													
Probability and conditional probability																			X	X																		

Table 11: SAT Aligned to TEKS in Statistics

SAT to Texas Essential Knowledge and Skills: Statistics	Statistical Process Sampling and Experimentation							Variability				Categorical and Quantitative Data						Probability and Random Variables				Inference										Bivariate Data					
	2							3				4						5				6										7					
	a	b	b	c	d	e	f	g	a	b	c	d	a	b	c	d	e	f	a	b	c	d	a	b	c	d	e	f	g	h	i	j	a	b	c	d	e
SAT HEART OF ALGEBRA																																					
Linear Equations in One Variable																																					
Linear Functions																																					
Linear equations in two variables																																					
Systems of two linear equations in two variables																																					
Linear inequalities in one or two variables																																					
SAT PROBLEM SOLVING AND DATA ANALYSIS																																					
Ratios, rates, proportional relationships, and units																																					
Percentages																																					
One variable data: Distributions and measures of center and spread																		X	X	X																	
Two-variable data: Models and scatterplots																																X		X			X
Probability and conditional probability																						X	X														

Table 12: SAT Aligned to TEKS in Algebraic Reasoning

SAT to Texas Essential Knowledge and Skills: Algebraic Reasoning	Patterns and Structure											Number and Algebraic Methods									Modeling from Data													
	2				3							4				5					6			7										
	a	b	b	c	d	a	b	c	d	e	f	a	b	c	d	a	b	c	d	e	a	b	c	a	b	c	d	e						
SAT HEART OF ALGEBRA																																		
Linear Equations in One Variable																																		
Linear Functions									X				X										X	X										
Linear equations in two variables																																		
Systems of two linear equations in two variables																																		
Linear inequalities in one or two variables																																		
SAT PROBLEM SOLVING AND DATA ANALYSIS																																		
Ratios, rates, proportional relationships, and units																																		
Percentages																																		
One variable data: Distributions and measures of center and spread																																		
Two-variable data: Models and scatterplots			X	X																					X								X	X
Probability and conditional probability																																		

Table 17: PSAT/NMSQT and PSAT 10 Aligned to TEKS in Quantitative Reasoning

PSAT/NMSQT and PSAT 10 to Texas Essential Knowledge and Skills: Advanced Quantitative Reasoning	Numeric Reasoning								Algebraic Reasoning								Probabilistic and Statistical Reasoning																					
	2								3								4																					
	a	b	c	d	e	f	g	h	a	b	c	d	e	f	g	h	a	b	c	d	e	f	g	h	i	j	k	l	m	n	o	p	q	r	s	t		
PSAT HEART OF ALGEBRA																																						
Linear Equations in One Variable																																						
Linear Functions											X																											
Linear equations in two variables																																						
Systems of two linear equations in two variables																																						
Linear inequalities in one or two variables																																						
PSAT PROBLEM SOLVING AND DATA ANALYSIS																																						
Ratios, rates, proportional relationships, and units																																						
Percentages																																						
One variable data: Distributions and measures of center and spread																																						
Two-variable data: Models and scatterplots									X																													

PSAT/NMSQT and PSAT 10 to Texas Essential Knowledge and Skills: Statistics	Statistical Process Sampling and Experimentation							Variability				Categorical and Quantitative Data						Probability and Random Variables				Inference										Bivariate Data							
	2							3				4						5				6										7							
	a	b	b	c	d	e	f	g	a	b	c	d	a	b	c	d	e	f	a	b	c	d	a	b	c	d	e	f	g	h	i	j	a	b	c	d	e	f	
PSAT PROBLEM SOLVING AND DATA ANALYSIS																																							
Probability and conditional probability																				X	X																		
Inference from sample statistics and margin of error																									X														
PSAT PASSPORT TO ADVANCED MATH																																							
Equivalent expressions																																							
Nonlinear equations in one variable and systems of equations in two variables																																							
Nonlinear functions																																							
PSAT ADDITIONAL TOPICS IN MATH																																							
Area and volume																																							
Lines, angles, and triangles																																							
Right triangles and trigonometry																																							

PSAT/NMSQT and PSAT 10 to Texas Essential Knowledge and Skills: Algebraic Reasoning	Patterns and Structure										Number and Algebraic Methods									Modeling from Data																					
	2				3						4				5				6			7																			
	a	b	c	d	a	b	c	d	e	f	a	b	c	d	a	b	c	d	e	a	b	c	a	b	c	d	e														
PSAT PROBLEM SOLVING AND DATA ANALYSIS																																									
Probability and conditional probability																																									
Inference from sample statistics and margin of error																																									
PSAT PASSPORT TO ADVANCED MATH																																									
Equivalent expressions														X																											
Nonlinear equations in one variable and systems of equations in two variables																																									
Nonlinear functions								X				X																X	X												
PSAT ADDITIONAL TOPICS IN MATH																																									
Area and volume																																									
Lines, angles, and triangles																																									
Right triangles and trigonometry																																									

Table 21: PSAT 8/9 Aligned to TEKS in Algebra II

PSAT 8/9 to Texas Essential Knowledge and Skills: Algebra II	Attributes of Functions and Their Inverses	Systems of Equations and Inequalities	Quadratic and Square Root Functions, Equations, and Inequalities	Exponential and Logarithmic Functions and Equations	Cubic, Cube Root, Absolute Value and Rational Functions, Equations, and Inequalities	Number and Algebraic Methods	Data
	2	3	4	5	6	7	8
	a b c d	a b c d e f g	a b c d e f g h	a b c d e	a b c d e f g h i j k l	a b c d e f g h i	a b c
PSAT HEART OF ALGEBRA							
Linear Equations in One Variable							
Linear Functions							
Linear equations in two variables							
Systems of two linear equations in two variables							
Linear inequalities in one or two variables							
PSAT PROBLEM SOLVING AND DATA ANALYSIS							
Ratios, rates, proportional relationships, and units							
Percentages							
One variable data: Distributions and measures of center and spread							

Table 24: PSAT 8/9 Aligned to TEKS in Quantitative Reasoning

PSAT 8/9 to Texas Essential Knowledge and Skills: Advanced Quantitative Reasoning	Numeric Reasoning								Algebraic Reasoning								Probabilistic and Statistical Reasoning																					
	2								3								4																					
	a	b	c	d	e	f	g	h	a	b	c	d	e	f	g	h	a	b	c	d	e	f	g	h	i	j	k	l	m	n	o	p	q	r	s	t		
PSAT HEART OF ALGEBRA																																						
Linear Equations in One Variable																																						
Linear Functions											X																											
Linear equations in two variables																																						
Systems of two linear equations in two variables																																						
Linear inequalities in one or two variables																																						
PSAT PROBLEM SOLVING AND DATA ANALYSIS																																						
Ratios, rates, proportional relationships, and units																																						
Percentages																																						
One variable data: Distributions and measures of center and spread																																						
Two-variable data: Models and scatterplots									X																													

PSAT 8/9 to Texas Essential Knowledge and Skills: Statistics	Statistical Process Sampling and Experimentation							Variability				Categorical and Quantitative Data						Probability and Random Variables				Inference										Bivariate Data												
	2							3				4						5				6										7												
	a	b	b	c	d	e	f	g	a	b	c	d	a	b	c	d	e	f	a	b	c	d	a	b	c	d	e	f	g	h	i	j	a	b	c	d	e	f						
PSAT PROBLEM SOLVING AND DATA ANALYSIS																																												
Probability and conditional probability																				X	X																							
Inference from sample statistics and margin of error																																												
PSAT PASSPORT TO ADVANCED MATH																																												
Equivalent expressions																																												
Nonlinear equations in one variable and systems of equations in two variables																																												
Nonlinear functions																																												

Table 26: PSAT 8/9 Aligned to TEKS in Algebraic Reasoning

PSAT 8/9 to Texas Essential Knowledge and Skills: Algebraic Reasoning	Patterns and Structure						Number and Algebraic Methods									Modeling from Data								
	2				3		4				5				6	7								
	a	b	c	d	a	b	a	b	c	d	a	b	c	d	e	a	b	c	a	b	c	d	e	
PSAT HEART OF ALGEBRA																								
Linear Equations in One Variable																								
Linear Functions							X																	
Linear equations in two variables																								
Systems of two linear equations in two variables																								
Linear inequalities in one or two variables																								
PSAT PROBLEM SOLVING AND DATA ANALYSIS																								
Ratios, rates, proportional relationships, and units																								
Percentages																								
One variable data: Distributions and measures of center and spread																								
Two-variable data: Models and scatterplots																							X	X

PSAT 8/9 to Texas Essential Knowledge and Skills: Algebraic Reasoning	Patterns and Structure										Number and Algebraic Methods										Modeling from Data						
	2				3						4				5				6		7						
	a	b	c	d	a	b	c	d	e	f	a	b	c	d	a	b	c	d	e	a	b	c	a	b	c	d	e
PSAT PROBLEM SOLVING AND DATA ANALYSIS																											
Probability and conditional probability																											
Inference from sample statistics and margin of error																											
PSAT PASSPORT TO ADVANCED MATH																											
Equivalent expressions														X													
Nonlinear equations in one variable and systems of equations in two variables																											
Nonlinear functions								X				X										X	X				

Table 27: PSAT 8/9 Aligned to TEKS in Grade 8

PSAT 8/9 to Texas Essential Knowledge and Skills: Grade 8	Number and Operations					Proportionality										Expressions, Equations, and Relationships								Two-dimensional Shapes				Measurement and Data			Personal Financial Literacy																		
	2					3			4			5							6			7			8		9	10				11			12														
	a	b	b	c	d	a	b	c	a	b	c	a	b	c	d	e	f	g	h	i	a	b	c	a	b	c	d	a	b	c	d		a	b	c	d	a	b	c	a	b	c	d	e	f	g			
PSAT HEART OF ALGEBRA																																																	
Linear Equations in One Variable																																																	
Linear Functions									X		X				X	X				X	X																												
Linear equations in two variables									X		X																																						
Systems of two linear equations in two variables																																		X															
Linear inequalities in one or two variables																																																	
PSAT PROBLEM SOLVING AND DATA ANALYSIS																																																	
Ratios, rates, proportional relationships, and units						X									X																																		
Percentages																																																	
One variable data: Distributions and measures of center and spread																																																	
Two-variable data: Models and scatterplots									X	X					X					X																			X										

Appendix A: Side-by-Side Alignment of ELAL Standards to SAT Suite

The following tables detail the Texas–SAT Suite alignments using Texas’s standards as the organizing principle. Partial or otherwise qualified alignments are noted in **red**. Partial or qualified alignments have been indicated only when College Board staff has identified an essential agreement between the given standard(s) and SAT Suite element(s) and, where applicable, Essay scoring dimensions. Explanatory notes, also in **red**, are included to help illuminate College Board’s methodology.

Table 30: Texas College and Career Readiness Writing Standards Aligned to SAT (including Essay)

State Standard ID and Description	SAT Writing and Language Test Elements and SAT Essay Scoring Dimensions
I.A. Compose a variety of texts that demonstrate clear focus, the logical development of ideas in well-organized paragraphs, and the use of appropriate language that advances the author’s purpose.	
I.A.1. Determine effective approaches, genres, rhetorical techniques, and media that demonstrate understanding of the writer’s purpose and audience.	Proposition Support Focus Quantitative information Precision Concision Style and tone Syntax Essay—Analysis Essay—Writing <i>Media is not included on the Writing and Language Test or Essay.</i>

State Standard ID and Description	SAT Writing and Language Test Elements and SAT Essay Scoring Dimensions
I.A.2. Generate ideas, gather information, and manage evidence relevant to the topic and purpose.	Support Focus Quantitative information Essay—Reading Essay—Analysis Essay—Writing
I.A.3. Evaluate relevance, quality, sufficiency, and depth of preliminary ideas and information; organize material generated; and formulate a thesis or purpose statement.	Proposition Support Focus Quantitative information Logical sequence Introductions, conclusions, and transitions Essay—Reading Essay—Analysis Essay—Writing
I.A.4. Review feedback and revise each draft by organizing it more logically and fluidly, refining key ideas, and using language more precisely and effectively.	Proposition Support Focus Quantitative information Logical sequence Introductions, conclusions, and transitions Precision Concision Style and tone Syntax <i>Feedback is not available on the summative Writing and Language Test.</i>

State Standard ID and Description	SAT Writing and Language Test Elements and SAT Essay Scoring Dimensions
<p>I.A.5. Edit writing for audience, purpose, context, and style, assuring that it conforms to Standard American English, when appropriate.</p>	<p>Precision</p> <p>Concision</p> <p>Style and tone</p> <p>Syntax</p> <p>Sentence boundaries</p> <p>Subordination and coordination</p> <p>Parallel structure</p> <p>Modifier placement</p> <p>Verb tense, mood, and voice</p> <p>Pronoun person and number</p> <p>Pronoun clarity</p> <p>Possessive determiners</p> <p>Pronoun-antecedent agreement</p> <p>Subject-verb agreement</p> <p>Noun agreement</p> <p>Frequently confused words</p> <p>Logical comparison</p> <p>Conventional expression</p> <p>End-of-sentence punctuation</p> <p>Within-sentence punctuation</p> <p>Possessive nouns and pronouns</p> <p>Items in a series</p> <p>Nonrestrictive and parenthetical elements</p> <p>Unnecessary punctuation</p>

Table 31: Texas College and Career Readiness Reading Standards Aligned to SAT (including Essay)

State Standard ID and Description	SAT Reading Test Elements and SAT Essay Scoring Dimensions
II.A. Identify, analyze, and evaluate information within and across texts of varying lengths and genres.	
II.A.1. Use effective reading strategies to determine a written work’s purpose and intended audience.	Analyzing point of view Analyzing purpose Essay—Reading Essay—Analysis
II.A.2. Use text features to form an overview of content and to locate information.	
II.A.3. Identify explicit and implicit textual information including main ideas and author’s purpose.	Determining explicit meanings Determining implicit meanings Using analogical reasoning Citing textual evidence Determining central ideas and themes Summarizing Understanding relationships Analyzing purpose Essay—Reading Essay—Analysis

State Standard ID and Description	SAT Reading Test Elements and SAT Essay Scoring Dimensions
II.A.4. Make evidence-based inferences about a text's meaning, intent, and values.	Determining implicit meanings Using analogical reasoning Citing textual evidence Determining central ideas and themes Understanding relationships Analyzing word choice Analyzing overall text structure Analyzing part-whole relationships Analyzing point of view Analyzing purpose Analyzing claims and counterclaims Assessing reasoning Analyzing evidence Analyzing quantitative information Essay—Reading Essay—Analysis
II.A.5. Analyze and evaluate implicit and explicit arguments in a variety of texts for the quality and coherence of evidence and reasoning.	Analyzing claims and counterclaims Assessing reasoning Analyzing evidence Essay—Analysis
II.A.6. Identify and analyze the author's use of rhetorical and literary devices to create meaning and affect the reader.	Analyzing word choice Analyzing part-whole relationships Essay—Analysis
II.A.7. Compare and analyze how features of genre are used across texts.	
II.A.8. Identify, analyze, and evaluate similarities and differences in how multiple texts present information, argue a position, or relate a theme.	Analyzing multiple texts
II.B. Apply a variety of strategies to determine the meanings of unfamiliar words and phrases.	

State Standard ID and Description	SAT Reading Test Elements and SAT Essay Scoring Dimensions
II.B.1. Identify new words and concepts acquired through study of their relationships to other words and concepts.	Determining explicit meanings Determining implicit meanings Interpreting words and phrases in context Analyzing part-whole relationships Essay—Reading <i>Vocabulary tested on the SAT may not be new to students.</i>
II.B.2. Apply knowledge of roots and affixes to infer the meanings of new words.	
II.B.3. Use reference guides to confirm the meanings of new words or concepts.	
II.B.4. Make inferences about the denotative and connotative meanings of unfamiliar words using context clues.	Determining implicit meanings Interpreting words and phrases in context Essay—Reading <i>Vocabulary tested on the SAT may not be unfamiliar to students.</i>
II.C. Read and analyze literary and other texts from a variety of cultural and historical contexts.	
II.C.1. Read widely, including complete texts from American, British, and world literatures.	
II.C.2. Analyze the relationships between works of literature and the historical periods and cultural contexts in which they were written.	
II.C.3. Examine the influence of myths, oral traditions, and Classical literature on subsequent works over time.	
II.D. Acquire insights about oneself, others, or the world from reading diverse texts.	
II.D.1. Make text-to-self, text-to-text, and text-to-world connections.	
II.D.2. Recognize the potential of diverse texts to cultivate empathy.	

State Standard ID and Description	SAT Reading Test Elements and SAT Essay Scoring Dimensions
II.D.3. Appreciate the aesthetic qualities and values of diverse texts.	

Table 32: TEKS in English IV Aligned to SAT (including Essay)

State Standard ID and Description	SAT Reading Test Elements, Writing and Language Test Elements, and Essay Scoring Dimensions
<p>1. Developing and sustaining foundational language skills: listening, speaking, discussion, and thinking—oral language. The student develops oral language through listening, speaking, and discussion. The student is expected to:</p> <p>A. engage in meaningful and respectful discourse when evaluating the clarity and coherence of a speaker's message and critiquing the impact of a speaker's use of diction, syntax, and rhetorical strategies;</p> <p>B. follow and give complex instructions, clarify meaning by asking pertinent questions, and respond appropriately;</p> <p>C. formulate sound arguments and present using elements of classical speeches such as introduction, first and second transitions, body, conclusion, the art of persuasion, rhetorical devices, employing eye contact, speaking rate such as pauses for effect, volume, enunciation, purposeful gestures, and conventions of language to communicate ideas effectively; and</p> <p>D. participate collaboratively, offering ideas or judgments that are purposeful in moving the team toward goals, asking relevant and insightful questions, tolerating a range of positions and ambiguity in decision making, and evaluating the work of the group based on agreed-upon criteria.</p>	

State Standard ID and Description	SAT Reading Test Elements, Writing and Language Test Elements, and Essay Scoring Dimensions
<p>2. Developing and sustaining foundational language skills: listening, speaking, reading, writing, and thinking—vocabulary. The student uses newly acquired vocabulary expressively. The student is expected to:</p> <p>A. use print or digital resources to clarify and validate understanding of multiple meanings of advanced vocabulary;</p> <p>B. analyze context to draw conclusions about nuanced meanings such as in imagery; and</p> <p>C. determine the meaning of foreign words or phrases used frequently in English such as ad nauseum, in loco parentis, laissez-faire, and caveat emptor.</p>	<p>Determining explicit meanings</p> <p>Determining implicit meanings</p> <p>Interpreting words and phrases in context</p> <p>Analyzing word choice</p> <p>Essay—Reading</p> <p>Essay—Analysis</p> <p><i>Listening and speaking are not assessed. Vocabulary tested on the SAT may not be new to students. Print and digital resources are not available on the summative Reading Test and Essay. Students' ability to determine the meaning of foreign words or phrases is not assessed.</i></p>
<p>3. Developing and sustaining foundational language skills: listening, speaking, reading, writing, and thinking—self-sustained reading. The student reads grade-appropriate texts independently. The student is expected to self-select text and read independently for a sustained period of time.</p>	

State Standard ID and Description	SAT Reading Test Elements, Writing and Language Test Elements, and Essay Scoring Dimensions
<p>4. Comprehension skills: listening, speaking, reading, writing, and thinking using multiple texts. The student uses metacognitive skills to both develop and deepen comprehension of increasingly complex texts. The student is expected to:</p> <p>A. establish purpose for reading assigned and self-selected texts;</p> <p>B. generate questions about text before, during, and after reading to deepen understanding and gain information;</p> <p>C. make and correct or confirm predictions using text features, characteristics of genre, and structures;</p> <p>D. create mental images to deepen understanding;</p> <p>E. make connections to personal experiences, ideas in other texts, and society;</p> <p>F. make inferences and use evidence to support understanding;</p> <p>G. evaluate details read to analyze key ideas;</p> <p>H. synthesize information from a variety of text types to create new understanding; and</p> <p>I. monitor comprehension and make adjustments such as re-reading, using background knowledge, asking questions, annotating, and using outside sources when understanding breaks down.</p>	<p>Text Complexity: Reading</p> <p>Determining explicit meanings</p> <p>Determining implicit meanings</p> <p>Using analogical reasoning</p> <p>Citing textual evidence</p> <p>Determining central ideas and themes</p> <p>Summarizing</p> <p>Understanding relationships</p> <p>Interpreting words and phrases in context</p> <p>Analyzing word choice</p> <p>Analyzing part-whole relationships</p> <p>Analyzing point of view</p> <p>Analyzing purpose</p> <p>Analyzing claims and counterclaims</p> <p>Assessing reasoning</p> <p>Analyzing evidence</p> <p>Analyzing multiple texts</p> <p>Analyzing quantitative information</p> <p>Essay—Reading</p> <p>Essay—Analysis</p> <p><i>Listening and speaking are not assessed. Students' use of metacognitive skills is not directly assessed. Paired passages of different text types are within the Reading Test domain but are not guaranteed to appear in any given test administration.</i></p>

State Standard ID and Description	SAT Reading Test Elements, Writing and Language Test Elements, and Essay Scoring Dimensions
<p>5. Response skills: listening, speaking, reading, writing, and thinking using multiple texts. The student responds to an increasingly challenging variety of sources that are read, heard, or viewed. The student is expected to:</p> <p>A. describe personal connections to a variety of sources, including self-selected texts;</p> <p>B. write responses that demonstrate analysis of texts, including comparing texts within and across genres;</p> <p>C. use text evidence and original commentary to support an evaluative response;</p> <p>D. paraphrase and summarize texts in ways that maintain meaning and logical order;</p> <p>E. interact with sources in meaningful ways such as notetaking, annotating, freewriting, or illustrating;</p> <p>F. respond using acquired content and academic vocabulary as appropriate;</p> <p>G. discuss and write about the explicit and implicit meanings of text;</p> <p>H. respond orally or in writing with appropriate register and purposeful vocabulary, tone, and voice;</p> <p>I. reflect on and adjust responses when valid evidence warrants; and</p> <p>J. defend or challenge the authors' claims using relevant text evidence.</p>	<p>Text Complexity: Reading</p> <p>Determining implicit meanings</p> <p>Citing textual evidence</p> <p>Summarizing</p> <p>Text Complexity: Writing and Language</p> <p>Precision</p> <p>Style and tone</p> <p>Essay—Reading</p> <p>Essay—Analysis</p> <p>Essay—Writing</p> <p><i>Listening and speaking are not assessed. Personal connections to sources are not assessed. On the Essay, students are required to draw evidence from a single argument. Interactions with sources such as those described in E are not assessed. The Essay is a first-draft task that does not permit time for reflection. On the Essay, test takers do not defend or challenge the passage author's claims but rather explains how the author builds an argument to persuade an audience.</i></p>

State Standard ID and Description	SAT Reading Test Elements, Writing and Language Test Elements, and Essay Scoring Dimensions
<p>6. Multiple genres: listening, speaking, reading, writing, and thinking using multiple texts—literary elements. The student recognizes and analyzes literary elements within and across increasingly complex traditional, contemporary, classical, and diverse literary texts. The student is expected to:</p> <p>A. analyze relationships among thematic development, characterization, point of view, significance of setting, and plot in a variety of literary texts;</p> <p>B. analyze how characters' behaviors and underlying motivations contribute to moral dilemmas that influence the plot and theme;</p> <p>C. critique and evaluate how complex plot structures such as subplots contribute to and advance the action; and</p> <p>D. evaluate how the historical, social, and economic context of setting(s) influences the plot, characterization, and theme.</p>	<p>Text Complexity: Reading</p> <p>Determining explicit meanings</p> <p>Determining implicit meanings</p> <p>Determining central ideas and themes</p> <p>Understanding relationships</p> <p>Analyzing part-whole relationships</p> <p>Analyzing point of view</p> <p><i>Listening and speaking are not assessed. Traditional literary texts are not assessed. Texts with moral dilemmas may or may not appear on the Reading Test. On the Reading Test, students are not asked to critique complex plot structures. Knowledge of historical, social, and economic contexts is not assessed.</i></p>

State Standard ID and Description	SAT Reading Test Elements, Writing and Language Test Elements, and Essay Scoring Dimensions
<p>7. Multiple genres: listening, speaking, reading, writing, and thinking using multiple texts—genres. The student recognizes and analyzes genre-specific characteristics, structures, and purposes within and across increasingly complex traditional, contemporary, classical, and diverse texts. The student is expected to:</p> <p>A. read and analyze British literature across literary periods;</p> <p>B. analyze the effects of sound, form, figurative language, graphics, and dramatic structure in poetry across literary time periods and cultures;</p> <p>C. analyze and evaluate how the relationships among the dramatic elements advance the plot;</p> <p>D. critique and evaluate characteristics and structural elements of informational texts such as:</p> <ul style="list-style-type: none"> i. clear thesis, effective supporting evidence, pertinent examples, commentary, summary, and conclusion; and ii. the relationship between organizational design and author's purpose; <p>E. critique and evaluate characteristics and structural elements of argumentative texts such as:</p> <ul style="list-style-type: none"> i. clear arguable thesis, appeals, structure of the argument, convincing conclusion, and call to action; ii. various types of evidence and treatment of counterarguments, including concessions and rebuttals; and iii. identifiable audience or reader; and <p>F. critique and evaluate the effectiveness of characteristics of multimodal and digital texts.</p>	<p>Text Complexity: Reading</p> <ul style="list-style-type: none"> Determining central ideas and themes Analyzing word choice Analyzing overall text structure Analyzing part-whole relationships Analyzing point of view Analyzing purpose Analyzing claims and counterclaims Assessing reasoning Analyzing evidence Analyzing quantitative information <p>Essay—Reading</p> <p>Essay—Analysis</p> <p><i>Listening and speaking are not assessed. British literature is within the Reading Test domain but is not guaranteed to appear in any given test administration. Each administration of the Reading Test includes one fiction passage. Poetry, drama, and digital texts are not included on the Reading Test. Multimodal texts, in the form of passages accompanied by informational graphics, appear on the Reading Test and the Writing and Language Test but are not critiqued and evaluated for their effectiveness per se.</i></p>

State Standard ID and Description	SAT Reading Test Elements, Writing and Language Test Elements, and Essay Scoring Dimensions
<p>8. Author's purpose and craft: listening, speaking, reading, writing, and thinking using multiple texts. The student uses critical inquiry to analyze the authors' choices and how they influence and communicate meaning within a variety of texts. The student analyzes and applies author's craft purposefully in order to develop his or her own products and performances. The student is expected to:</p> <p>A. evaluate the author's purpose, audience, and message within a text;</p> <p>B. evaluate use of text structure to achieve the author's purpose;</p> <p>C. evaluate the author's use of print and graphic features to achieve specific purposes;</p> <p>D. critique and evaluate how the author's use of language informs and shapes the perception of readers;</p> <p>E. evaluate the use of literary devices such as paradox, satire, and allegory to achieve specific purposes;</p> <p>F. evaluate how the author's diction and syntax contribute to the effectiveness of a text; and</p> <p>G. analyze the effects of rhetorical devices and logical fallacies on the way the text is read and understood.</p>	<p>Analyzing word choice</p> <p>Analyzing overall text structure</p> <p>Analyzing part-whole relationships</p> <p>Analyzing point of view</p> <p>Analyzing purpose</p> <p>Essay—Reading</p> <p>Essay—Analysis</p> <p><i>Listening and speaking are not assessed. Students do not develop performances. Print and graphic features are not assessed. Students are not assessed on the use of allegory. Students may be asked to recognize weaknesses or inconsistencies in authors' reasoning but not to identify fallacies by name, though they may opt to do so for Essay.</i></p>

9. Composition: **listening, speaking**, reading, writing, and thinking using multiple texts—writing process. The student uses the writing process **recursively** to compose multiple texts that **are legible and** use appropriate conventions. The student is expected to:

A. **plan a piece of writing appropriate for various purposes and audiences by generating ideas through a range of strategies such as brainstorming, journaling, reading, or discussing;**

B. develop drafts into a focused, structured, and coherent piece of writing in timed **and open-ended** situations by:

i. using strategic organizational structures appropriate to purpose, audience, topic, and context; and

ii. developing an engaging idea reflecting depth of thought with effective use of rhetorical devices, details, examples, and commentary;

C. revise drafts to improve clarity, development, organization, style, diction, and sentence fluency, both within and between sentences;

D. edit drafts to demonstrate a command of standard English conventions **using a style guide as appropriate;** and

E. **publish written work for appropriate audiences.**

Proposition

Support

Focus

Quantitative information

Logical sequence

Introductions, conclusions, and transitions

Precision

Concision

Style and tone

Syntax

Sentence boundaries

Subordination and coordination

Parallel structure

Modifier placement

Verb tense, mood, and voice

Pronoun person and number

Pronoun clarity

Possessive determiners

Pronoun-antecedent agreement

Subject-verb agreement

Noun agreement

Frequently confused words

Logical comparison

Conventional expression

End-of-sentence punctuation

Within-sentence punctuation

Possessive nouns and pronouns

Items in a series

Nonrestrictive and parenthetical elements

Unnecessary punctuation

Essay—Analysis

Essay—Writing

Listening and speaking are not assessed. Students do not engage in a recursive writing process, given the time limits on and the nature of the test. Students

State Standard ID and Description	SAT Reading Test Elements, Writing and Language Test Elements, and Essay Scoring Dimensions
	<p><i>taking the Essay may plan, but their planning is not scored. The Essay is a timed, single-sitting assessment. Students taking the Essay do not typically have time to produce multiple drafts. Use of a style guide is not assessed, and students do not publish their work.</i></p>
<p>10. Composition: listening, speaking, reading, writing, and thinking using multiple texts—genres. The student uses genre characteristics and craft to compose multiple texts that are meaningful. The student is expected to:</p> <p>A. compose literary texts such as fiction and poetry using genre characteristics and craft;</p> <p>B. compose informational texts such as explanatory essays, reports, resumes, and personal essays using genre characteristics and craft;</p> <p>C. compose argumentative texts using genre characteristics and craft;</p> <p>D. compose correspondence in a professional or friendly structure;</p> <p>E. compose literary analysis using genre characteristics and craft; and</p> <p>F. compose rhetorical analysis using genre characteristics and craft.</p>	<p>Proposition</p> <p>Support</p> <p>Focus</p> <p>Quantitative information</p> <p>Logical sequence</p> <p>Introductions, conclusions, and transitions</p> <p>Precision</p> <p>Concision</p> <p>Style and tone</p> <p>Syntax</p> <p>Essay—Analysis</p> <p>Essay—Writing</p> <p><i>Listening and speaking are not assessed. Fictional narratives and poetry are not included on the Writing and Language Test. Students are not asked to compose reports, resumes, personal essays, or correspondence.</i></p>

State Standard ID and Description	SAT Reading Test Elements, Writing and Language Test Elements, and Essay Scoring Dimensions
<p>11. Inquiry and research: listening, speaking, reading, writing, and thinking using multiple texts. The student engages in both short-term and sustained recursive inquiry processes for a variety of purposes. The student is expected to:</p> <ul style="list-style-type: none"> A. develop questions for formal and informal inquiry; B. critique the research process at each step to implement changes as needs occur and are identified; C. develop and revise a plan; D. modify the major research question as necessary to refocus the research plan; E. locate relevant sources; F. synthesize information from a variety of sources; G. examine sources for: <ul style="list-style-type: none"> i. credibility, bias, and accuracy; and ii. faulty reasoning such as straw man, false dilemma, faulty analogies, and non-sequitur; H. display academic citations, including for paraphrased and quoted text, and use source materials ethically to avoid plagiarism; and I. use an appropriate mode of delivery, whether written, oral, or multimodal, to present results. 	

Table 33: TEKS in English III Aligned to SAT (including Essay)

State Standard ID and Description	SAT Reading Test Elements, Writing and Language Test Elements, and Essay Scoring Dimensions
<p>1. Developing and sustaining foundational language skills: listening, speaking, discussion, and thinking—oral language. The student develops oral language through listening, speaking, and discussion. The student is expected to:</p> <p>A. engage in meaningful and respectful discourse when evaluating the clarity and coherence of a speaker's message and critiquing the impact of a speaker's use of diction and syntax;</p> <p>B. follow and give complex instructions, clarify meaning by asking pertinent questions, and respond appropriately;</p> <p>C. give a formal presentation that exhibits a logical structure, smooth transitions, accurate evidence, well-chosen details, and rhetorical devices and that employs eye contact, speaking rate such as pauses for effect, volume, enunciation, purposeful gestures, and conventions of language to communicate ideas effectively; and</p> <p>D. participate collaboratively, offering ideas or judgments that are purposeful in moving the team toward goals, asking relevant and insightful questions, tolerating a range of positions and ambiguity in decision making, and evaluating the work of the group based on agreed-upon criteria.</p>	
<p>2. Developing and sustaining foundational language skills: listening, speaking, reading, writing, and thinking—vocabulary. The student uses newly acquired vocabulary expressively. The student is expected to:</p> <p>A. use print or digital resources to clarify and validate understanding of multiple meanings of advanced vocabulary;</p> <p>B. analyze context to draw conclusions about nuanced meanings such as in imagery; and</p> <p>C. determine the meaning of foreign words or phrases used frequently in English such as ad hoc, faux pas, non sequitur, and modus operandi.</p>	<p>Determining explicit meanings</p> <p>Determining implicit meanings</p> <p>Interpreting words and phrases in context</p> <p>Analyzing word choice</p> <p>Essay—Reading</p> <p>Essay—Analysis</p> <p><i>Listening and speaking are not assessed. Vocabulary tested on the SAT may not be new to students. Print and digital resources are not available on the summative Reading Test and Essay. Students' ability to determine the meaning of foreign words or phrases is not assessed.</i></p>

State Standard ID and Description	SAT Reading Test Elements, Writing and Language Test Elements, and Essay Scoring Dimensions
<p>3. Developing and sustaining foundational language skills: listening, speaking, reading, writing, and thinking—self-sustained reading. The student reads grade-appropriate texts independently. The student is expected to self-select text and read independently for a sustained period of time.</p>	
<p>4. Comprehension skills: listening, speaking, reading, writing, and thinking using multiple texts. The student uses metacognitive skills to both develop and deepen comprehension of increasingly complex texts. The student is expected to:</p> <p>A. establish purpose for reading assigned and self-selected texts;</p> <p>B. generate questions about text before, during, and after reading to deepen understanding and gain information;</p> <p>C. make and correct or confirm predictions using text features, characteristics of genre, and structures;</p> <p>D. create mental images to deepen understanding;</p> <p>E. make connections to personal experiences, ideas in other texts, and society;</p> <p>F. make inferences and use evidence to support understanding;</p> <p>G. evaluate details read to understand key ideas;</p> <p>H. synthesize information from a variety of text types to create new understanding; and</p> <p>I. monitor comprehension and make adjustments such as re-reading, using background knowledge, asking questions, annotating, and using outside sources when understanding breaks down.</p>	<p>Text Complexity: Reading</p> <p>Determining explicit meanings</p> <p>Determining implicit meanings</p> <p>Using analogical reasoning</p> <p>Citing textual evidence</p> <p>Determining central ideas and themes</p> <p>Summarizing</p> <p>Understanding relationships</p> <p>Interpreting words and phrases in context</p> <p>Analyzing word choice</p> <p>Analyzing overall text structure</p> <p>Analyzing part-whole relationships</p> <p>Analyzing point of view</p> <p>Analyzing purpose</p> <p>Analyzing claims and counterclaims</p> <p>Assessing reasoning</p> <p>Analyzing evidence</p> <p>Analyzing multiple texts</p> <p>Analyzing quantitative information</p> <p>Essay—Reading</p> <p>Essay—Analysis</p> <p><i>Listening and speaking are not assessed. Students' use of metacognitive skills is not directly assessed. Paired passages of different text types are within the Reading Test domain but are not guaranteed to appear in any given test administration.</i></p>

State Standard ID and Description	SAT Reading Test Elements, Writing and Language Test Elements, and Essay Scoring Dimensions
<p>5. Response skills: listening, speaking, reading, writing, and thinking using multiple texts. The student responds to an increasingly challenging variety of sources that are read, heard, or viewed. The student is expected to:</p> <p>A. describe personal connections to a variety of sources, including self-selected texts;</p> <p>B. write responses that demonstrate analysis of texts, including comparing texts within and across genres;</p> <p>C. use text evidence and original commentary to support an analytic response;</p> <p>D. paraphrase and summarize texts in ways that maintain meaning and logical order;</p> <p>E. interact with sources in meaningful ways such as notetaking, annotating, freewriting, or illustrating;</p> <p>F. respond using acquired content and academic vocabulary as appropriate;</p> <p>G. discuss and write about the explicit and implicit meanings of text;</p> <p>H. respond orally or in writing with appropriate register and effective vocabulary, tone, and voice;</p> <p>I. reflect on and adjust responses when valid evidence warrants; and</p> <p>J. defend or challenge the authors' claims using relevant text evidence.</p>	<p>Text Complexity: Reading</p> <p>Determining implicit meanings</p> <p>Citing textual evidence</p> <p>Summarizing</p> <p>Text Complexity: Writing and Language</p> <p>Precision</p> <p>Style and tone</p> <p>Essay—Reading</p> <p>Essay—Analysis</p> <p>Essay—Writing</p> <p><i>Listening and speaking are not assessed. Personal connections to sources are not assessed. On the Essay, students are required to draw evidence from a single argument. Interactions with sources such as those described in E are not assessed. The Essay is a first-draft task that does not permit time for reflection. On the Essay, test takers do not defend or challenge the passage author's claims but rather explains how the author builds an argument to persuade an audience.</i></p>

State Standard ID and Description	SAT Reading Test Elements, Writing and Language Test Elements, and Essay Scoring Dimensions
<p>6. Multiple genres: listening, speaking, reading, writing, and thinking using multiple texts—literary elements. The student recognizes and analyzes literary elements within and across increasingly complex traditional, contemporary, classical, and diverse literary texts. The student is expected to:</p> <p>A. analyze relationships among thematic development, characterization, point of view, significance of setting, and plot in a variety of literary texts;</p> <p>B. analyze how characters' behaviors and underlying motivations contribute to moral dilemmas that influence the plot and theme;</p> <p>C. evaluate how different literary elements shape the author's portrayal of the plot; and</p> <p>D. analyze how the historical, social, and economic context of setting(s) influences the plot, characterization, and theme.</p>	<p>Text Complexity: Reading</p> <p>Determining explicit meanings</p> <p>Determining implicit meanings</p> <p>Determining central ideas and themes</p> <p>Understanding relationships</p> <p>Analyzing word choice</p> <p>Analyzing part-whole relationships</p> <p>Analyzing point of view</p> <p><i>Listening and speaking are not assessed. Traditional literary texts are not assessed. Texts with moral dilemmas may or may not appear on the Reading Test. Knowledge of historical, social, and economic contexts is not assessed.</i></p>

State Standard ID and Description	SAT Reading Test Elements, Writing and Language Test Elements, and Essay Scoring Dimensions
<p>7. Multiple genres: listening, speaking, reading, writing, and thinking using multiple texts—genres. The student recognizes and analyzes genre-specific characteristics, structures, and purposes within and across increasingly complex traditional, contemporary, classical, and diverse texts. The student is expected to:</p> <p>A. read and analyze American literature across literary periods;</p> <p>B. analyze relationships among characteristics of poetry, including stanzas, line breaks, speaker, and sound devices in poems across a variety of poetic forms;</p> <p>C. analyze how the relationships among dramatic elements advance the plot;</p> <p>D. analyze characteristics and structural elements of informational texts such as:</p> <ul style="list-style-type: none"> i. clear thesis, strong supporting evidence, pertinent examples, commentary, summary, and conclusion; and ii. the relationship between organizational design and author's purpose; <p>E. analyze characteristics and structural elements of argumentative texts such as:</p> <ul style="list-style-type: none"> i. clear arguable thesis, appeals, structure of the argument, convincing conclusion, and call to action; ii. various types of evidence and treatment of counterarguments, including concessions and rebuttals; and iii. identifiable audience or reader; and <p>F. analyze the effectiveness of characteristics of multimodal and digital texts.</p>	<p>Text Complexity: Reading</p> <ul style="list-style-type: none"> Determining central ideas and themes Analyzing word choice Analyzing overall text structure Analyzing part-whole relationships Analyzing point of view Analyzing purpose Analyzing claims and counterclaims Assessing reasoning Analyzing evidence Analyzing quantitative information <p>Essay—Reading</p> <p>Essay—Analysis</p> <p><i>Listening and speaking are not assessed. American literature is within the Reading Test domain but is not guaranteed to appear in any given test administration. Each administration of the Reading Test includes one fiction passage. Poetry, drama, and digital texts are not included on the Reading Test. Multimodal texts, in the form of passages accompanied by informational graphics, appear on the Reading Test and the Writing and Language Test but are not analyzed for their effectiveness per se.</i></p>

State Standard ID and Description	SAT Reading Test Elements, Writing and Language Test Elements, and Essay Scoring Dimensions
<p>8. Author's purpose and craft: listening, speaking, reading, writing, and thinking using multiple texts. The student uses critical inquiry to analyze the authors' choices and how they influence and communicate meaning within a variety of texts. The student analyzes and applies author's craft purposefully in order to develop his or her own products and performances. The student is expected to:</p> <p>A. analyze the author's purpose, audience, and message within a text;</p> <p>B. evaluate use of text structure to achieve the author's purpose;</p> <p>C. evaluate the author's use of print and graphic features to achieve specific purposes;</p> <p>D. evaluate how the author's use of language informs and shapes the perception of readers;</p> <p>E. evaluate the use of literary devices such as paradox, satire, and allegory to achieve specific purposes;</p> <p>F. evaluate how the author's diction and syntax contribute to the mood, voice, and tone of a text; and</p> <p>G. analyze the effects of rhetorical devices and logical fallacies on the way the text is read and understood.</p>	<p>Analyzing word choice</p> <p>Analyzing overall text structure</p> <p>Analyzing part-whole relationships</p> <p>Analyzing point of view</p> <p>Analyzing purpose</p> <p>Essay—Reading</p> <p>Essay—Analysis</p> <p><i>Listening and speaking are not assessed. Students do not develop performances. Print and graphic features are not assessed. Students are not assessed on the use of allegory. Students may be asked to recognize weaknesses or inconsistencies in authors' reasoning but not to identify fallacies by name, though they may opt to do so for Essay.</i></p>

9. Composition: **listening, speaking**, reading, writing, and thinking using multiple texts—writing process. The student uses the writing process **recursively** to compose multiple texts that **are legible and** use appropriate conventions. The student is expected to:

A. **plan a piece of writing appropriate for various purposes and audiences by generating ideas through a range of strategies such as brainstorming, journaling, reading, or discussing;**

B. develop drafts into a focused, structured, and coherent piece of writing in timed **and open-ended** situations by:

i. using strategic organizational structures appropriate to purpose, audience, topic, and context; and

ii. developing an engaging idea reflecting depth of thought with effective use of rhetorical devices, details, examples, and commentary;

C. revise drafts to improve clarity, development, organization, style, diction, and sentence fluency, both within and between sentences;

D. edit drafts to demonstrate a command of standard English conventions **using a style guide as appropriate;** and

E. **publish written work for appropriate audiences.**

Proposition

Support

Focus

Quantitative information

Logical sequence

Introductions, conclusions, and transitions

Precision

Concision

Style and tone

Syntax

Sentence boundaries

Subordination and coordination

Parallel structure

Modifier placement

Verb tense, mood, and voice

Pronoun person and number

Pronoun clarity

Possessive determiners

Pronoun-antecedent agreement

Subject-verb agreement

Noun agreement

Frequently confused words

Logical comparison

Conventional expression

End-of-sentence punctuation

Within-sentence punctuation

Possessive nouns and pronouns

Items in a series

Nonrestrictive and parenthetical elements

Unnecessary punctuation

Essay—Analysis

Essay—Writing

Listening and speaking are not assessed. Students do not engage in a recursive writing process, given the time limits on and the nature of the test. Students

State Standard ID and Description	SAT Reading Test Elements, Writing and Language Test Elements, and Essay Scoring Dimensions
	<p><i>taking the Essay may plan, but their planning is not scored. The Essay is a timed, single-sitting assessment. Students taking the Essay do not typically have time to produce multiple drafts. Use of a style guide is not assessed, and students do not publish their work.</i></p>
<p>10. Composition: listening, speaking, reading, writing, and thinking using multiple texts—genres. The student uses genre characteristics and craft to compose multiple texts that are meaningful. The student is expected to:</p> <p>A. compose literary texts such as fiction and poetry using genre characteristics and craft;</p> <p>B. compose informational texts such as explanatory essays, reports, resumes, and personal essays using genre characteristics and craft;</p> <p>C. compose argumentative texts using genre characteristics and craft;</p> <p>D. compose correspondence in a professional or friendly structure;</p> <p>E. compose literary analysis using genre characteristics and craft; and</p> <p>F. compose rhetorical analysis using genre characteristics and craft.</p>	<p>Proposition</p> <p>Support</p> <p>Focus</p> <p>Quantitative information</p> <p>Logical sequence</p> <p>Introductions, conclusions, and transitions</p> <p>Precision</p> <p>Concision</p> <p>Style and tone</p> <p>Syntax</p> <p>Essay—Analysis</p> <p>Essay—Writing</p> <p><i>Listening and speaking are not assessed. Fictional narratives and poetry are not included on the Writing and Language Test. Students are not asked to compose reports, resumes, personal essays, or correspondence.</i></p>

State Standard ID and Description	SAT Reading Test Elements, Writing and Language Test Elements, and Essay Scoring Dimensions
<p>11. Inquiry and research: listening, speaking, reading, writing, and thinking using multiple texts. The student engages in both short-term and sustained recursive inquiry processes for a variety of purposes. The student is expected to:</p> <ul style="list-style-type: none"> A. develop questions for formal and informal inquiry; B. critique the research process at each step to implement changes as needs occur and are identified; C. develop and revise a plan; D. modify the major research question as necessary to refocus the research plan; E. locate relevant sources; F. synthesize information from a variety of sources; G. examine sources for: <ul style="list-style-type: none"> i. credibility, bias, and accuracy; and ii. faulty reasoning such as post hoc-ad hoc, circular reasoning, red herring, and assumptions; H. display academic citations, including for paraphrased and quoted text, and use source materials ethically to avoid plagiarism; and I. use an appropriate mode of delivery, whether written, oral, or multimodal, to present results. 	

Table 34: TEKS in English II Aligned to PSAT/NMSQT and PSAT 10

State Standard Description	PSAT/NMSQT and PSAT 10 Reading Test Elements and Writing and Language Test Elements
<p>1. Developing and sustaining foundational language skills: listening, speaking, discussion, and thinking—oral language. The student develops oral language through listening, speaking, and discussion. The student is expected to:</p> <p>A. engage in meaningful and respectful discourse by listening actively, responding appropriately, and adjusting communication to audiences and purposes;</p> <p>B. follow and give complex oral instructions to perform specific tasks, answer questions, or solve problems and complex processes;</p> <p>C. give a formal presentation that incorporates a clear thesis and a logical progression of valid evidence from reliable sources and that employs eye contact, speaking rate such as pauses for effect, volume, enunciation, purposeful gestures, and conventions of language to communicate ideas effectively; and</p> <p>D. participate collaboratively, building on the ideas of others, contributing relevant information, developing a plan for consensus building, and setting ground rules for decision making.</p>	
<p>2. Developing and sustaining foundational language skills: listening, speaking, reading, writing, and thinking—vocabulary. The student uses newly acquired vocabulary expressively. The student is expected to:</p> <p>A. use print or digital resources such as glossaries or technical dictionaries to clarify and validate understanding of the precise and appropriate meaning of technical or discipline-based vocabulary;</p> <p>B. analyze context to distinguish among denotative, connotative, and figurative meanings of words; and</p> <p>C. determine the meaning of foreign words or phrases used frequently in English such as pas de deux, status quo, déjà vu, avant-garde, and coup d'état.</p>	<p>Determining explicit meanings</p> <p>Interpreting words and phrases in context</p> <p><i>Listening and speaking are not assessed. Vocabulary tested on the PSAT/NMSQT and PSAT 10 may not be new to students. Print and digital resources are not available on the summative Reading Test. Students' ability to determine the meaning of foreign words or phrases is not assessed.</i></p>

State Standard Description	PSAT/NMSQT and PSAT 10 Reading Test Elements and Writing and Language Test Elements
<p>3. Developing and sustaining foundational language skills: listening, speaking, reading, writing, and thinking—self-sustained reading. The student reads grade-appropriate texts independently. The student is expected to self-select text and read independently for a sustained period of time.</p>	
<p>4. Comprehension skills: listening, speaking, reading, writing, and thinking using multiple texts. The student uses metacognitive skills to both develop and deepen comprehension of increasingly complex texts. The student is expected to:</p> <p>A. establish purpose for reading assigned and self-selected texts;</p> <p>B. generate questions about text before, during, and after reading to deepen understanding and gain information;</p> <p>C. make and correct or confirm predictions using text features, characteristics of genre, and structures;</p> <p>D. create mental images to deepen understanding;</p> <p>E. make connections to personal experiences, ideas in other texts, and society;</p> <p>F. make inferences and use evidence to support understanding;</p> <p>G. evaluate details read to determine key ideas;</p> <p>H. synthesize information from multiple texts to create new understanding; and</p> <p>I. monitor comprehension and make adjustments such as re-reading, using background knowledge, asking questions, and annotating when understanding breaks down.</p>	<p>Text Complexity: Reading</p> <p>Determining explicit meanings</p> <p>Determining implicit meanings</p> <p>Using analogical reasoning</p> <p>Citing textual evidence</p> <p>Determining central ideas and themes</p> <p>Summarizing</p> <p>Understanding relationships</p> <p>Interpreting words and phrases in context</p> <p>Analyzing word choice</p> <p>Analyzing overall text structure</p> <p>Analyzing part-whole relationships</p> <p>Analyzing point of view</p> <p>Analyzing purpose</p> <p>Analyzing claims and counterclaims</p> <p>Assessing reasoning</p> <p>Analyzing evidence</p> <p>Analyzing multiple texts</p> <p>Analyzing quantitative information</p> <p><i>Listening and speaking are not assessed. Students' use of metacognitive skills is not directly assessed.</i></p>

State Standard Description	PSAT/NMSQT and PSAT 10 Reading Test Elements and Writing and Language Test Elements
<p>5. Response skills: listening, speaking, reading, writing, and thinking using multiple texts. The student responds to an increasingly challenging variety of sources that are read, heard, or viewed. The student is expected to:</p> <p>A. describe personal connections to a variety of sources, including self-selected texts;</p> <p>B. write responses that demonstrate understanding of texts, including comparing texts within and across genres;</p> <p>C. use text evidence and original commentary to support an interpretive response;</p> <p>D. paraphrase and summarize texts in ways that maintain meaning and logical order;</p> <p>E. interact with sources in meaningful ways such as notetaking, annotating, freewriting, or illustrating;</p> <p>F. respond using acquired content and academic vocabulary as appropriate;</p> <p>G. discuss and write about the explicit or implicit meanings of text;</p> <p>H. respond orally or in writing with appropriate register, vocabulary, tone, and voice;</p> <p>I. reflect on and adjust responses when valid evidence warrants; and</p> <p>J. defend or challenge the authors' claims using relevant text evidence.</p>	<p>Text Complexity: Reading</p> <p>Determining implicit meanings</p> <p>Citing textual evidence</p> <p>Summarizing</p> <p>Analyzing multiple texts</p> <p>Text Complexity: Writing and Language</p> <p>Precision</p> <p>Style and tone</p> <p><i>Listening and speaking are not assessed. Personal connections to sources are not assessed, and test takers do not generate original commentary. Interactions with sources such as those described in E are not assessed. Test takers do not discuss and write about texts. Test takers do not have particular opportunities for reflection. Although Reading Test passages may include claims that test takers analyze and evaluate, test takers do not have an opportunity to defend or challenge those claims.</i></p>

State Standard Description	PSAT/NMSQT and PSAT 10 Reading Test Elements and Writing and Language Test Elements
<p>6. Multiple genres: listening, speaking, reading, writing, and thinking using multiple texts—literary elements. The student recognizes and analyzes literary elements within and across increasingly complex traditional, contemporary, classical, and diverse literary texts. The student is expected to:</p> <p>A. analyze how themes are developed through characterization and plot, including comparing similar themes in a variety of literary texts representing different cultures;</p> <p>B. analyze how authors develop complex yet believable characters, including archetypes, through historical and cultural settings and events;</p> <p>C. analyze isolated scenes and their contribution to the success of the plot as a whole; and</p> <p>D. analyze how historical and cultural settings influence characterization, plot, and theme across texts.</p>	<p>Text Complexity: Reading</p> <p>Determining explicit meanings</p> <p>Determining implicit meanings</p> <p>Determining central ideas and themes</p> <p>Understanding relationships</p> <p>Analyzing part-whole relationships</p> <p>Analyzing point of view</p> <p><i>Listening and speaking are not assessed. Traditional literary texts are not assessed. On the Reading Test, students are not asked to compare similar themes across literary texts. Each administration of the Reading Test includes one fiction passage, which may or may not contain an archetypal character or characters. Test takers are not asked on the Reading Test to analyze historical or cultural elements of texts in isolation. Isolated scenes may be presented, but students generally do not have access to the plot as a whole. Knowledge of historical and cultural contexts is not assessed.</i></p>

State Standard Description	PSAT/NMSQT and PSAT 10 Reading Test Elements and Writing and Language Test Elements
<p>7. Multiple genres: listening, speaking, reading, writing, and thinking using multiple texts—genres. The student recognizes and analyzes genre-specific characteristics, structures, and purposes within and across increasingly complex traditional, contemporary, classical, and diverse texts. The student is expected to:</p> <p>A. read and analyze world literature across literary periods;</p> <p>B. analyze the effects of metrics; rhyme schemes; types of rhymes such as end, internal, slant, and eye; and other conventions in poems across a variety of poetic forms;</p> <p>C. analyze the function of dramatic conventions such as asides, soliloquies, dramatic irony, and satire;</p> <p>D. analyze characteristics and structural elements of informational texts such as:</p> <ul style="list-style-type: none"> i. clear thesis, relevant supporting evidence, pertinent examples, and conclusion; and ii. the relationship between organizational design and thesis; <p>E. analyze characteristics and structural elements of argumentative texts such as:</p> <ul style="list-style-type: none"> i. clear arguable claim, appeals, and convincing conclusion; ii. various types of evidence and treatment of counterarguments, including concessions and rebuttals; and iii. identifiable audience or reader; and <p>F. analyze characteristics of multimodal and digital texts.</p>	<p>Text Complexity: Reading</p> <p>Determining central ideas and themes</p> <p>Analyzing word choice</p> <p>Analyzing overall text structure</p> <p>Analyzing part-whole relationships</p> <p>Analyzing point of view</p> <p>Analyzing purpose</p> <p>Analyzing claims and counterclaims</p> <p>Assessing reasoning</p> <p>Analyzing evidence</p> <p>Analyzing quantitative information</p> <p><i>Listening and speaking are not assessed. World literature is within the Reading Test domain but is not guaranteed to appear in any given test administration. Each administration of the Reading Test includes one fiction passage. Poetry, drama, and digital texts are not included on the Reading Test. Multimodal texts, in the form of passages accompanied by informational graphics, appear on the Reading Test and the Writing and Language Test but are not analyzed for their characteristics per se.</i></p>

State Standard Description	PSAT/NMSQT and PSAT 10 Reading Test Elements and Writing and Language Test Elements
<p>8. Author's purpose and craft: listening, speaking, reading, writing, and thinking using multiple texts. The student uses critical inquiry to analyze the authors' choices and how they influence and communicate meaning within a variety of texts. The student analyzes and applies author's craft purposefully in order to develop his or her own products and performances. The student is expected to:</p> <p>A. analyze the author's purpose, audience, and message within a text;</p> <p>B. analyze use of text structure to achieve the author's purpose;</p> <p>C. evaluate the author's use of print and graphic features to achieve specific purposes;</p> <p>D. analyze how the author's use of language informs and shapes the perception of readers;</p> <p>E. analyze the use of literary devices such as irony, sarcasm, and motif to achieve specific purposes;</p> <p>F. analyze how the author's diction and syntax contribute to the mood, voice, and tone of a text; and</p> <p>G. analyze the purpose of rhetorical devices such as appeals, antithesis, parallelism, and shifts and the effects of logical fallacies.</p>	<p>Analyzing word choice</p> <p>Analyzing overall text structure</p> <p>Analyzing part-whole relationships</p> <p>Analyzing point of view</p> <p>Analyzing purpose</p> <p><i>Listening and speaking are not assessed. The Writing and Language Test is a test of revision and editing; test takers do not produce their own products. Students do not develop performances. Print and graphic features are not assessed. Antithesis and motif are not assessed. Students may be asked to recognize weaknesses or inconsistencies in authors' reasoning but not to identify fallacies by name.</i></p>

State Standard Description	PSAT/NMSQT and PSAT 10 Reading Test Elements and Writing and Language Test Elements
<p>9. Composition: listening, speaking, reading, writing, and thinking using multiple texts—writing process. The student uses the writing process recursively to compose multiple texts that are legible and use appropriate conventions. The student is expected to:</p> <p>A. plan a piece of writing appropriate for various purposes and audiences by generating ideas through a range of strategies such as brainstorming, journaling, reading, or discussing;</p> <p>B. develop drafts into a focused, structured, and coherent piece of writing in timed and open-ended situations by:</p> <ul style="list-style-type: none"> i. using an organizing structure appropriate to purpose, audience, topic, and context; and ii. developing an engaging idea reflecting depth of thought with specific details, examples, and commentary; <p>C. revise drafts to improve clarity, development, organization, style, diction, and sentence effectiveness, including use of parallel constructions and placement of phrases and dependent clauses;</p> <p>D. edit drafts using standard English conventions, including:</p> <ul style="list-style-type: none"> i. a variety of complete, controlled sentences and avoidance of unintentional splices, run-ons, and fragments; ii. consistent, appropriate use of verb tense and active and passive voice; iii. pronoun-antecedent agreement; iv. correct capitalization; v. punctuation, including commas, semicolons, colons, dashes, and parentheses to set off phrases and clauses as appropriate; and vi. correct spelling; and <p>E. publish written work for appropriate audiences.</p>	<p>Proposition</p> <p>Support</p> <p>Focus</p> <p>Quantitative information</p> <p>Logical sequence</p> <p>Introductions, conclusions, and transitions</p> <p>Precision</p> <p>Concision</p> <p>Style and tone</p> <p>Syntax</p> <p>Sentence boundaries</p> <p>Subordination and coordination</p> <p>Parallel structure</p> <p>Modifier placement</p> <p>Verb tense, mood, and voice</p> <p>Pronoun-antecedent agreement</p> <p>End-of-sentence punctuation</p> <p>Within-sentence punctuation</p> <p>Items in a series</p> <p>Nonrestrictive and parenthetical elements</p> <p>Unnecessary punctuation</p> <p><i>Listening and speaking are not assessed. Students do not engage in a recursive writing process, given the time limits on and the nature of the test. The standard English conventions of capitalization and spelling are not assessed. Students do not publish their work.</i></p>

State Standard Description	PSAT/NMSQT and PSAT 10 Reading Test Elements and Writing and Language Test Elements
<p>10. Composition: listening, speaking, reading, writing, and thinking using multiple texts—genres. The student uses genre characteristics and craft to compose multiple texts that are meaningful. The student is expected to:</p> <p>A. compose literary texts such as fiction and poetry using genre characteristics and craft;</p> <p>B. compose informational texts such as explanatory essays, reports, and personal essays using genre characteristics and craft;</p> <p>C. compose argumentative texts using genre characteristics and craft; and</p> <p>D. compose correspondence in a professional or friendly structure.</p>	<p>Proposition</p> <p>Support</p> <p>Focus</p> <p>Quantitative information</p> <p>Logical sequence</p> <p>Introductions, conclusions, and transitions</p> <p>Precision</p> <p>Concision</p> <p>Style and tone</p> <p>Syntax</p> <p><i>Listening and speaking are not assessed. Fictional narratives and poetry are not included on the Writing and Language Test. Students are not asked to compose reports, resumes, personal essays, or correspondence.</i></p>

State Standard Description	PSAT/NMSQT and PSAT 10 Reading Test Elements and Writing and Language Test Elements
<p>11. Inquiry and research: listening, speaking, reading, writing, and thinking using multiple texts. The student engages in both short-term and sustained recursive inquiry processes for a variety of purposes. The student is expected to:</p> <ul style="list-style-type: none"> A. develop questions for formal and informal inquiry; B. critique the research process at each step to implement changes as needs occur and are identified; C. develop and revise a plan; D. modify the major research question as necessary to refocus the research plan; E. locate relevant sources; F. synthesize information from a variety of sources; G. examine sources for: <ul style="list-style-type: none"> i. credibility and bias, including omission; and ii. faulty reasoning such as incorrect premise, hasty generalizations, and either-or; H. display academic citations, including for paraphrased and quoted text, and use source materials ethically to avoid plagiarism; and I. use an appropriate mode of delivery, whether written, oral, or multimodal, to present results. 	

Table 35: TEKS in English I Aligned to PSAT/NMSQT and PSAT 10

State Standard Description	PSAT/NMSQT and PSAT 10 Reading Test Elements and Writing and Language Test Elements
<p>1. Developing and sustaining foundational language skills: listening, speaking, discussion, and thinking—oral language. The student develops oral language through listening, speaking, and discussion. The student is expected to:</p> <p>A. engage in meaningful and respectful discourse by listening actively, responding appropriately, and adjusting communication to audiences and purposes;</p> <p>B. follow and give complex oral instructions to perform specific tasks, answer questions, or solve problems and complex processes;</p> <p>C. give a presentation using informal, formal, and technical language effectively to meet the needs of audience, purpose, and occasion, employing eye contact, speaking rate such as pauses for effect, volume, enunciation, purposeful gestures, and conventions of language to communicate ideas effectively; and</p> <p>D. participate collaboratively, building on the ideas of others, contributing relevant information, developing a plan for consensus building, and setting ground rules for decision making.</p>	
<p>2. Developing and sustaining foundational language skills: listening, speaking, reading, writing, and thinking—vocabulary. The student uses newly acquired vocabulary expressively. The student is expected to:</p> <p>A. use print or digital resources such as glossaries or technical dictionaries to clarify and validate understanding of the precise and appropriate meaning of technical or discipline-based vocabulary;</p> <p>B. analyze context to distinguish between the denotative and connotative meanings of words; and</p> <p>C. determine the meaning of foreign words or phrases used frequently in English such as bona fide, caveat, carte blanche, tête-à-tête, bon appétit, and quid pro quo.</p>	<p>Determining explicit meanings</p> <p>Interpreting words and phrases in context</p> <p><i>Listening and speaking are not assessed. Vocabulary tested on the PSAT/NMSQT and PSAT 10 may not be new to students. Print and digital resources are not available on the summative Reading Test. Students' ability to determine the meaning of foreign words or phrases is not assessed.</i></p>

State Standard Description	PSAT/NMSQT and PSAT 10 Reading Test Elements and Writing and Language Test Elements
<p>3. Developing and sustaining foundational language skills: listening, speaking, reading, writing, and thinking—self-sustained reading. The student reads grade-appropriate texts independently. The student is expected to self-select text and read independently for a sustained period of time.</p>	
<p>4. Comprehension skills: listening, speaking, reading, writing, and thinking using multiple texts. The student uses metacognitive skills to both develop and deepen comprehension of increasingly complex texts. The student is expected to:</p> <p>A. establish purpose for reading assigned and self-selected texts;</p> <p>B. generate questions about text before, during, and after reading to deepen understanding and gain information;</p> <p>C. make and correct or confirm predictions using text features, characteristics of genre, and structures;</p> <p>D. create mental images to deepen understanding;</p> <p>E. make connections to personal experiences, ideas in other texts, and society;</p> <p>F. make inferences and use evidence to support understanding;</p> <p>G. evaluate details read to determine key ideas;</p> <p>H. synthesize information from two texts to create new understanding; and</p> <p>I. monitor comprehension and make adjustments such as re-reading, using background knowledge, asking questions, and annotating when understanding breaks down.</p>	<p>Text Complexity: Reading</p> <p>Determining explicit meanings</p> <p>Determining implicit meanings</p> <p>Using analogical reasoning</p> <p>Citing textual evidence</p> <p>Determining central ideas and themes</p> <p>Summarizing</p> <p>Understanding relationships</p> <p>Interpreting words and phrases in context</p> <p>Analyzing word choice</p> <p>Analyzing overall text structure</p> <p>Analyzing part-whole relationships</p> <p>Analyzing point of view</p> <p>Analyzing purpose</p> <p>Analyzing claims and counterclaims</p> <p>Assessing reasoning</p> <p>Analyzing evidence</p> <p>Analyzing multiple texts</p> <p>Analyzing quantitative information</p> <p><i>Listening and speaking are not assessed. Students' use of metacognitive skills is not directly assessed.</i></p>

State Standard Description	PSAT/NMSQT and PSAT 10 Reading Test Elements and Writing and Language Test Elements
<p>5. Response skills: listening, speaking, reading, writing, and thinking using multiple texts. The student responds to an increasingly challenging variety of sources that are read, heard, or viewed. The student is expected to:</p> <p>A. describe personal connections to a variety of sources, including self-selected texts;</p> <p>B. write responses that demonstrate understanding of texts, including comparing texts within and across genres;</p> <p>C. use text evidence and original commentary to support a comprehensive response;</p> <p>D. paraphrase and summarize texts in ways that maintain meaning and logical order;</p> <p>E. interact with sources in meaningful ways such as notetaking, annotating, freewriting, or illustrating;</p> <p>F. respond using acquired content and academic vocabulary as appropriate;</p> <p>G. discuss and write about the explicit or implicit meanings of text;</p> <p>H. respond orally or in writing with appropriate register, vocabulary, tone, and voice;</p> <p>I. reflect on and adjust responses when valid evidence warrants; and</p> <p>J. defend or challenge the authors' claims using relevant text evidence.</p>	<p>Text Complexity: Reading</p> <p>Determining implicit meanings</p> <p>Citing textual evidence</p> <p>Summarizing</p> <p>Analyzing multiple texts</p> <p>Text Complexity: Writing and Language</p> <p>Precision</p> <p>Style and tone</p> <p><i>Listening and speaking are not assessed. Personal connections to sources are not assessed, and test takers do not generate original commentary. Interactions with sources such as those described in E are not assessed. Test takers do not discuss and write about texts. Test takers do not have particular opportunities for reflection. Although Reading Test passages may include claims that test takers analyze and evaluate, test takers do not have an opportunity to defend or challenge those claims.</i></p>

State Standard Description	PSAT/NMSQT and PSAT 10 Reading Test Elements and Writing and Language Test Elements
<p>6. Multiple genres: listening, speaking, reading, writing, and thinking using multiple texts—literary elements. The student recognizes and analyzes literary elements within and across increasingly complex traditional, contemporary, classical, and diverse literary texts. The student is expected to:</p> <p>A. analyze how themes are developed through characterization and plot in a variety of literary texts;</p> <p>B. analyze how authors develop complex yet believable characters in works of fiction through a range of literary devices, including character foils;</p> <p>C. analyze non-linear plot development such as flashbacks, foreshadowing, subplots, and parallel plot structures and compare it to linear plot development; and</p> <p>D. analyze how the setting influences the theme.</p>	<p>Text Complexity: Reading</p> <p>Determining explicit meanings</p> <p>Determining implicit meanings</p> <p>Determining central ideas and themes</p> <p>Understanding relationships</p> <p>Analyzing part-whole relationships</p> <p>Analyzing point of view</p> <p><i>Listening and speaking are not assessed. Traditional literary texts are not assessed. Each administration of the Reading Test includes one fiction passage. Texts with particular literary devices such as character foils and texts with nonlinear plot development may or may not appear on the Reading Test. On the Reading Test, students are not asked to compare nonlinear and linear plot development.</i></p>

State Standard Description	PSAT/NMSQT and PSAT 10 Reading Test Elements and Writing and Language Test Elements
<p>7. Multiple genres: listening, speaking, reading, writing, and thinking using multiple texts—genres. The student recognizes and analyzes genre-specific characteristics, structures, and purposes within and across increasingly complex traditional, contemporary, classical, and diverse texts. The student is expected to:</p> <p>A. read and respond to American, British, and world literature;</p> <p>B. analyze the structure, prosody, and graphic elements such as line length and word position in poems across a variety of poetic forms;</p> <p>C. analyze the function of dramatic conventions such as asides, soliloquies, dramatic irony, and satire;</p> <p>D. analyze characteristics and structural elements of informational texts such as:</p> <ul style="list-style-type: none"> i. clear thesis, relevant supporting evidence, pertinent examples, and conclusion; and ii. multiple organizational patterns within a text to develop the thesis; <p>E. analyze characteristics and structural elements of argumentative texts such as:</p> <ul style="list-style-type: none"> i. clear arguable claim, appeals, and convincing conclusion; ii. various types of evidence and treatment of counterarguments, including concessions and rebuttals; and iii. identifiable audience or reader; and <p>F. analyze characteristics of multimodal and digital texts.</p>	<p>Text Complexity: Reading</p> <p>Determining central ideas and themes</p> <p>Analyzing word choice</p> <p>Analyzing overall text structure</p> <p>Analyzing part-whole relationships</p> <p>Analyzing point of view</p> <p>Analyzing purpose</p> <p>Analyzing claims and counterclaims</p> <p>Assessing reasoning</p> <p>Analyzing evidence</p> <p>Analyzing quantitative information</p> <p><i>Listening and speaking are not assessed. Traditional literary texts are not assessed. Poetry, drama, and digital texts are not included on the Reading Test. Texts with multiple organizational patterns may or may not appear on the Reading Test. Multimodal texts, in the form of passages accompanied by informational graphics, appear on the Reading Test and the Writing and Language Test but are not analyzed for their characteristics per se.</i></p>

State Standard Description	PSAT/NMSQT and PSAT 10 Reading Test Elements and Writing and Language Test Elements
<p>8. Author's purpose and craft: listening, speaking, reading, writing, and thinking using multiple texts. The student uses critical inquiry to analyze the authors' choices and how they influence and communicate meaning within a variety of texts. The student analyzes and applies author's craft purposefully in order to develop his or her own products and performances. The student is expected to:</p> <p>A. analyze the author's purpose, audience, and message within a text;</p> <p>B. analyze use of text structure to achieve the author's purpose;</p> <p>C. evaluate the author's use of print and graphic features to achieve specific purposes;</p> <p>D. analyze how the author's use of language achieves specific purposes;</p> <p>E. analyze the use of literary devices such as irony, sarcasm, and motif to achieve specific purposes;</p> <p>F. analyze how the author's diction and syntax contribute to the mood, voice, and tone of a text; and</p> <p>G. explain the purpose of rhetorical devices such as understatement and overstatement and the effect of logical fallacies such as straw man and red herring arguments.</p>	<p>Analyzing word choice</p> <p>Analyzing overall text structure</p> <p>Analyzing part-whole relationships</p> <p>Analyzing point of view</p> <p>Analyzing purpose</p> <p><i>Listening and speaking are not assessed. The Writing and Language Test is a test of revision and editing; test takers do not produce their own products. Students do not develop performances. Print and graphic features are not assessed. Motif is not assessed. Students may be asked to recognize weaknesses or inconsistencies in authors' reasoning but not to identify fallacies by name.</i></p>

State Standard Description	PSAT/NMSQT and PSAT 10 Reading Test Elements and Writing and Language Test Elements
<p>9. Composition: listening, speaking, reading, writing, and thinking using multiple texts—writing process. The student uses the writing process recursively to compose multiple texts that are legible and use appropriate conventions. The student is expected to:</p> <p>A. plan a piece of writing appropriate for various purposes and audiences by generating ideas through a range of strategies such as brainstorming, journaling, reading, or discussing;</p> <p>B. develop drafts into a focused, structured, and coherent piece of writing in timed and open-ended situations by:</p> <ul style="list-style-type: none"> i. using an organizing structure appropriate to purpose, audience, topic, and context; and ii. developing an engaging idea reflecting depth of thought with specific details, examples, and commentary; <p>C. revise drafts to improve clarity, development, organization, style, diction, and sentence effectiveness, including use of parallel constructions and placement of phrases and dependent clauses;</p> <p>D. edit drafts using standard English conventions, including:</p> <ul style="list-style-type: none"> i. a variety of complete, controlled sentences and avoidance of unintentional splices, run-ons, and fragments; ii. consistent, appropriate use of verb tense and active and passive voice; iii. pronoun-antecedent agreement; iv. correct capitalization; v. punctuation, including commas, semicolons, colons, and dashes to set off phrases and clauses as appropriate; and vi. correct spelling; and <p>E. publish written work for appropriate audiences.</p>	<p>Proposition</p> <p>Support</p> <p>Focus</p> <p>Quantitative information</p> <p>Logical sequence</p> <p>Introductions, conclusions, and transitions</p> <p>Precision</p> <p>Concision</p> <p>Style and tone</p> <p>Syntax</p> <p>Sentence boundaries</p> <p>Subordination and coordination</p> <p>Parallel structure</p> <p>Verb tense, mood, and voice</p> <p>Pronoun-antecedent agreement</p> <p>End-of-sentence punctuation</p> <p>Within-sentence punctuation</p> <p>Items in a series</p> <p>Nonrestrictive and parenthetical elements</p> <p>Unnecessary punctuation</p> <p><i>Listening and speaking are not assessed. Students do not engage in a recursive writing process, given the time limits on and the nature of the test. The standard English conventions of capitalization and spelling are not assessed. Students do not publish their work.</i></p>

State Standard Description	PSAT/NMSQT and PSAT 10 Reading Test Elements and Writing and Language Test Elements
<p>10. Composition: listening, speaking, reading, writing, and thinking using multiple texts—genres. The student uses genre characteristics and craft to compose multiple texts that are meaningful. The student is expected to:</p> <p>A. compose literary texts such as fiction and poetry using genre characteristics and craft;</p> <p>B. compose informational texts such as explanatory essays, reports, and personal essays using genre characteristics and craft;</p> <p>C. compose argumentative texts using genre characteristics and craft; and</p> <p>D. compose correspondence in a professional or friendly structure.</p>	<p>Proposition</p> <p>Support</p> <p>Focus</p> <p>Quantitative information</p> <p>Logical sequence</p> <p>Introductions, conclusions, and transitions</p> <p>Precision</p> <p>Concision</p> <p>Style and tone</p> <p>Syntax</p> <p><i>Listening and speaking are not assessed. Fictional narratives and poetry are not included on the Writing and Language Test. Students are not asked to compose reports, resumes, personal essays, or correspondence.</i></p>

State Standard Description	PSAT/NMSQT and PSAT 10 Reading Test Elements and Writing and Language Test Elements
<p>11. Inquiry and research: listening, speaking, reading, writing, and thinking using multiple texts. The student engages in both short-term and sustained recursive inquiry processes for a variety of purposes. The student is expected to:</p> <ul style="list-style-type: none"> A. develop questions for formal and informal inquiry; B. critique the research process at each step to implement changes as needs occur and are identified; C. develop and revise a plan; D. modify the major research question as necessary to refocus the research plan; E. locate relevant sources; F. synthesize information from a variety of sources; G. examine sources for: <ul style="list-style-type: none"> i. credibility and bias, including omission; and ii. faulty reasoning such as ad hominem, loaded language, and slippery slope; H. display academic citations, including for paraphrased and quoted text, and use source materials ethically to avoid plagiarism; and I. use an appropriate mode of delivery, whether written, oral, or multimodal, to present results. 	

Table 36: TEKS in Grade 8 Aligned to PSAT 8/9

State Standard Description	PSAT 8/9 Reading Test Elements and Writing and Language Test Elements
<p>1. Developing and sustaining foundational language skills: listening, speaking, discussion, and thinking—oral language. The student develops oral language through listening, speaking, and discussion. The student is expected to:</p> <p>A. listen actively to interpret a message by summarizing, asking questions, and making comments;</p> <p>B. follow and give complex oral instructions to perform specific tasks, answer questions, or solve problems;</p> <p>C. advocate a position using anecdotes, analogies, and/or illustrations employing eye contact, speaking rate, volume, enunciation, a variety of natural gestures, and conventions of language to communicate ideas effectively; and</p> <p>D. participate collaboratively in discussions, plan agendas with clear goals and deadlines, set time limits for speakers, take notes, and vote on key issues.</p>	
<p>2. Developing and sustaining foundational language skills: listening, speaking, reading, writing, and thinking—vocabulary. The student uses newly acquired vocabulary expressively. The student is expected to:</p> <p>A. use print or digital resources to determine the meaning, syllabication, pronunciation, word origin, and part of speech;</p> <p>B. use context within or beyond a paragraph to clarify the meaning of unfamiliar or ambiguous words; and</p> <p>C. determine the meaning and usage of grade-level academic English words derived from Greek and Latin roots such as ast, qui, path, mand/mend, and duc.</p>	<p>Determining explicit meanings</p> <p>Interpreting words and phrases in context</p> <p><i>Listening and speaking are not assessed. Vocabulary tested on the PSAT 8/9 may not be new to students. Print and digital resources are not available on the summative Reading Test. Students' ability to determine the meaning of words derived from Greek and Latin roots is not directly assessed.</i></p>

State Standard Description	PSAT 8/9 Reading Test Elements and Writing and Language Test Elements
<p>3. Developing and sustaining foundational language skills: listening, speaking, reading, writing, and thinking—fluency. The student reads grade-level text with fluency and comprehension. The student is expected to adjust fluency when reading grade-level text based on the reading purpose.</p>	<p>Text Complexity: Reading</p> <ul style="list-style-type: none"> Determining explicit meanings Determining implicit meanings Using analogical reasoning Citing textual evidence Determining central ideas and themes Summarizing Understanding relationships Interpreting words and phrases in context Analyzing word choice Analyzing overall text structure Analyzing part-whole relationships Analyzing point of view Analyzing purpose Analyzing claims and counterclaims Assessing reasoning Analyzing evidence Analyzing multiple texts Analyzing quantitative information <p><i>Fluency is not directly assessed.</i></p>
<p>4. Developing and sustaining foundational language skills: listening, speaking, reading, writing, and thinking—self-sustained reading. The student reads grade-appropriate texts independently. The student is expected to self-select text and read independently for a sustained period of time.</p>	

State Standard Description	PSAT 8/9 Reading Test Elements and Writing and Language Test Elements
<p>5. Comprehension skills: listening, speaking, reading, writing, and thinking using multiple texts. The student uses metacognitive skills to both develop and deepen comprehension of increasingly complex texts. The student is expected to:</p> <p>A. establish purpose for reading assigned and self-selected texts;</p> <p>B. generate questions about text before, during, and after reading to deepen understanding and gain information;</p> <p>C. make and correct or confirm predictions using text features, characteristics of genre, and structures;</p> <p>D. create mental images to deepen understanding;</p> <p>E. make connections to personal experiences, ideas in other texts, and society;</p> <p>F. make inferences and use evidence to support understanding;</p> <p>G. evaluate details read to determine key ideas;</p> <p>H. synthesize information to create new understanding; and</p> <p>I. monitor comprehension and make adjustments such as re-reading, using background knowledge, asking questions, and annotating when understanding breaks down.</p>	<p>Text Complexity: Reading</p> <p>Determining explicit meanings</p> <p>Determining implicit meanings</p> <p>Using analogical reasoning</p> <p>Citing textual evidence</p> <p>Determining central ideas and themes</p> <p>Summarizing</p> <p>Understanding relationships</p> <p>Interpreting words and phrases in context</p> <p>Analyzing word choice</p> <p>Analyzing overall text structure</p> <p>Analyzing part-whole relationships</p> <p>Analyzing point of view</p> <p>Analyzing purpose</p> <p>Analyzing claims and counterclaims</p> <p>Assessing reasoning</p> <p>Analyzing evidence</p> <p>Analyzing multiple texts</p> <p>Analyzing quantitative information</p> <p><i>Listening and speaking are not assessed. Students' use of metacognitive skills is not directly assessed.</i></p>

State Standard Description	PSAT 8/9 Reading Test Elements and Writing and Language Test Elements
<p>6. Response skills: listening, speaking, reading, writing, and thinking using multiple texts. The student responds to an increasingly challenging variety of sources that are read, heard, or viewed. The student is expected to:</p> <p>A. describe personal connections to a variety of sources, including self-selected texts;</p> <p>B. write responses that demonstrate understanding of texts, including comparing sources within and across genres;</p> <p>C. use text evidence to support an appropriate response;</p> <p>D. paraphrase and summarize texts in ways that maintain meaning and logical order;</p> <p>E. interact with sources in meaningful ways such as notetaking, annotating, freewriting, or illustrating;</p> <p>F. respond using newly acquired vocabulary as appropriate;</p> <p>G. discuss and write about the explicit or implicit meanings of text;</p> <p>H. respond orally or in writing with appropriate register, vocabulary, tone, and voice;</p> <p>I. reflect on and adjust responses as new evidence is presented; and</p> <p>J. defend or challenge the authors' claims using relevant text evidence.</p>	<p>Text Complexity: Reading</p> <p>Determining implicit meanings</p> <p>Citing textual evidence</p> <p>Summarizing</p> <p>Text Complexity: Writing and Language</p> <p>Precision</p> <p>Style and tone</p> <p><i>Listening and speaking are not assessed. Personal connections to sources are not assessed. Interactions with sources such as those described in E are not assessed. The vocabulary test takers use is not necessarily new to them. Test takers do not discuss or write about texts. Test takers do not have particular opportunities for reflection. Although Reading Test passages may include claims that test takers analyze and evaluate, test takers do not have an opportunity to defend or challenge those claims.</i></p>

State Standard Description	PSAT 8/9 Reading Test Elements and Writing and Language Test Elements
<p>7. Multiple genres: listening, speaking, reading, writing, and thinking using multiple texts—literary elements. The student recognizes and analyzes literary elements within and across increasingly complex traditional, contemporary, classical, and diverse literary texts. The student is expected to:</p> <p>A. analyze how themes are developed through the interaction of characters and events;</p> <p>B. analyze how characters' motivations and behaviors influence events and resolution of the conflict;</p> <p>C. analyze non-linear plot development such as flashbacks, foreshadowing, subplots, and parallel plot structures and compare it to linear plot development; and</p> <p>D. explain how the setting influences the values and beliefs of characters.</p>	<p>Text Complexity: Reading</p> <p>Determining explicit meanings</p> <p>Determining implicit meanings</p> <p>Determining central ideas and themes</p> <p>Understanding relationships</p> <p>Analyzing part-whole relationships</p> <p>Analyzing point of view</p> <p><i>Listening and speaking are not assessed. Traditional literary texts are not assessed. Each administration of the Reading Test includes one fiction passage. Texts with particular literary devices such as nonlinear plot development may or may not appear on the Reading Test. On the Reading Test, students are not asked to compare nonlinear and linear plot development.</i></p>

State Standard Description	PSAT 8/9 Reading Test Elements and Writing and Language Test Elements
<p>8. Multiple genres: listening, speaking, reading, writing, and thinking using multiple texts—genres. The student recognizes and analyzes genre-specific characteristics, structures, and purposes within and across increasingly complex traditional, contemporary, classical, and diverse texts. The student is expected to:</p> <p>A. demonstrate knowledge of literary genres such as realistic fiction, adventure stories, historical fiction, mysteries, humor, fantasy, science fiction, and short stories;</p> <p>B. analyze the effect of graphical elements such as punctuation and line length in poems across a variety of poetic forms such as epic, lyric, and humorous poetry;</p> <p>C. analyze how playwrights develop dramatic action through the use of acts and scenes;</p> <p>D. analyze characteristics and structural elements of informational text, including:</p> <ul style="list-style-type: none"> i. the controlling idea or thesis with supporting evidence; ii. features such as footnotes, endnotes, and citations; and iii. multiple organizational patterns within a text to develop the thesis; <p>E. analyze characteristics and structures of argumentative text by:</p> <ul style="list-style-type: none"> i. identifying the claim and analyzing the argument; ii. identifying and explaining the counter argument; and iii. identifying the intended audience or reader; and <p>F. analyze characteristics of multimodal and digital texts.</p>	<p>Text Complexity: Reading</p> <ul style="list-style-type: none"> Determining central ideas and themes Analyzing overall text structure Analyzing part-whole relationships Analyzing point of view Analyzing purpose Analyzing claims and counterclaims Assessing reasoning Analyzing evidence Analyzing quantitative information <p><i>Listening and speaking are not assessed. Traditional literary texts are not assessed. While students encounter works of various literary genres on the Reading Test, specific knowledge of genres is not assessed. Poetry, drama, and digital texts are not included on the Reading Test. Features such as footnotes, endnotes, and citations are not assessed, though endnotes may appear on the Reading Test. Texts with multiple organizational patterns may or may not appear on the Reading Test. Multimodal texts, in the form of passages accompanied by informational graphics, appear on the Reading Test and the Writing and Language Test but are not analyzed for their characteristics per se.</i></p>

State Standard Description	PSAT 8/9 Reading Test Elements and Writing and Language Test Elements
<p>9. Author's purpose and craft: listening, speaking, reading, writing, and thinking using multiple texts. The student uses critical inquiry to analyze the authors' choices and how they influence and communicate meaning within a variety of texts. The student analyzes and applies author's craft purposefully in order to develop his or her own products and performances. The student is expected to:</p> <p>A. explain the author's purpose and message within a text;</p> <p>B. analyze how the use of text structure contributes to the author's purpose;</p> <p>C. analyze the author's use of print and graphic features to achieve specific purposes;</p> <p>D. describe how the author's use of figurative language such as extended metaphor achieves specific purposes;</p> <p>E. identify and analyze the use of literary devices, including multiple points of view and irony;</p> <p>F. analyze how the author's use of language contributes to the mood, voice, and tone; and</p> <p>G. explain the purpose of rhetorical devices such as analogy and juxtaposition and of logical fallacies such as bandwagon appeals and circular reasoning.</p>	<p>Analyzing word choice</p> <p>Analyzing overall text structure</p> <p>Analyzing part-whole relationships</p> <p>Analyzing point of view</p> <p>Analyzing purpose</p> <p><i>Listening and speaking are not assessed. The Writing and Language Test is a test of revision and editing; test takers do not produce their own products. Students do not develop performances. Print and graphic features are not assessed. Passages on the Reading Test may or may not present multiple points of view. Students may be asked to recognize weaknesses or inconsistencies in authors' reasoning but not to identify fallacies by name or explain their purpose.</i></p>

State Standard Description	PSAT 8/9 Reading Test Elements and Writing and Language Test Elements
<p>10. Composition: listening, speaking, reading, writing, and thinking using multiple texts—writing process. The student uses the writing process recursively to compose multiple texts that are legible and use appropriate conventions. The student is expected to:</p> <p>A. plan a first draft by selecting a genre appropriate for a particular topic, purpose, and audience using a range of strategies such as discussion, background reading, and personal interests;</p> <p>B. develop drafts into a focused, structured, and coherent piece of writing by:</p> <ul style="list-style-type: none"> i. organizing with purposeful structure, including an introduction, transitions, coherence within and across paragraphs, and a conclusion; and ii. developing an engaging idea reflecting depth of thought with specific facts, details, and examples; <p>C. revise drafts for clarity, development, organization, style, word choice, and sentence variety;</p> <p>D. edit drafts using standard English conventions, including:</p> <ul style="list-style-type: none"> i. complete complex sentences with subject-verb agreement and avoidance of splices, run-ons, and fragments; ii. consistent, appropriate use of verb tenses and active and passive voice; iii. prepositions and prepositional phrases and their influence on subject-verb agreement; iv. pronoun-antecedent agreement; v. correct capitalization; vi. punctuation, including commas in nonrestrictive phrases and clauses, semicolons, colons, and parentheses; and vii. correct spelling, including commonly confused terms such as its/it's, affect/effect, there/their/they're, and to/two/too; and <p>E. publish written work for appropriate audiences.</p>	<p>Proposition</p> <p>Support</p> <p>Focus</p> <p>Quantitative information</p> <p>Logical sequence</p> <p>Introductions, conclusions, and transitions</p> <p>Precision</p> <p>Concision</p> <p>Style and tone</p> <p>Syntax</p> <p>Sentence boundaries</p> <p>Subordination and coordination</p> <p>Parallel structure</p> <p>Verb tense, mood, and voice</p> <p>Possessive determiners</p> <p>Pronoun-antecedent agreement</p> <p>Subject-verb agreement</p> <p>Frequently confused words</p> <p>Conventional expression</p> <p>End-of-sentence punctuation</p> <p>Within-sentence punctuation</p> <p>Items in a series</p> <p>Nonrestrictive and parenthetical elements</p> <p>Unnecessary punctuation</p> <p><i>Listening and speaking are not assessed. Students do not engage in a recursive writing process, given the time limits on and the nature of the test. The standard English conventions of capitalization and spelling are not assessed, though frequently confused words/phrases (such as too and to) and possessive determiners (such as its relative to the contraction it's) are. Students do not publish their work.</i></p>

State Standard Description	PSAT 8/9 Reading Test Elements and Writing and Language Test Elements
<p>11. Composition: listening, speaking, reading, writing, and thinking using multiple texts—genres. The student uses genre characteristics and craft to compose multiple texts that are meaningful. The student is expected to:</p> <p>A. <i>compose literary texts such as personal narratives, fiction, and poetry using genre characteristics and craft;</i></p> <p>B. compose informational texts, including multi-paragraph essays that convey information about a topic, using a clear controlling idea or thesis statement and genre characteristics and craft;</p> <p>C. compose multi-paragraph argumentative texts using genre characteristics and craft; and</p> <p>D. <i>compose correspondence that reflects an opinion, registers a complaint, or requests information in a business or friendly structure.</i></p>	<p>Proposition</p> <p>Support</p> <p>Focus</p> <p>Quantitative information</p> <p>Logical sequence</p> <p>Introductions, conclusions, and transitions</p> <p>Precision</p> <p>Concision</p> <p>Style and tone</p> <p>Syntax</p> <p><i>Listening and speaking are not assessed. Fictional narratives and poetry are not included on the Writing and Language Test. Students are not asked to compose reports, resumes, personal essays, or correspondence.</i></p>

State Standard Description	PSAT 8/9 Reading Test Elements and Writing and Language Test Elements
<p>12. Inquiry and research: listening, speaking, reading, writing, and thinking using multiple texts. The student engages in both short-term and sustained recursive inquiry processes for a variety of purposes. The student is expected to:</p> <p>A. generate student-selected and teacher-guided questions for formal and informal inquiry;</p> <p>B. develop and revise a plan;</p> <p>C. refine the major research question, if necessary, guided by the answers to a secondary set of questions;</p> <p>D. identify and gather relevant information from a variety of sources;</p> <p>E. differentiate between primary and secondary sources;</p> <p>F. synthesize information from a variety of sources;</p> <p>G. differentiate between paraphrasing and plagiarism when using source materials;</p> <p>H. examine sources for:</p> <ul style="list-style-type: none"> i. reliability, credibility, and bias, including omission; and ii. faulty reasoning such as bandwagon appeals, repetition, and loaded language; <p>I. display academic citations and use source materials ethically; and</p> <p>J. use an appropriate mode of delivery, whether written, oral, or multimodal, to present results.</p>	

Appendix B: Side-by-Side Alignment of Math Standards to SAT Suite

The following tables detail the Texas–SAT Suite alignments using Texas’s standards as the organizing principle. A standard is considered aligned if the content is measured on the SAT Suite. For those standards that are aligned, the SAT Suite elements are presented in the right-hand column. If the SAT Suite Elements column is blank, the knowledge or skill covered by the standard is not assessed on the SAT Suite.

Table 37: Texas College and Career Readiness Mathematics Standards Aligned to SAT

State Standard ID and Description	SAT Elements
I. Numeric Reasoning	
A. Number representations and operations	
I.A.1. Compare relative magnitudes of rational and irrational numbers, and understand that numbers can be represented in different ways.	
I.A.2. Perform computations with rational and irrational numbers.	
B. Number sense and number concepts	
I.B.1. Use estimation to check for errors and reasonableness of solutions.	Students are expected to perform this skill throughout the SAT.
I.B.2. Interpret the relationships between the different representations of numbers.	
C. Systems of measurement	
I.C.1. Select or use the appropriate type of method, unit, and tool for the attribute being measured.	

State Standard ID and Description	SAT Elements
I.C.2. Convert units within and between systems of measurement.	<p>Problem Solving and Data Analysis</p> <p>Ratios, rates, proportional relationships, and units</p> <p>Additional Topics in Math</p> <p>Area and volume</p> <p>Circles</p>
II. Algebraic Reasoning	
A. Identifying expressions and equations	
II.A.1. Explain the difference between expressions and equations.	Students are expected to perform this skill throughout the SAT.
B. Manipulating expressions	
II.B.1. Recognize and use algebraic properties, concepts, and algorithms to combine, transform, and evaluate expressions (e.g., polynomials, radicals, rational expressions).	<p>Heart of Algebra</p> <p>Linear Functions</p> <p>Passport to Advanced Math</p> <p>Equivalent expressions</p> <p>Nonlinear functions</p>
C. Solving equations, inequalities, and systems of equations and inequalities	
II.C.1. Describe and interpret solution sets of equalities and inequalities.	<p>Heart of Algebra</p> <p>Linear equations in one variable</p> <p>Linear functions</p> <p>Linear equations in two variables</p> <p>Systems of two linear equations in two variables</p> <p>Linear inequalities in one or two variables</p> <p>Passport to Advanced Math</p> <p>Nonlinear functions</p>
II.C.2. Explain the difference between the solution set of an equation and the solution set of an inequality.	

State Standard ID and Description	SAT Elements
<p>II.C.3. Recognize and use algebraic properties, concepts, and algorithms to solve equations, inequalities, and systems of linear equations and inequalities.</p>	<p>Heart of Algebra</p> <p>Linear equations in one variable</p> <p>Systems of two linear equations in two variables</p> <p>Passport to Algebra</p> <p>Nonlinear equations in one variable and systems of equations in two variables</p>
<p>D. Representing relationships</p>	
<p>II.D.1. Interpret multiple representations of equations, inequalities, and relationships.</p>	<p>Heart of Algebra</p> <p>Linear functions</p> <p>Linear equations in two variables</p> <p>Systems of two linear equations in two variables</p> <p>Linear inequalities in one or two variables</p> <p>Passport to Algebra</p> <p>Nonlinear equations in one variable and systems of equations in two variables</p> <p>Nonlinear functions</p>
<p>II.D.2. Convert among multiple representations of equations, inequalities, and relationships.</p>	<p>Heart of Algebra</p> <p>Linear functions</p> <p>Linear equations in two variables</p> <p>Systems of two linear equations in two variables</p> <p>Linear inequalities in one or two variables</p> <p>Passport to Algebra</p> <p>Nonlinear equations in one variable and systems of equations in two variables</p> <p>Nonlinear functions</p>
<p>III. Geometric and Spatial Reasoning</p>	

State Standard ID and Description	SAT Elements
A. Figures and their properties	
III.A.1. Recognize characteristics and dimensional changes of two- and three-dimensional figures.	<p>Additional Topics in Math</p> <p>Area and volume</p> <p>Lines, angles, and triangles</p> <p>Right triangles and trigonometry</p> <p>Circles</p>
III.A.2. Form and validate conjectures about one-, two-, and three-dimensional figures and their properties.	<p>Additional Topics in Math</p> <p>Lines, angles, and triangles</p>
III.A.3. Recognize and apply right triangle relationships including basic trigonometry.	<p>Additional Topics in Math</p> <p>Right triangles and trigonometry</p>
B. Transformations and symmetry	
III.B.1. Identify transformations and symmetries of figures.	
III.B.2. Use transformations to investigate congruence, similarity, and symmetries of figures	<p>Additional Topics in Math</p> <p>Lines, angles, and triangles</p>
C. Connections between geometry and other mathematical content strands	
III.C.1. Make connections between geometry and algebraic equations.	<p>Heart of Algebra</p> <p>Linear functions</p> <p>Linear equations in two variables</p> <p>Systems of two linear equations in two variables</p> <p>Linear inequalities in one or two variables</p> <p>Passport to Algebra</p> <p>Nonlinear equations in one variable and systems of equations in two variables</p> <p>Nonlinear functions</p> <p>Additional Topics in Math</p> <p>Circles</p>

State Standard ID and Description	SAT Elements
III.C.2. Make connections between geometry, statistics, and probability.	<p>Problem Solving and Data Analysis</p> <p>Probability and conditional probability</p>
D. Measurements involving geometry and algebra	
III.D.1. Find the perimeter and area of two-dimensional figures.	<p>Additional Topics in Math</p> <p>Area and volume</p> <p>Right triangles and trigonometry</p>
III.D.2. Determine the surface area and volume of three-dimensional figures.	<p>Additional Topics in Math</p> <p>Area and volume</p>
III.D.3. Determine indirect measurements of geometric figures using a variety of methods.	<p>Problem Solving and Data Analysis</p> <p>Ratios, rates, proportional relationships, and units</p> <p>Additional Topics in Math</p> <p>Area and volume</p> <p>Lines, angles, and triangles</p>
IV. Probabilistic Reasoning	
A. Counting principles	
IV.A.1. Determine the nature and the number of elements in a finite sample space.	
B. Computation and interpretation of probabilities	
IV.B.1. Compute and interpret the probability of an event and its complement.	<p>Problem Solving and Data Analysis</p> <p>Probability and conditional Probability</p>
IV.B.2. Compute and interpret the probability of conditional and compound events.	<p>Problem Solving and Data Analysis</p> <p>Probability and conditional Probability</p>
C. Measurement involving probability	

State Standard ID and Description	SAT Elements
IV.C.1. Use probability to make informed decisions.	
V. Statistical Reasoning	
A. Design a study	
V.A.1. Formulate a statistical question, plan an investigation, and collect data.	<p>Problem Solving and Data Analysis</p> <p>Evaluating statistical claims: Observational studies and experiments</p>
B. Describe data	
V.B.1. Classify types of data.	
V.B.2. Construct appropriate visual representations of data.	<p>Problem Solving and Data Analysis</p> <p>One variable data: Distributions and measures of center and spread</p> <p>Two-variable data: Models and scatterplots</p>
V.B.3. Compute and describe the study data with measures of center and basic notions of spread.	<p>Problem Solving and Data Analysis</p> <p>One variable data: Distributions and measures of center and spread</p> <p>Evaluating statistical claims: Observational studies and experiments</p>
V.B.4. Describe patterns and departure from patterns in the study data.	<p>Problem Solving and Data Analysis</p> <p>One variable data: Distributions and measures of center and spread</p>
C. Analyze, interpret, and draw conclusions from data	

State Standard ID and Description	SAT Elements
V.C.1. Analyze data sets using graphs and summary statistics.	<p>Problem Solving and Data Analysis</p> <p>One variable data: Distributions and measures of center and spread</p> <p>Inference from sample statistics and margin of error</p>
V.C.2. Analyze relationships between paired data using spreadsheets, graphing calculators, or statistical software.	<p>Problem Solving and Data Analysis</p> <p>Two-variable data: Models and scatterplots</p>
V.C.3. Make predictions using summary statistics.	<p>Problem Solving and Data Analysis</p> <p>Inference from sample statistics and margin of error</p>
V.C.4. Identify and explain misleading uses of data.	
VI. Functions	
A. Recognition and representation of functions	
VI.A.1. Recognize if a relation is a function.	
VI.A.2. Recognize and distinguish between different types of functions.	<p>Problem Solving and Data Analysis</p> <p>Two-variable data: Models and scatterplots</p>
B. Analysis of functions	
VI.B.1. Understand and analyze features of functions.	<p>Heart of Algebra</p> <p>Linear functions</p> <p>Passport to Advanced Math</p> <p>Nonlinear functions</p>
VI.B.2. Algebraically construct and analyze new functions.	<p>Heart of Algebra</p> <p>Linear functions</p> <p>Passport to Advanced Math</p> <p>Nonlinear functions</p>

State Standard ID and Description	SAT Elements
C. Model real-world situations with functions	
VI.C.1. Apply known functions to model real-world situations.	<p>Problem Solving and Data Analysis</p> <p>Two-variable data: Models and scatterplots</p>
VI.C.2. Develop a function to model a situation.	<p>Heart of Algebra</p> <p>Linear functions</p> <p>Problem Solving and Data Analysis</p> <p>Two-variable data: Models and scatterplots</p> <p>Passport to Advanced Math</p> <p>Nonlinear equations in one variable and systems of equations in two variables</p>
VII. Problem Solving and Reasoning	
A. Mathematical problem solving	
VII.A.1. Analyze given information.	Students are expected to perform this skill throughout the SAT.
VII.A.2. Formulate a plan or strategy.	Students are expected to perform this skill throughout the SAT.
VII.A.3. Determine a solution.	Students are expected to perform this skill throughout the SAT.
VII.A.4. Justify the solution.	
VII.A.5. Evaluate the problem-solving process.	
B. Proportional reasoning	
VII.B.1. Use proportional reasoning to solve problems that require fractions, ratios, percentages, decimals, and proportions in a variety of contexts using multiple representations.	<p>Heart of Algebra</p> <p>Linear Functions</p> <p>Problem Solving and Data Analysis</p> <p>Ratios, rates, proportional relationships, and units</p>

State Standard ID and Description	SAT Elements
C. Logical reasoning	
VII.C.1. Develop and evaluate convincing arguments.	
VII.C.2. Understand attributes and relationships with inductive and deductive reasoning.	Students are expected to perform this skill throughout the SAT.
D. Real-world problem solving	
VII.D.1. Interpret results of the mathematical problem in terms of the original real-world situation.	Students are expected to perform this skill throughout the SAT.
VII.D.2. Evaluate the problem-solving process.	
VIII. Communication and Representation	
A. Language, terms, and symbols of mathematics	
VIII.A.1. Use mathematical symbols, terminology, and notation to represent given and unknown information in a problem.	Students are expected to perform this skill throughout the SAT.
VIII.A.2. Use mathematical language to represent and communicate the mathematical concepts in a problem.	Students are expected to perform this skill throughout the SAT.
VIII.A.3. Use mathematical language for reasoning, problem solving, making connections, and generalizing.	Students are expected to perform this skill throughout the SAT.
B. Interpretation of mathematical work	
VIII.B.1. Model and interpret mathematical ideas and concepts using multiple representations.	Students are expected to perform this skill throughout the SAT.
VIII.6.2. Summarize and interpret mathematical information provided orally, visually, or in written form within the given context.	
C. Presentation and representation of mathematical work	
VIII.C.1. Communicate mathematical ideas, reasoning, and their implications using symbols, diagrams, models, graphs, and words.	Students are expected to perform this skill throughout the SAT.
VIII.C.2. Create and use representations to organize, record, and communicate mathematical ideas.	Students are expected to perform this skill throughout the SAT.
VIII.C.3. Explain, display, or justify mathematical ideas and arguments using precise mathematical language in written or oral communications.	
IX. Connections	
A. Connections among the strands of mathematics	

State Standard ID and Description	SAT Elements
IX.A.1. Connect and use multiple key concepts of mathematics in situations and problems.	Students are expected to perform this skill throughout the SAT.
IX.A.2. Connect mathematics to the study of other disciplines.	Students are expected to perform this skill throughout the SAT.
B. Connections of mathematics to nature, real-world situations, and everyday life	
IX.B.1. Use multiple representations to demonstrate links between mathematical and real-world situations.	Students are expected to perform this skill throughout the SAT.
IX.B.2. Understand and use appropriate mathematical models in the natural, physical, and social sciences.	Students are expected to perform this skill throughout the SAT.
IX.B.3. Know and understand the use of mathematics in a variety of careers and professions.	

Table 38: TEKS in Algebra I Aligned to SAT

State Standard ID and Description	SAT Elements
<p>2. Linear functions, equations, and inequalities. The student applies the mathematical process standards when using properties of linear functions to write and represent in multiple ways, with and without technology, linear equations, inequalities, and systems of equations. The student is expected to:</p>	
<p>2.A. determine the domain and range of a linear function in mathematical problems; determine reasonable domain and range values for real-world situations, both continuous and discrete; and represent domain and range using inequalities;</p>	
<p>2.B. write linear equations in two variables in various forms, including $y = mx + b$, $Ax + By = C$, and $y - y_1 = m(x - x_1)$, given one point and the slope and given two points;</p>	<p>Heart of Algebra Linear functions Linear equations in two variables</p>
<p>2.C. write linear equations in two variables given a table of values, a graph, and a verbal description;</p>	<p>Heart of Algebra Linear functions Linear equations in two variables</p>
<p>2.D. write and solve equations involving direct variation;</p>	<p>Heart of Algebra Linear functions Problem Solving and Data Analysis Ratios, rates, proportional relationships, and units</p>
<p>2.E. write the equation of a line that contains a given point and is parallel to a given line;</p>	<p>Heart of Algebra Linear equations in two variables</p>
<p>2.F. write the equation of a line that contains a given point and is perpendicular to a given line;</p>	<p>Heart of Algebra Linear equations in two variables</p>
<p>2.G. write an equation of a line that is parallel or perpendicular to the x- or y-axis and determine whether the slope of the line is zero or undefined;</p>	<p>Heart of Algebra Linear equations in two variables</p>
<p>2.H. write linear inequalities in two variables given a table of values, a graph, and a verbal description; and</p>	<p>Heart of Algebra Linear inequalities in one or two variables</p>

State Standard ID and Description	SAT Elements
2.I. write systems of two linear equations given a table of values, a graph, and a verbal description.	Heart of Algebra Systems of linear equations in two variables
3. Linear functions, equations, and inequalities. The student applies the mathematical process standards when using graphs of linear functions, key features, and related transformations to represent in multiple ways and solve, with and without technology, equations, inequalities, and systems of equations. The student is expected to:	
3.A. determine the slope of a line given a table of values, a graph, two points on the line, and an equation written in various forms, including $y = mx + b$, $Ax + By = C$, and $y - y_1 = m(x - x_1)$;	Heart of Algebra Linear functions Linear equations in two variables
3.B. calculate the rate of change of a linear function represented tabularly, graphically, or algebraically in context of mathematical and real-world problems;	Heart of Algebra Linear functions
3.C. graph linear functions on the coordinate plane and identify key features, including x-intercept, y-intercept, zeros, and slope, in mathematical and real-world problems;	Heart of Algebra Linear functions
3.D. graph the solution set of linear inequalities in two variables on the coordinate plane;	Heart of Algebra Linear inequalities in one or two variables
3.E. determine the effects on the graph of the parent function $f(x) = x$ when $f(x)$ is replaced by $a \cdot f(x)$, $f(x) + d$, $f(x - c)$, $f(bx)$ for specific values of a , b , c , and d ;	Heart of Algebra Linear functions
3.F. graph systems of two linear equations in two variables on the coordinate plane and determine the solutions if they exist;	Heart of Algebra Systems of linear equations in two variables
3.G. estimate graphically the solutions to systems of two linear equations with two variables in real-world problems; and	Heart of Algebra Systems of linear equations in two variables
3.H. graph the solution set of systems of two linear inequalities in two variables on the coordinate plane.	Heart of Algebra Linear inequalities in one or two variables

State Standard ID and Description	SAT Elements
<p>4. Linear functions, equations, and inequalities. The student applies the mathematical process standards to formulate statistical relationships and evaluate their reasonableness based on real-world data. The student is expected to:</p>	
<p>4.A. calculate, using technology, the correlation coefficient between two quantitative variables and interpret this quantity as a measure of the strength of the linear association;</p>	
<p>4.B. compare and contrast association and causation in real-world problems; and</p>	<p>Problem Solving and Data Analysis</p> <p>Evaluating statistical claims: Observational studies and experiments</p>
<p>4.C. write, with and without technology, linear functions that provide a reasonable fit to data to estimate solutions and make predictions for real-world problems.</p>	<p>Problem Solving and Data Analysis</p> <p>Two-variable data: Models and scatterplots</p>
<p>5. Linear functions, equations, and inequalities. The student applies the mathematical process standards to solve, with and without technology, linear equations and evaluate the reasonableness of their solutions. The student is expected to:</p>	
<p>5.A. solve linear equations in one variable, including those for which the application of the distributive property is necessary and for which variables are included on both sides;</p>	<p>Heart of Algebra</p> <p>Linear equations in one variable</p>
<p>5.B. solve linear inequalities in one variable, including those for which the application of the distributive property is necessary and for which variables are included on both sides; and</p>	<p>Heart of Algebra</p> <p>Linear inequalities in one or two variables</p>
<p>5.C. solve systems of two linear equations with two variables for mathematical and real-world problems.</p>	<p>Heart of Algebra</p> <p>Systems of linear equations in two variables</p>
<p>6. Quadratic functions and equations. The student applies the mathematical process standards when using properties of quadratic functions to write and represent in multiple ways, with and without technology, quadratic equations. The student is expected to:</p>	
<p>6.A. determine the domain and range of quadratic functions and represent the domain and range using inequalities;</p>	

State Standard ID and Description	SAT Elements
<p>6.B. write equations of quadratic functions given the vertex and another point on the graph, write the equation in vertex form, $f(x) = a(x - h)^2 + k$, and rewrite the equation from vertex form to standard form, $f(x) = ax^2 + bx + c$; and</p>	<p>Passport to Advanced Math Nonlinear functions</p>
<p>6.C. write quadratic functions when given real solutions and graphs of their related equations.</p>	<p>Passport to Advanced Math Nonlinear functions</p>
<p>7. Quadratic functions and equations. The student applies the mathematical process standards when using graphs of quadratic functions and their related transformations to represent in multiple ways and determine, with and without technology, the solutions to equations. The student is expected to:</p>	
<p>7.A. graph quadratic functions on the coordinate plane and use the graph to identify key attributes, if possible, including x-intercept, y-intercept, zeros, maximum value, minimum values, vertex, and the equation of the axis of symmetry;</p>	<p>Passport to Advanced Math Nonlinear functions</p>
<p>7.B. describe the relationship between the linear factors of quadratic expressions and the zeros of their associated quadratic functions; and</p>	<p>Passport to Advanced Math Nonlinear functions</p>
<p>7.C. determine the effects on the graph of the parent function $f(x) = x^2$ when $f(x)$ is replaced by $a \cdot f(x)$, $f(x) + d$, $f(x - c)$, or $f(bx)$ for specific values of a, b, c, and d.</p>	<p>Passport to Advanced Math Nonlinear functions</p>
<p>8. Quadratic functions and equations. The student applies the mathematical process standards to solve, with and without technology, quadratic equations and evaluate the reasonableness of their solutions. The student formulates statistical relationships and evaluates their reasonableness based on real-world data. The student is expected to:</p>	
<p>8.A. solve quadratic equations having real solutions by factoring, taking square roots, completing the square, and applying the quadratic formula; and</p>	<p>Passport to Advanced Math Nonlinear equations in one variable and systems of equations in two variables</p>
<p>8.B. write, using technology, quadratic functions that provide a reasonable fit to data to estimate solutions and make predictions for real-world problems.</p>	<p>Problem Solving and Data Analysis Two-variable data: Models and scatterplots</p>

State Standard ID and Description	SAT Elements
<p>9. Exponential functions and equations. The student applies the mathematical process standards when using properties of exponential functions and their related transformations to write, graph, and represent in multiple ways exponential equations and evaluate, with and without technology, the reasonableness of their solutions. The student formulates statistical relationships and evaluates their reasonableness based on real-world data. The student is expected to:</p>	
<p>9.A. determine the domain and range of exponential functions of the form $f(x) = a \cdot b^x$ and represent the domain and range using inequalities;</p>	
<p>9.B. interpret the meaning of the values of a and b in exponential functions of the form $f(x) = a \cdot b^x$ in real-world problems;</p>	<p>Passport to Advanced Math Nonlinear functions</p>
<p>9.C. write exponential functions in the form $f(x) = a \cdot b^x$ (where b is a rational number) to describe problems arising from mathematical and real-world situations, including growth and decay;</p>	<p>Passport to Advanced Math Nonlinear functions</p>
<p>9.D. graph exponential functions that model growth and decay and identify key features, including y-intercept and asymptote, in mathematical and real-world problems; and</p>	<p>Passport to Advanced Math Nonlinear functions</p>
<p>9.E. write, using technology, exponential functions that provide a reasonable fit to data and make predictions for real-world problems.</p>	<p>Problem Solving and Data Analysis Two-variable relationships: Models and scatterplots</p>
<p>10. Number and algebraic methods. The student applies the mathematical process standards and algebraic methods to rewrite in equivalent forms and perform operations on polynomial expressions. The student is expected to:</p>	
<p>10.A. add and subtract polynomials of degree one and degree two;</p>	<p>Passport to Advanced Math Equivalent expressions</p>
<p>10.B. multiply polynomials of degree one and degree two;</p>	<p>Passport to Advanced Math Equivalent expressions</p>
<p>10.C. determine the quotient of a polynomial of degree one and polynomial of degree two when divided by a polynomial of degree one and polynomial of degree two when the degree of the divisor does not exceed the degree of the dividend;</p>	<p>Passport to Advanced Math Equivalent expressions</p>
<p>10.D. rewrite polynomial expressions of degree one and degree two in equivalent forms using the distributive property;</p>	<p>Passport to Advanced Math Equivalent expressions</p>

State Standard ID and Description	SAT Elements
10.E. factor, if possible, trinomials with real factors in the form $ax^2 + bx + c$, including perfect square trinomials of degree two; and	Passport to Advanced Math Equivalent expressions
10.F. decide if a binomial can be written as the difference of two squares and, if possible, use the structure of a difference of two squares to rewrite the binomial.	Passport to Advanced Math Equivalent expressions
11. Number and algebraic methods. The student applies the mathematical process standards and algebraic methods to rewrite algebraic expressions into equivalent forms. The student is expected to:	
11.A. simplify numerical radical expressions involving square roots; and	Passport to Advanced Math Equivalent expressions
11.B. simplify numeric and algebraic expressions using the laws of exponents, including integral and rational exponents.	Passport to Advanced Math Equivalent expressions
12. Number and algebraic methods. The student applies the mathematical process standards and algebraic methods to write, solve, analyze, and evaluate equations, relations, and functions. The student is expected to:	
12.A. decide whether relations represented verbally, tabularly, graphically, and symbolically define a function;	
12.B. evaluate functions, expressed in function notation, given one or more elements in their domains;	Heart of Algebra Linear functions Passport to Advanced Math Nonlinear functions
12.C. identify terms of arithmetic and geometric sequences when the sequences are given in function form using recursive processes;	
12.D. write a formula for the n th term of arithmetic and geometric sequences, given the value of several of their terms; and	
12.E. solve mathematic and scientific formulas, and other literal equations, for a specified variable.	Heart of Algebra Linear functions Linear equations in two variables Passport to Advanced Math Nonlinear equations in one variable and systems of equations in two variables Nonlinear functions

Table 39: TEKS in Algebra II Aligned to SAT

State Standard ID and Description	SAT Elements
<p>2. Attributes of functions and their inverses. The student applies mathematical processes to understand that functions have distinct key attributes and understand the relationship between a function and its inverse. The student is expected to:</p>	
<p>2.A. graph the functions $f(x) = \sqrt{x}$, $f(x) = \frac{1}{x}$, $f(x) = x^3$, $f(x) = \sqrt[3]{x}$, $f(x) = bx$, $f(x) = x$, and $f(x) = \log_b x$ where b is 2, 10, and e, and, when applicable, analyze the key attributes such as domain, range, intercepts, symmetries, asymptotic behavior, and maximum and minimum given an interval;</p>	<p>Passport to Advanced Math Nonlinear functions</p>
<p>2.B. graph and write the inverse of a function using notation such as $f^{-1}(x)$;</p>	
<p>2.C. describe and analyze the relationship between a function and its inverse (quadratic and square root, logarithmic and exponential), including the restriction(s) on domain, which will restrict its range; and</p>	
<p>2.D. use the composition of two functions, including the necessary restrictions on the domain, to determine if the functions are inverses of each other.</p>	
<p>3. Systems of equations and inequalities. The student applies mathematical processes to formulate systems of equations and inequalities, use a variety of methods to solve, and analyze reasonableness of solutions. The student is expected to:</p>	
<p>3.A. formulate systems of equations, including systems consisting of three linear equations in three variables and systems consisting of two equations, the first linear and the second quadratic;</p>	
<p>3.B. solve systems of three linear equations in three variables by using Gaussian elimination, technology with matrices, and substitution;</p>	
<p>3.C. solve, algebraically, systems of two equations in two variables consisting of a linear equation and a quadratic equation;</p>	<p>Passport to Advanced Math Nonlinear equations in one variable and systems of equations in two variables</p>
<p>3.D. determine the reasonableness of solutions to systems of a linear equation and a quadratic equation in two variables;</p>	<p>Passport to Advanced Math Nonlinear equations in one variable and systems of equations in two variables</p>

State Standard ID and Description	SAT Elements
3.E. formulate systems of at least two linear inequalities in two variables;	Heart of Algebra Linear inequalities in one or two variables
3.F. solve systems of two or more linear inequalities in two variables; and	Heart of Algebra Linear inequalities in one or two variables
3.G. determine possible solutions in the solution set of systems of two or more linear inequalities in two variables.	Heart of Algebra Linear inequalities in one or two variables
4. Quadratic and square root functions, equations, and inequalities. The student applies mathematical processes to understand that quadratic and square root functions, equations, and quadratic inequalities can be used to model situations, solve problems, and make predictions. The student is expected to:	
4.A. write the quadratic function given three specified points in the plane;	Passport to Advanced Math Nonlinear functions
4.B. write the equation of a parabola using given attributes, including vertex, focus, directrix, axis of symmetry, and direction of opening;	Passport to Advanced Math Nonlinear functions
4.C. determine the effect on the graph of $f(x) = \sqrt{x}$ when $f(x)$ is replaced by $a \cdot f(x)$, $f(x) + d$, $f(x - c)$, or $f(bx)$ for specific values of a , b , c , and d ;	
4.D. transform a quadratic function $f(x) = ax^2 + bx + c$ to the form $f(x) = a(x - h)^2 + k$ to identify the different attributes of $f(x)$;	Passport to Advanced Math Nonlinear functions
4.E. formulate quadratic and square root equations using technology given a table of data;	
4.F. solve quadratic and square root equations;	Passport to Advanced Math Nonlinear equations in one variable and systems of equations in two variables
4.G. identify extraneous solutions of square root equations; and	Passport to Advanced Math Nonlinear equations in one variable and systems of equations in two variables
4.H. solve quadratic inequalities.	

State Standard ID and Description	SAT Elements
<p>5. Exponential and logarithmic functions and equations. The student applies mathematical processes to understand that exponential and logarithmic functions can be used to model situations and solve problems. The student is expected to:</p>	
<p>5.A. determine the effects on the key attributes on the graphs of $f(x) = bx$ and $f(x) = \log_b x$ where b is 2, 10, and e when $f(x)$ is replaced by $a \cdot f(x)$, $f(x) + d$, or $f(x - c)$, for specific positive and negative real values of a, c, and d;</p>	
<p>5.B. formulate exponential and logarithmic equations that model real-world situations, including exponential relationships written in recursive notation;</p>	<p>Passport to Advanced Math Nonlinear functions</p>
<p>5.C. rewrite exponential equations as their corresponding logarithmic equations and logarithmic equations as their corresponding exponential equations;</p>	
<p>5.D. solve exponential equations of the form $f(x) = a \cdot b^x$ where a is a nonzero real number and b is greater than zero and not equal to one and single logarithmic equations having real solutions; and</p>	<p>Passport to Advanced Math Nonlinear functions</p>
<p>5.E. determine the reasonableness of a solution to a logarithmic equation.</p>	
<p>6. Cubic, cube root, absolute value and rational functions, equations, and inequalities. The student applies mathematical processes to understand that cubic, cube root, absolute value and rational functions, equations, and inequalities can be used to model situations, solve problems, and make predictions. The student is expected to:</p>	
<p>6.A. analyze the effect on the graphs of $f(x) = x^3$ and $f(x) = \sqrt[3]{x}$ when $f(x)$ is replaced by $a \cdot f(x)$, $f(x) + d$, $f(x - c)$, and $f(x) + d$ for specific positive and negative real values of a, b, c, and d;</p>	
<p>6.B. solve cube root equations that have real roots;</p>	
<p>6.C. analyze the effect on the graphs of $f(x) = x$ when $f(x)$ is replaced by $a \cdot f(x)$, $f(x) + d$, $f(x - c)$, and $f(x) + d$ for specific positive and negative real values of a, b, c, and d;</p>	
<p>6.D. formulate absolute value linear equations;</p>	
<p>6.E. solve absolute value linear equations;</p>	<p>Passport to Advanced Math Nonlinear equations in one variable and systems of equations in two variables</p>

State Standard ID and Description	SAT Elements
6.F. solve absolute value linear inequalities;	
6.G. analyze the effect on the graphs of $f(x) = \frac{1}{x}$ when $f(x)$ is replaced by $a \cdot f(x)$, $f(x) + d$, $f(x - c)$, and $f(x) + d$ for specific positive and negative real values of a , b , c , and d ;	
6.H. formulate rational equations that model real-world situations;	
6.I. solve rational equations that have real solutions;	Passport to Advanced Math Nonlinear equations in one variable and systems of equations in two variables
6.J. determine the reasonableness of a solution to a rational equation;	Passport to Advanced Math Nonlinear equations in one variable and systems of equations in two variables
6.K. determine the asymptotic restrictions on the domain of a rational function and represent domain and range using interval notation, inequalities, and set notation; and	
6.L. formulate and solve equations involving inverse variation.	
7. Number and algebraic methods. The student applies mathematical processes to simplify and perform operations on expressions and to solve equations. The student is expected to:	
7.A. add, subtract, and multiply complex numbers;	Additional Topics in Math Complex numbers
7.B. add, subtract, and multiply polynomials;	Passport to Advanced Math Equivalent expressions
7.C. determine the quotient of a polynomial of degree three and of degree four when divided by a polynomial of degree one and of degree two;	Passport to Advanced Math Equivalent expressions
7.D. determine the linear factors of a polynomial function of degree three and of degree four using algebraic methods;	Passport to Advanced Math Equivalent expressions
7.E. determine linear and quadratic factors of a polynomial expression of degree three and of degree four, including factoring the sum and difference of two cubes and factoring by grouping;	Passport to Advanced Math Equivalent expressions

State Standard ID and Description	SAT Elements
7.F. determine the sum, difference, product, and quotient of rational expressions with integral exponents of degree one and of degree two;	Passport to Advanced Math Equivalent expressions
7.G. rewrite radical expressions that contain variables to equivalent forms;	Passport to Advanced Math Equivalent expressions
7.H. solve equations involving rational exponents; and	
7.I. write the domain and range of a function in interval notation, inequalities, and set notation.	
8. Data. The student applies mathematical processes to analyze data, select appropriate models, write corresponding functions, and make predictions. The student is expected to:	
8.A. analyze data to select the appropriate model from among linear, quadratic, and exponential models;	Problem Solving and Data Analysis Two-variable data: Models and scatterplots
8.B. use regression methods available through technology to write a linear function, a quadratic function, and an exponential function from a given set of data; and	
8.C. predict and make decisions and critical judgments from a given set of data using linear, quadratic, and exponential models.	Problem Solving and Data Analysis Two-variable data: Models and scatterplots

Table 40: TEKS in Geometry Aligned to SAT

State Standard ID and Description	SAT Math Test
<p>2. Coordinate and transformational geometry. The student uses the process skills to understand the connections between algebra and geometry and uses the one- and two-dimensional coordinate systems to verify geometric conjectures. The student is expected to:</p>	
<p>2.A. determine the coordinates of a point that is a given fractional distance less than one from one end of a line segment to the other in one- and two-dimensional coordinate systems, including finding the midpoint;</p>	
<p>2.B. derive and use the distance, slope, and midpoint formulas to verify geometric relationships, including congruence of segments and parallelism or perpendicularity of pairs of lines; and</p>	<p>Heart of Algebra Linear equations in two variables</p>
<p>2.C. determine an equation of a line parallel or perpendicular to a given line that passes through a given point.</p>	<p>Heart of Algebra Linear equations in two variables</p>
<p>3. Coordinate and transformational geometry. The student uses the process skills to generate and describe rigid transformations (translation, reflection, and rotation) and non-rigid transformations (dilations that preserve similarity and reductions and enlargements that do not preserve similarity). The student is expected to:</p>	
<p>3.A. describe and perform transformations of figures in a plane using coordinate notation;</p>	
<p>3.B. determine the image or pre-image of a given two-dimensional figure under a composition of rigid transformations, a composition of non-rigid transformations, and a composition of both, including dilations where the center can be any point in the plane;</p>	
<p>3.C. identify the sequence of transformations that will carry a given pre-image onto an image on and off the coordinate plane; and</p>	
<p>3.D. identify and distinguish between reflectional and rotational symmetry in a plane figure.</p>	
<p>4. Logical argument and constructions. The student uses the process skills with deductive reasoning to understand geometric relationships. The student is expected to:</p>	
<p>4.A. distinguish between undefined terms, definitions, postulates, conjectures, and theorems;</p>	

State Standard ID and Description	SAT Math Test
4.B. identify and determine the validity of the converse, inverse, and contrapositive of a conditional statement and recognize the connection between a biconditional statement and a true conditional statement with a true converse;	
4.C. verify that a conjecture is false using a counterexample; and	
4.D. compare geometric relationships between Euclidean and spherical geometries, including parallel lines and the sum of the angles in a triangle.	
5. Logical argument and constructions. The student uses constructions to validate conjectures about geometric figures. The student is expected to:	
5.A. investigate patterns to make conjectures about geometric relationships, including angles formed by parallel lines cut by a transversal, criteria required for triangle congruence, special segments of triangles, diagonals of quadrilaterals, interior and exterior angles of polygons, and special segments and angles of circles choosing from a variety of tools;	Additional Topics in Math Lines, angles, and triangles
5.B. construct congruent segments, congruent angles, a segment bisector, an angle bisector, perpendicular lines, the perpendicular bisector of a line segment, and a line parallel to a given line through a point not on a line using a compass and a straightedge;	
5.C. use the constructions of congruent segments, congruent angles, angle bisectors, and perpendicular bisectors to make conjectures about geometric relationships; and	
5.D. verify the Triangle Inequality theorem using constructions and apply the theorem to solve problems.	Additional Topics in Math Lines, angles, and triangles
6. Proof and congruence. The student uses the process skills with deductive reasoning to prove and apply theorems by using a variety of methods such as coordinate, transformational, and axiomatic and formats such as two-column, paragraph, and flow chart. The student is expected to:	
6.A. verify theorems about angles formed by the intersection of lines and line segments, including vertical angles, and angles formed by parallel lines cut by a transversal and prove equidistance between the endpoints of a segment and points on its perpendicular bisector and apply these relationships to solve problems;	Additional Topics in Math Lines, angles, and triangles
6.B. prove two triangles are congruent by applying the Side-Angle-Side, Angle-Side-Angle, Side-Side-Side, Angle-Angle-Side, and Hypotenuse-Leg congruence conditions;	Additional Topics in Math Lines, angles, and triangles

State Standard ID and Description	SAT Math Test
6.C. apply the definition of congruence, in terms of rigid transformations, to identify congruent figures and their corresponding sides and angles;	
6.D. verify theorems about the relationships in triangles, including proof of the Pythagorean Theorem, the sum of interior angles, base angles of isosceles triangles, midsegments, and medians, and apply these relationships to solve problems; and	Additional Topics in Math Right triangles and trigonometry
6.E. prove a quadrilateral is a parallelogram, rectangle, square, or rhombus using opposite sides, opposite angles, or diagonals and apply these relationships to solve problems.	
7. Similarity, proof, and trigonometry. The student uses the process skills in applying similarity to solve problems. The student is expected to:	
7.A. apply the definition of similarity in terms of a dilation to identify similar figures and their proportional sides and the congruent corresponding angles; and	Additional Topics in Math Lines, angles, and triangles
7.B. apply the Angle-Angle criterion to verify similar triangles and apply the proportionality of the corresponding sides to solve problems.	Additional Topics in Math Lines, angles, and triangles
8. Similarity, proof, and trigonometry. The student uses the process skills with deductive reasoning to prove and apply theorems by using a variety of methods such as coordinate, transformational, and axiomatic and formats such as two-column, paragraph, and flow chart. The student is expected to:	
8.A. prove theorems about similar triangles, including the Triangle Proportionality theorem, and apply these theorems to solve problems; and	Additional Topics in Math Lines, angles, and triangles
8.B. identify and apply the relationships that exist when an altitude is drawn to the hypotenuse of a right triangle, including the geometric mean, to solve problems.	Additional Topics in Math Lines, angles, and triangles
9. Similarity, proof, and trigonometry. The student uses the process skills to understand and apply relationships in right triangles. The student is expected to:	
9.A. determine the lengths of sides and measures of angles in a right triangle by applying the trigonometric ratios sine, cosine, and tangent to solve problems; and	Additional Topics in Math Right triangles and trigonometry
9.B. apply the relationships in special right triangles 30° - 60° - 90° and 45° - 45° - 90° and the Pythagorean theorem, including Pythagorean triples, to solve problems.	Additional Topics in Math Right triangles and trigonometry

State Standard ID and Description	SAT Math Test
<p>10. Two-dimensional and three-dimensional figures. The student uses the process skills to recognize characteristics and dimensional changes of two- and three-dimensional figures. The student is expected to:</p>	
<p>10.A. identify the shapes of two-dimensional cross-sections of prisms, pyramids, cylinders, cones, and spheres and identify three-dimensional objects generated by rotations of two-dimensional shapes; and</p>	
<p>10.B. determine and describe how changes in the linear dimensions of a shape affect its perimeter, area, surface area, or volume, including proportional and non-proportional dimensional change.</p>	<p>Additional Topics in Math Area and volume</p>
<p>11. Two-dimensional and three-dimensional figures. The student uses the process skills in the application of formulas to determine measures of two- and three-dimensional figures. The student is expected to:</p>	
<p>11.A. apply the formula for the area of regular polygons to solve problems using appropriate units of measure;</p>	<p>Additional Topics in Math Area and volume</p>
<p>11.B. determine the area of composite two-dimensional figures comprised of a combination of triangles, parallelograms, trapezoids, kites, regular polygons, or sectors of circles to solve problems using appropriate units of measure;</p>	<p>Additional Topics in Math Area and volume Circles</p>
<p>11.C. apply the formulas for the total and lateral surface area of three-dimensional figures, including prisms, pyramids, cones, cylinders, spheres, and composite figures, to solve problems using appropriate units of measure; and</p>	<p>Additional Topics in Math Area and volume</p>
<p>11.D. apply the formulas for the volume of three-dimensional figures, including prisms, pyramids, cones, cylinders, spheres, and composite figures, to solve problems using appropriate units of measure.</p>	<p>Additional Topics in Math Area and volume</p>
<p>12. Circles. The student uses the process skills to understand geometric relationships and apply theorems and equations about circles. The student is expected to:</p>	
<p>12.A. apply theorems about circles, including relationships among angles, radii, chords, tangents, and secants, to solve non-contextual problems;</p>	<p>Additional Topics in Math Circles</p>
<p>12.B. apply the proportional relationship between the measure of an arc length of a circle and the circumference of the circle to solve problems;</p>	<p>Additional Topics in Math Circles</p>

State Standard ID and Description	SAT Math Test
12.C. apply the proportional relationship between the measure of the area of a sector of a circle and the area of the circle to solve problems;	Additional Topics in Math Circles
12.D. describe radian measure of an angle as the ratio of the length of an arc intercepted by a central angle and the radius of the circle; and	Additional Topics in Math Circles
12.E. show that the equation of a circle with center at the origin and radius r is $x^2 + y^2 = r^2$ and determine the equation for the graph of a circle with radius r and center (h, k) , $(x - h)^2 + (y - k)^2 = r^2$.	Additional Topics in Math Circles
13. Probability. The student uses the process skills to understand probability in real-world situations and how to apply independence and dependence of events. The student is expected to:	
13.A. develop strategies to use permutations and combinations to solve contextual problems;	
13.B. determine probabilities based on area to solve contextual problems;	Problem Solving and Data Analysis Probability and conditional probability
13.C. identify whether two events are independent and compute the probability of the two events occurring together with or without replacement;	Problem Solving and Data Analysis Probability and conditional probability
13.D. apply conditional probability in contextual problems; and	Problem Solving and Data Analysis Probability and conditional probability
13.E. apply independence in contextual problems.	Problem Solving and Data Analysis Probability and conditional probability

Table 41: TEKS in Mathematical Models with Applications Aligned to SAT

State Standard ID and Description	SAT Math Test
<p>2. Mathematical modeling in personal finance. The student uses mathematical processes with graphical and numerical techniques to study patterns and analyze data related to personal finance. The student is expected to:</p>	
<p>2.A. use rates and linear functions to solve problems involving personal finance and budgeting, including compensations and deductions;</p>	<p>Heart of Algebra Linear functions Problem Solving and Data Analysis Ratios, rates, proportional relationships, and units</p>
<p>2.B. solve problems involving personal taxes; and</p>	<p>Problem Solving and Data Analysis Percentages</p>
<p>2.C. analyze data to make decisions about banking, including options for online banking, checking accounts, overdraft protection, processing fees, and debit card/ATM fees.</p>	
<p>3. Mathematical modeling in personal finance. The student uses mathematical processes with algebraic formulas, graphs, and amortization modeling to solve problems involving credit. The student is expected to:</p>	
<p>3.A. use formulas to generate tables to display series of payments for loan amortizations resulting from financed purchases;</p>	
<p>3.B. analyze personal credit options in retail purchasing and compare relative advantages and disadvantages of each option;</p>	
<p>3.C. use technology to create amortization models to investigate home financing and compare buying a home to renting a home; and</p>	
<p>3.D. use technology to create amortization models to investigate automobile financing and compare buying a vehicle to leasing a vehicle.</p>	
<p>4. Mathematical modeling in personal finance. The student uses mathematical processes with algebraic formulas, numerical techniques, and graphs to solve problems related to financial planning. The student is expected to:</p>	
<p>4.A. analyze and compare coverage options and rates in insurance;</p>	

State Standard ID and Description	SAT Math Test
4.B. investigate and compare investment options, including stocks, bonds, annuities, certificates of deposit, and retirement plans; and	
4.C. analyze types of savings options involving simple and compound interest and compare relative advantages of these options.	Passport to Advanced Math Nonlinear functions
5. Mathematical modeling in science and engineering. The student applies mathematical processes with algebraic techniques to study patterns and analyze data as it applies to science. The student is expected to:	
5.A. use proportionality and inverse variation to describe physical laws such as Hook's Law, Newton's Second Law of Motion, and Boyle's Law;	Heart of Algebra Linear functions Problem Solving and Data Analysis Ratios, rates, proportional relationships, and units
5.B. use exponential models available through technology to model growth and decay in areas, including radioactive decay; and	Passport to Advanced Math Nonlinear functions
5.C. use quadratic functions to model motion.	Passport to Advanced Math Nonlinear functions
6. Mathematical modeling in science and engineering. The student applies mathematical processes with algebra and geometry to study patterns and analyze data as it applies to architecture and engineering. The student is expected to:	
6.A. use similarity, geometric transformations, symmetry, and perspective drawings to describe mathematical patterns and structure in architecture;	Additional Topics in Math Lines, angles, and triangles
6.B. use scale factors with two-dimensional and three-dimensional objects to demonstrate proportional and non-proportional changes in surface area and volume as applied to fields;	Additional Topics in Math Area and volume
6.C. use the Pythagorean Theorem and special right-triangle relationships to calculate distances; and	Additional Topics in Math Right triangles and trigonometry
6.D. use trigonometric ratios to calculate distances and angle measures as applied to fields.	Additional Topics in Math Right triangles and trigonometry
7. Mathematical modeling in fine arts. The student uses mathematical processes with algebra and geometry to study patterns and analyze data as it applies to fine arts. The student is expected to:	

State Standard ID and Description	SAT Math Test
7.A. use trigonometric ratios and functions available through technology to model periodic behavior in art and music;	
7.B. use similarity, geometric transformations, symmetry, and perspective drawings to describe mathematical patterns and structure in art and photography;	Additional Topics in Math Lines, angles, and triangles
7.C. use geometric transformations, proportions, and periodic motion to describe mathematical patterns and structure in music; and	Problem Solving and Data Analysis Ratios, rates, proportional relationships, and units
7.D. use scale factors with two-dimensional and three-dimensional objects to demonstrate proportional and non-proportional changes in surface area and volume as applied to fields.	Additional Topics in Math Area and volume
8. Mathematical modeling in social sciences. The student applies mathematical processes to determine the number of elements in a finite sample space and compute the probability of an event. The student is expected to:	
8.A. determine the number of ways an event may occur using combinations, permutations, and the Fundamental Counting Principle;	
8.B. compare theoretical to empirical probability; and	
8.C. use experiments to determine the reasonableness of a theoretical model such as binomial or geometric.	
9. Mathematical modeling in social sciences. The student applies mathematical processes and mathematical models to analyze data as it applies to social sciences. The student is expected to:	
9.A. interpret information from various graphs, including line graphs, bar graphs, circle graphs, histograms, scatterplots, dot plots, stem-and-leaf plots, and box and whisker plots, to draw conclusions from the data and determine the strengths and weaknesses of conclusions;	Problem Solving and Data Analysis One-variable data: Distributions and measures of center and spread
9.B. analyze numerical data using measures of central tendency (mean, median, and mode) and variability (range, interquartile range or IQR, and standard deviation) in order to make inferences with normal distributions;	Problem Solving and Data Analysis One-variable data: Distributions and measures of center and spread

State Standard ID and Description	SAT Math Test
9.C. distinguish the purposes and differences among types of research, including surveys, experiments, and observational studies;	<p>Problem Solving and Data Analysis</p> <p>Evaluating statistical claims: Observational studies and experiments</p>
9.D. use data from a sample to estimate population mean or population proportion	<p>Problem Solving and Data Analysis</p> <p>Inference from sample statistics and margin of error</p>
9.E. analyze marketing claims based on graphs and statistics from electronic and print media and justify the validity of stated or implied conclusions; and	
9.F. use regression methods available through technology to model linear and exponential functions, interpret correlations, and make predictions.	
<p>10. Mathematical modeling in social sciences. The student applies mathematical processes to design a study and use graphical, numerical, and analytical techniques to communicate the results of the study. The student is expected to:</p>	
10.A. formulate a meaningful question, determine the data needed to answer the question, gather the appropriate data, analyze the data, and draw reasonable conclusions; and	
10.B. communicate methods used, analyses conducted, and conclusions drawn for a data-analysis project through the use of one or more of the following: a written report, a visual display, an oral report, or a multi-media presentation.	

Table 42: TEKS in Advanced Quantitative Reasoning Aligned to SAT

State Standard ID and Description	SAT Math Test
<p>2. Numeric reasoning. The student applies the process standards in mathematics to generate new understandings by extending existing knowledge. The student generates new mathematical understandings through problems involving numerical data that arise in everyday life, society, and the workplace. The student extends existing knowledge and skills to analyze real-world situations. The student is expected to:</p>	
<p>2.A. use precision and accuracy in real-life situations related to measurement and significant figures;</p>	
<p>2.B. apply and analyze published ratings, weighted averages, and indices to make informed decisions;</p>	
<p>2.C. solve problems involving quantities that are not easily measured using proportionality;</p>	
<p>2.D. solve geometric problems involving indirect measurement, including similar triangles, the Pythagorean Theorem, Law of Sines, Law of Cosines, and the use of dynamic geometry software;</p>	<p>Additional Topics in Math Lines, angles, and triangles Right triangles and trigonometry</p>
<p>2.E. solve problems involving large quantities using combinatorics;</p>	
<p>2.F. use arrays to efficiently manage large collections of data and add, subtract, and multiply matrices to solve applied problems, including geometric transformations;</p>	
<p>2.G. analyze various voting and selection processes to compare results in given situations; and</p>	
<p>2.H. select and apply an algorithm of interest to solve real-life problems such as problems using recursion or iteration involving population growth or decline, fractals, and compound interest; the validity in recorded and transmitted data using checksums and hashing; sports rankings, weighted class rankings, and search engine rankings; and problems involving scheduling or routing situations using vertex-edge graphs, critical paths, Euler paths, and minimal spanning trees and communicate to peers the application of the algorithm in precise mathematical and nontechnical language.</p>	

State Standard ID and Description	SAT Math Test
<p>3. Algebraic reasoning (expressions, equations, and generalized relationships). The student applies the process standards in mathematics to create and analyze mathematical models of everyday situations to make informed decisions related to earning, investing, spending, and borrowing money by appropriate, proficient, and efficient use of tools, including technology. The student uses mathematical relationships to make connections and predictions. The student judges the validity of a prediction and uses mathematical models to represent, analyze, and solve dynamic real-world problems. The student is expected to:</p>	
<p>3.A. collect numerical bivariate data to create a scatterplot, select a function to model the data, justify the model selection, and use the model to interpret results and make predictions;</p>	<p>Problem Solving and Data Analysis Two-variable data: Models and scatterplots</p>
<p>3.B. describe the degree to which uncorrelated variables may or may not be related and analyze situations where correlated variables do or do not indicate a cause-and-effect relationship;</p>	<p>Problem Solving and Data Analysis Evaluating statistical claims: Observational studies and experiments</p>
<p>3.C. determine or analyze an appropriate growth or decay model for problem situations, including linear, exponential, and logistic functions;</p>	<p>Heart of Algebra Linear functions Passport to Advanced Math Nonlinear functions</p>
<p>3.D. determine or analyze an appropriate cyclical model for problem situations that can be modeled with periodic functions;</p>	
<p>3.E. determine or analyze an appropriate piecewise model for problem situations;</p>	
<p>3.F. create, represent, and analyze mathematical models for various types of income calculations to determine the best option for a given situation;</p>	
<p>3.G. create, represent, and analyze mathematical models for expenditures, including those involving credit, to determine the best option for a given situation; and</p>	
<p>3.H. create, represent, and analyze mathematical models and appropriate representations, including formulas and amortization tables, for various types of loans and investments to determine the best option for a given situation.</p>	

State Standard ID and Description	SAT Math Test
<p>4. Probabilistic and statistical reasoning. The student uses the process standards in mathematics to generate new understandings of probability and statistics. The student analyzes statistical information and evaluates risk and return to connect mathematical ideas and make informed decisions. The student applies a problem-solving model and statistical methods to design and conduct a study that addresses one or more particular question(s). The student uses multiple representations to communicate effectively the results of student-generated statistical studies and the critical analysis of published statistical studies. The student is expected to:</p>	
<p>4.A. use a two-way frequency table as a sample space to identify whether two events are independent and to interpret the results;</p>	
<p>4.B. use the Addition Rule, $P(A \text{ or } B) = P(A) + P(B) - P(A \text{ and } B)$, in mathematical and real-world problems;</p>	
<p>4.C. calculate conditional probabilities and probabilities of compound events using tree diagrams, Venn diagrams, area models, and formulas;</p>	<p>Problem Solving and Data Analysis Probability and conditional probability</p>
<p>4.D. interpret conditional probabilities and probabilities of compound events by analyzing representations to make decisions in problem situations;</p>	<p>Problem Solving and Data Analysis Probability and conditional probability</p>
<p>4.E. use probabilities to make and justify decisions about risks in everyday life;</p>	
<p>4.F. calculate expected value to analyze mathematical fairness, payoff, and risk;</p>	
<p>4.G. determine the validity of logical arguments that include compound conditional statements by constructing truth tables;</p>	
<p>4.H. identify limitations and lack of relevant information in studies reporting statistical information, especially when studies are reported in condensed form;</p>	
<p>4.I. interpret and compare statistical results using appropriate technology given a margin of error;</p>	

State Standard ID and Description	SAT Math Test
4.J. identify potential misuses of statistics to justify particular conclusions, including assertions of a cause-and-effect relationship rather than an association, and missteps or fallacies in logical reasoning;	<p>Problem Solving and Data Analysis</p> <p>Evaluating statistical claims: Observational studies and experiments</p>
4.K. describe strengths and weaknesses of sampling techniques, data and graphical displays, and interpretations of summary statistics and other results appearing in a study, including reports published in the media;	<p>Problem Solving and Data Analysis</p> <p>Inference from sample statistics and margin of error</p>
4.L. determine the need for and purpose of a statistical investigation and what type of statistical analysis can be used to answer a specific question or set of questions;	
4.M. identify the population of interest for a statistical investigation, select an appropriate sampling technique, and collect data;	
4.N. identify the variables to be used in a study;	
4.O. determine possible sources of statistical bias in a study and how bias may affect the validity of the results;	<p>Problem Solving and Data Analysis</p> <p>Evaluating statistical claims: Observational studies and experiments</p>
4.P. create data displays for given data sets to investigate, compare, and estimate center, shape, spread, and unusual features of the data;	
4.Q. analyze possible sources of data variability, including those that can be controlled and those that cannot be controlled;	
4.R. report results of statistical studies to a particular audience, including selecting an appropriate presentation format, creating graphical data displays, and interpreting results in terms of the question studied;	
4.S. justify the design and the conclusion(s) of statistical studies, including the methods used; and	
4.T. communicate statistical results in oral and written formats using appropriate statistical and nontechnical language.	

Table 43: TEKS in Statistics Aligned to SAT

State Standard ID and Description	SAT Math Test	
<p>2. Statistical process sampling and experimentation. The student applies mathematical processes to apply understandings about statistical studies, surveys, and experiments to design and conduct a study and use graphical, numerical, and analytical techniques to communicate the results of the study. The student is expected to:</p>		
	2.A. compare and contrast the benefits of different sampling techniques, including random sampling and convenience sampling methods;	
	2.B. distinguish among observational studies, surveys, and experiments;	
	2.C. analyze generalizations made from observational studies, surveys, and experiments;	
	2.D. distinguish between sample statistics and population parameters;	<p>Problem Solving and Data Analysis</p> <p>Evaluating statistical claims: Observational studies and experiments</p>
	2.E. formulate a meaningful question, determine the data needed to answer the question, gather the appropriate data, analyze the data, and draw reasonable conclusions;	
	2.F. communicate methods used, analyses conducted, and conclusions drawn for a data-analysis project through the use of one or more of the following: a written report, a visual display, an oral report, or a multi-media presentation; and	
	2.G. critically analyze published findings for appropriateness of study design implemented, sampling methods used, or the statistics applied.	
<p>3. Variability. The student applies the mathematical process standards when describing and modeling variability. The student is expected to:</p>		
	3.A. distinguish between mathematical models and statistical models;	
	3.B. construct a statistical model to describe variability around the structure of a mathematical model for a given situation;	
	3.C. distinguish among different sources of variability, including measurement, natural, induced, and sampling variability; and	
	3.D. describe and model variability using population and sampling distributions.	

State Standard ID and Description	SAT Math Test
<p>4. Categorical and quantitative data. The student applies the mathematical process standards to represent and analyze both categorical and quantitative data. The student is expected to:</p>	
<p>4.A. distinguish between categorical and quantitative data;</p>	
<p>4.B. represent and summarize data and justify the representation;</p>	<p>Problem Solving and Data Analysis</p> <p>One variable data: Distributions and measures of center and spread</p>
<p>4.C. analyze the distribution characteristics of quantitative data, including determining the possible existence and impact of outliers;</p>	<p>Problem Solving and Data Analysis</p> <p>One variable data: Distributions and measures of center and spread</p>
<p>4.D. compare and contrast different graphical or visual representations given the same data set;</p>	<p>Problem Solving and Data Analysis</p> <p>One variable data: Distributions and measures of center and spread</p>
<p>4.E. compare and contrast meaningful information derived from summary statistics given a data set; and</p>	
<p>4.F. analyze categorical data, including determining marginal and conditional distributions, using two-way tables.</p>	<p>Problem Solving and Data Analysis</p> <p>Probability and conditional probability</p>
<p>5. Probability and random variables. The student applies the mathematical process standards to connect probability and statistics. The student is expected to:</p>	
<p>5.A. determine probabilities, including the use of a two-way table;</p>	<p>Problem Solving and Data Analysis</p> <p>Probability and conditional probability</p>
<p>5.B. describe the relationship between theoretical and empirical probabilities using the Law of Large Numbers;</p>	

State Standard ID and Description	SAT Math Test
5.C. construct a distribution based on a technology-generated simulation or collected samples for a discrete random variable; and	
5.D. compare statistical measures such as sample mean and standard deviation from a technology-simulated sampling distribution to the theoretical sampling distribution.	
6. Inference. The student applies the mathematical process standards to make inferences and justify conclusions from statistical studies. The student is expected to:	
6.A. explain how a sample statistic and a confidence level are used in the construction of a confidence interval;	
6.B. explain how changes in the sample size, confidence level, and standard deviation affect the margin of error of a confidence interval;	<p>Problem Solving and Data Analysis</p> <p>Inference from sample statistics and margin of error</p>
6.C. calculate a confidence interval for the mean of a normally distributed population with a known standard deviation;	
6.D. calculate a confidence interval for a population proportion;	
6.E. interpret confidence intervals for a population parameter, including confidence intervals from media or statistical reports;	
6.F. explain how a sample statistic provides evidence against a claim about a population parameter when using a hypothesis test;	
6.G. construct null and alternative hypothesis statements about a population parameter;	
6.H. explain the meaning of the p-value in relation to the significance level in providing evidence to reject or fail to reject the null hypothesis in the context of the situation;	
6.I. interpret the results of a hypothesis test using technology-generated results such as large sample tests for proportion, mean, difference between two proportions, and difference between two independent means; and	
6.J. describe the potential impact of Type I and Type II Errors.	
7. Bivariate data. The student applies the mathematical process standards to analyze relationships among bivariate quantitative data. The student is expected to:	

State Standard ID and Description	SAT Math Test
7.A. analyze scatterplots for patterns, linearity, outliers, and influential points;	<p>Problem Solving and Data Analysis</p> <p>Two-variable data: Models and scatterplots</p>
7.B. transform a linear parent function to determine a line of best fit;	
7.C. compare different linear models for the same set of data to determine best fit, including discussions about error;	<p>Problem Solving and Data Analysis</p> <p>Two-variable data: Models and scatterplots</p>
7.D. compare different methods for determining best fit, including median-median and absolute value;	
7.E. describe the relationship between influential points and lines of best fit using dynamic graphing technology; and	
7.F. identify and interpret the reasonableness of attributes of lines of best fit within the context, including slope and y -intercept.	<p>Problem Solving and Data Analysis</p> <p>Two-variable data: Models and scatterplots</p>

Table 44: TEKS in Algebra I Aligned to PSAT/NMSQT and PSAT 10

State Standard ID and Description	PSAT/NMSQT and PSAT 10 Math Tests
<p>2. Linear functions, equations, and inequalities. The student applies the mathematical process standards when using properties of linear functions to write and represent in multiple ways, with and without technology, linear equations, inequalities, and systems of equations. The student is expected to:</p>	
<p>2.A. determine the domain and range of a linear function in mathematical problems; determine reasonable domain and range values for real-world situations, both continuous and discrete; and represent domain and range using inequalities;</p>	
<p>2.B. write linear equations in two variables in various forms, including $y = mx + b$, $Ax + By = C$, and $y - y_1 = m(x - x_1)$, given one point and the slope and given two points;</p>	<p>Heart of Algebra Linear functions Linear equations in two variables</p>
<p>2.C. write linear equations in two variables given a table of values, a graph, and a verbal description;</p>	<p>Heart of Algebra Linear functions Linear equations in two variables</p>
<p>2.D. write and solve equations involving direct variation;</p>	<p>Heart of Algebra Linear functions Problem Solving and Data Analysis Ratios, rates, proportional relationships, and units</p>
<p>2.E. write the equation of a line that contains a given point and is parallel to a given line;</p>	<p>Heart of Algebra Linear equations in two variables</p>
<p>2.F. write the equation of a line that contains a given point and is perpendicular to a given line;</p>	<p>Heart of Algebra Linear equations in two variables</p>
<p>2.G. write an equation of a line that is parallel or perpendicular to the x- or y-axis and determine whether the slope of the line is zero or undefined;</p>	<p>Heart of Algebra Linear equations in two variables</p>
<p>2.H. write linear inequalities in two variables given a table of values, a graph, and a verbal description; and</p>	<p>Heart of Algebra Linear inequalities in one or two variables</p>

State Standard ID and Description	PSAT/NMSQT and PSAT 10 Math Tests
2.I. write systems of two linear equations given a table of values, a graph, and a verbal description.	Heart of Algebra Systems of linear equations in two variables
3. Linear functions, equations, and inequalities. The student applies the mathematical process standards when using graphs of linear functions, key features, and related transformations to represent in multiple ways and solve, with and without technology, equations, inequalities, and systems of equations. The student is expected to:	
3.A. determine the slope of a line given a table of values, a graph, two points on the line, and an equation written in various forms, including $y = mx + b$, $Ax + By = C$, and $y - y_1 = m(x - x_1)$;	Heart of Algebra Linear functions Linear equations in two variables
3.B. calculate the rate of change of a linear function represented tabularly, graphically, or algebraically in context of mathematical and real-world problems;	Heart of Algebra Linear functions
3.C. graph linear functions on the coordinate plane and identify key features, including x-intercept, y-intercept, zeros, and slope, in mathematical and real-world problems;	Heart of Algebra Linear functions
3.D. graph the solution set of linear inequalities in two variables on the coordinate plane;	Heart of Algebra Linear inequalities in one or two variables
3.E. determine the effects on the graph of the parent function $f(x) = x$ when $f(x)$ is replaced by $a \cdot f(x)$, $f(x) + d$, $f(x - c)$, $f(bx)$ for specific values of a , b , c , and d ;	Heart of Algebra Linear functions
3.F. graph systems of two linear equations in two variables on the coordinate plane and determine the solutions if they exist;	Heart of Algebra Systems of linear equations in two variables
3.G. estimate graphically the solutions to systems of two linear equations with two variables in real-world problems; and	Heart of Algebra Systems of linear equations in two variables
3.H. graph the solution set of systems of two linear inequalities in two variables on the coordinate plane.	Heart of Algebra Linear inequalities in one or two variables

State Standard ID and Description	PSAT/NMSQT and PSAT 10 Math Tests
<p>4. Linear functions, equations, and inequalities. The student applies the mathematical process standards to formulate statistical relationships and evaluate their reasonableness based on real-world data. The student is expected to:</p>	
<p>4.A. calculate, using technology, the correlation coefficient between two quantitative variables and interpret this quantity as a measure of the strength of the linear association;</p>	
<p>4.B. compare and contrast association and causation in real-world problems; and</p>	
<p>4.C. write, with and without technology, linear functions that provide a reasonable fit to data to estimate solutions and make predictions for real-world problems.</p>	<p>Problem Solving and Data Analysis Two-variable data: Models and scatterplots</p>
<p>5. Linear functions, equations, and inequalities. The student applies the mathematical process standards to solve, with and without technology, linear equations and evaluate the reasonableness of their solutions. The student is expected to:</p>	
<p>5.A. solve linear equations in one variable, including those for which the application of the distributive property is necessary and for which variables are included on both sides;</p>	<p>Heart of Algebra Linear equations in one variable</p>
<p>5.B. solve linear inequalities in one variable, including those for which the application of the distributive property is necessary and for which variables are included on both sides; and</p>	<p>Heart of Algebra Linear inequalities in one or two variables</p>
<p>5.C. solve systems of two linear equations with two variables for mathematical and real-world problems.</p>	<p>Heart of Algebra Systems of linear equations in two variables</p>
<p>6. Quadratic functions and equations. The student applies the mathematical process standards when using properties of quadratic functions to write and represent in multiple ways, with and without technology, quadratic equations. The student is expected to:</p>	
<p>6.A. determine the domain and range of quadratic functions and represent the domain and range using inequalities;</p>	

State Standard ID and Description	PSAT/NMSQT and PSAT 10 Math Tests
<p>6.B. write equations of quadratic functions given the vertex and another point on the graph, write the equation in vertex form, $f(x) = a(x - h)^2 + k$, and rewrite the equation from vertex form to standard form, $f(x) = ax^2 + bx + c$; and</p>	<p>Passport to Advanced Math Nonlinear functions</p>
<p>6.C. write quadratic functions when given real solutions and graphs of their related equations.</p>	<p>Passport to Advanced Math Nonlinear functions</p>
<p>7. Quadratic functions and equations. The student applies the mathematical process standards when using graphs of quadratic functions and their related transformations to represent in multiple ways and determine, with and without technology, the solutions to equations. The student is expected to:</p>	
<p>7.A. graph quadratic functions on the coordinate plane and use the graph to identify key attributes, if possible, including x-intercept, y-intercept, zeros, maximum value, minimum values, vertex, and the equation of the axis of symmetry;</p>	<p>Passport to Advanced Math Nonlinear functions</p>
<p>7.B. describe the relationship between the linear factors of quadratic expressions and the zeros of their associated quadratic functions; and</p>	<p>Passport to Advanced Math Nonlinear functions</p>
<p>7.C. determine the effects on the graph of the parent function $f(x) = x^2$ when $f(x)$ is replaced by $a \cdot f(x)$, $f(x) + d$, $f(x - c)$, or $f(bx)$ for specific values of a, b, c, and d.</p>	<p>Passport to Advanced Math Nonlinear functions</p>
<p>8. Quadratic functions and equations. The student applies the mathematical process standards to solve, with and without technology, quadratic equations and evaluate the reasonableness of their solutions. The student formulates statistical relationships and evaluates their reasonableness based on real-world data. The student is expected to:</p>	
<p>8.A. solve quadratic equations having real solutions by factoring, taking square roots, completing the square, and applying the quadratic formula; and</p>	<p>Passport to Advanced Math Nonlinear equations in one variable and systems of equations in two variables</p>
<p>8.B. write, using technology, quadratic functions that provide a reasonable fit to data to estimate solutions and make predictions for real-world problems.</p>	<p>Problem Solving and Data Analysis Two-variable data: Models and scatterplots</p>

State Standard ID and Description	PSAT/NMSQT and PSAT 10 Math Tests
<p>9. Exponential functions and equations. The student applies the mathematical process standards when using properties of exponential functions and their related transformations to write, graph, and represent in multiple ways exponential equations and evaluate, with and without technology, the reasonableness of their solutions. The student formulates statistical relationships and evaluates their reasonableness based on real-world data. The student is expected to:</p>	
<p>9.A. determine the domain and range of exponential functions of the form $f(x) = a \cdot b^x$ and represent the domain and range using inequalities;</p>	
<p>9.B. interpret the meaning of the values of a and b in exponential functions of the form $f(x) = a \cdot b^x$ in real-world problems;</p>	<p>Passport to Advanced Math Nonlinear functions</p>
<p>9.C. write exponential functions in the form $f(x) = a \cdot b^x$ (where b is a rational number) to describe problems arising from mathematical and real-world situations, including growth and decay;</p>	<p>Passport to Advanced Math Nonlinear functions</p>
<p>9.D. graph exponential functions that model growth and decay and identify key features, including y-intercept and asymptote, in mathematical and real-world problems; and</p>	<p>Passport to Advanced Math Nonlinear functions</p>
<p>9.E. write, using technology, exponential functions that provide a reasonable fit to data and make predictions for real-world problems.</p>	<p>Problem Solving and Data Analysis Two-variable relationships: Models and scatterplots</p>
<p>10. Number and algebraic methods. The student applies the mathematical process standards and algebraic methods to rewrite in equivalent forms and perform operations on polynomial expressions. The student is expected to:</p>	
<p>10.A. add and subtract polynomials of degree one and degree two;</p>	<p>Passport to Advanced Math Equivalent expressions</p>
<p>10.B. multiply polynomials of degree one and degree two;</p>	<p>Passport to Advanced Math Equivalent expressions</p>
<p>10.C. determine the quotient of a polynomial of degree one and polynomial of degree two when divided by a polynomial of degree one and polynomial of degree two when the degree of the divisor does not exceed the degree of the dividend;</p>	
<p>10.D. rewrite polynomial expressions of degree one and degree two in equivalent forms using the distributive property;</p>	<p>Passport to Advanced Math Equivalent expressions</p>

State Standard ID and Description	PSAT/NMSQT and PSAT 10 Math Tests
10.E. factor, if possible, trinomials with real factors in the form $ax^2 + bx + c$, including perfect square trinomials of degree two; and	Passport to Advanced Math Equivalent expressions
10.F. decide if a binomial can be written as the difference of two squares and, if possible, use the structure of a difference of two squares to rewrite the binomial.	Passport to Advanced Math Equivalent expressions
11. Number and algebraic methods. The student applies the mathematical process standards and algebraic methods to rewrite algebraic expressions into equivalent forms. The student is expected to:	
11.A. simplify numerical radical expressions involving square roots; and	
11.B. simplify numeric and algebraic expressions using the laws of exponents, including integral and rational exponents.	Passport to Advanced Math Equivalent expressions
12. Number and algebraic methods. The student applies the mathematical process standards and algebraic methods to write, solve, analyze, and evaluate equations, relations, and functions. The student is expected to:	
12.A. decide whether relations represented verbally, tabularly, graphically, and symbolically define a function;	
12.B. evaluate functions, expressed in function notation, given one or more elements in their domains;	Heart of Algebra Linear functions Passport to Advanced Math Nonlinear functions
12.C. identify terms of arithmetic and geometric sequences when the sequences are given in function form using recursive processes;	
12.D. write a formula for the n th term of arithmetic and geometric sequences, given the value of several of their terms; and	
12.E. solve mathematic and scientific formulas, and other literal equations, for a specified variable.	Heart of Algebra Linear functions Linear equations in two variables Passport to Advanced Math Nonlinear equations in one variable and systems of equations in two variables

Table 45: TEKS in Algebra II Aligned to PSAT/NMSQT and PSAT 10

State Standard ID and Description	PSAT/NMSQT and PSAT 10 Math Tests
<p>2. Attributes of functions and their inverses. The student applies mathematical processes to understand that functions have distinct key attributes and understand the relationship between a function and its inverse. The student is expected to:</p>	
<p>2.A. graph the functions $f(x) = \sqrt{x}$, $f(x) = \frac{1}{x}$, $f(x) = x^3$, $f(x) = \sqrt[3]{x}$, $f(x) = bx$, $f(x) = x$, and $f(x) = \log_b x$ where b is 2, 10, and e, and, when applicable, analyze the key attributes such as domain, range, intercepts, symmetries, asymptotic behavior, and maximum and minimum given an interval;</p>	<p>Passport to Advanced Math Nonlinear functions</p>
<p>2.B. graph and write the inverse of a function using notation such as $f^{-1}(x)$;</p>	
<p>2.C. describe and analyze the relationship between a function and its inverse (quadratic and square root, logarithmic and exponential), including the restriction(s) on domain, which will restrict its range; and</p>	
<p>2.D. use the composition of two functions, including the necessary restrictions on the domain, to determine if the functions are inverses of each other.</p>	
<p>3. Systems of equations and inequalities. The student applies mathematical processes to formulate systems of equations and inequalities, use a variety of methods to solve, and analyze reasonableness of solutions. The student is expected to:</p>	
<p>3.A. formulate systems of equations, including systems consisting of three linear equations in three variables and systems consisting of two equations, the first linear and the second quadratic;</p>	
<p>3.B. solve systems of three linear equations in three variables by using Gaussian elimination, technology with matrices, and substitution;</p>	
<p>3.C. solve, algebraically, systems of two equations in two variables consisting of a linear equation and a quadratic equation;</p>	<p>Passport to Advanced Math Nonlinear equations in one variable and systems of equations in two variables</p>
<p>3.D. determine the reasonableness of solutions to systems of a linear equation and a quadratic equation in two variables;</p>	<p>Passport to Advanced Math Nonlinear equations in one variable and systems of equations in two variables</p>

State Standard ID and Description	PSAT/NMSQT and PSAT 10 Math Tests
3.E. formulate systems of at least two linear inequalities in two variables;	Heart of Algebra Linear inequalities in one or two variables
3.F. solve systems of two or more linear inequalities in two variables; and	Heart of Algebra Linear inequalities in one or two variables
3.G. determine possible solutions in the solution set of systems of two or more linear inequalities in two variables.	Heart of Algebra Linear inequalities in one or two variables
4. Quadratic and square root functions, equations, and inequalities. The student applies mathematical processes to understand that quadratic and square root functions, equations, and quadratic inequalities can be used to model situations, solve problems, and make predictions. The student is expected to:	
4.A. write the quadratic function given three specified points in the plane;	Passport to Advanced Math Nonlinear functions
4.B. write the equation of a parabola using given attributes, including vertex, focus, directrix, axis of symmetry, and direction of opening;	Passport to Advanced Math Nonlinear functions
4.C. determine the effect on the graph of $f(x) = \sqrt{x}$ when $f(x)$ is replaced by $a \cdot f(x)$, $f(x) + d$, $f(x - c)$, or $f(bx)$ for specific values of a , b , c , and d ;	
4.D. transform a quadratic function $f(x) = ax^2 + bx + c$ to the form $f(x) = a(x - h)^2 + k$ to identify the different attributes of $f(x)$;	Passport to Advanced Math Nonlinear functions
4.E. formulate quadratic and square root equations using technology given a table of data;	
4.F. solve quadratic and square root equations;	Passport to Advanced Math Nonlinear equations in one variable and systems of equations in two variables
4.G. identify extraneous solutions of square root equations; and	Passport to Advanced Math Nonlinear equations in one variable and systems of equations in two variables

State Standard ID and Description	PSAT/NMSQT and PSAT 10 Math Tests
4.H. solve quadratic inequalities.	
5. Exponential and logarithmic functions and equations. The student applies mathematical processes to understand that exponential and logarithmic functions can be used to model situations and solve problems. The student is expected to:	
5.A. determine the effects on the key attributes on the graphs of $f(x) = bx$ and $f(x) = \log_b x$ where b is 2, 10, and e when $f(x)$ is replaced by $a \cdot f(x)$, $f(x) + d$, or $f(x - c)$, for specific positive and negative real values of a , c , and d ;	
5.B. formulate exponential and logarithmic equations that model real-world situations, including exponential relationships written in recursive notation;	Passport to Advanced Math Nonlinear functions
5.C. rewrite exponential equations as their corresponding logarithmic equations and logarithmic equations as their corresponding exponential equations;	
5.D. solve exponential equations of the form $f(x) = a \cdot b^x$ where a is a nonzero real number and b is greater than zero and not equal to one and single logarithmic equations having real solutions; and	Passport to Advanced Math Nonlinear functions
5.E. determine the reasonableness of a solution to a logarithmic equation.	
6. Cubic, cube root, absolute value and rational functions, equations, and inequalities. The student applies mathematical processes to understand that cubic, cube root, absolute value and rational functions, equations, and inequalities can be used to model situations, solve problems, and make predictions. The student is expected to:	
6.A. analyze the effect on the graphs of $f(x) = x^3$ and $f(x) = \sqrt[3]{x}$ when $f(x)$ is replaced by $a \cdot f(x)$, $f(x) + d$, $f(x - c)$, and $f(x) + d$ for specific positive and negative real values of a , b , c , and d ;	
6.B. solve cube root equations that have real roots;	
6.C. analyze the effect on the graphs of $f(x) = x $ when $f(x)$ is replaced by $a \cdot f(x)$, $f(x) + d$, $f(x - c)$, and $f(x) + d$ for specific positive and negative real values of a , b , c , and d ;	
6.D. formulate absolute value linear equations;	

State Standard ID and Description	PSAT/NMSQT and PSAT 10 Math Tests
6.E. solve absolute value linear equations;	Passport to Advanced Math Nonlinear equations in one variable and systems of equations in two variables
6.F. solve absolute value linear inequalities;	
6.G. analyze the effect on the graphs of $f(x) = \frac{1}{x}$ when $f(x)$ is replaced by $a \cdot f(x)$, $f(x) + d$, $f(x - c)$, and $f(x) + d$ for specific positive and negative real values of a , b , c , and d ;	
6.H. formulate rational equations that model real-world situations;	
6.I. solve rational equations that have real solutions;	Passport to Advanced Math Nonlinear equations in one variable and systems of equations in two variables
6.J. determine the reasonableness of a solution to a rational equation;	Passport to Advanced Math Nonlinear equations in one variable and systems of equations in two variables
6.K. determine the asymptotic restrictions on the domain of a rational function and represent domain and range using interval notation, inequalities, and set notation; and	
6.L. formulate and solve equations involving inverse variation.	
7. Number and algebraic methods. The student applies mathematical processes to simplify and perform operations on expressions and to solve equations. The student is expected to:	
7.A. add, subtract, and multiply complex numbers;	
7.B. add, subtract, and multiply polynomials;	Passport to Advanced Math Equivalent expressions
7.C. determine the quotient of a polynomial of degree three and of degree four when divided by a polynomial of degree one and of degree two;	
7.D. determine the linear factors of a polynomial function of degree three and of degree four using algebraic methods;	Passport to Advanced Math Equivalent expressions

State Standard ID and Description	PSAT/NMSQT and PSAT 10 Math Tests
7.E. determine linear and quadratic factors of a polynomial expression of degree three and of degree four, including factoring the sum and difference of two cubes and factoring by grouping;	Passport to Advanced Math Equivalent expressions
7.F. determine the sum, difference, product, and quotient of rational expressions with integral exponents of degree one and of degree two;	
7.G. rewrite radical expressions that contain variables to equivalent forms;	
7.H. solve equations involving rational exponents; and	
7.I. write the domain and range of a function in interval notation, inequalities, and set notation.	
8. Data. The student applies mathematical processes to analyze data, select appropriate models, write corresponding functions, and make predictions. The student is expected to:	
8.A. analyze data to select the appropriate model from among linear, quadratic, and exponential models;	Problem Solving and Data Analysis Two-variable data: Models and scatterplots
8.B. use regression methods available through technology to write a linear function, a quadratic function, and an exponential function from a given set of data; and	
8.C. predict and make decisions and critical judgments from a given set of data using linear, quadratic, and exponential models.	Problem Solving and Data Analysis Two-variable data: Models and scatterplots

Table 46: TEKS in Geometry Aligned to PSAT/NMSQT and PSAT 10

State Standard ID and Description	PSAT/NMSQT and PSAT 10 Math Tests
<p>2. Coordinate and transformational geometry. The student uses the process skills to understand the connections between algebra and geometry and uses the one- and two-dimensional coordinate systems to verify geometric conjectures. The student is expected to:</p>	
<p>2.A. determine the coordinates of a point that is a given fractional distance less than one from one end of a line segment to the other in one- and two-dimensional coordinate systems, including finding the midpoint;</p>	
<p>2.B. derive and use the distance, slope, and midpoint formulas to verify geometric relationships, including congruence of segments and parallelism or perpendicularity of pairs of lines; and</p>	<p>Heart of Algebra Linear equations in two variables</p>
<p>2.C. determine an equation of a line parallel or perpendicular to a given line that passes through a given point.</p>	<p>Heart of Algebra Linear equations in two variables</p>
<p>3. Coordinate and transformational geometry. The student uses the process skills to generate and describe rigid transformations (translation, reflection, and rotation) and non-rigid transformations (dilations that preserve similarity and reductions and enlargements that do not preserve similarity). The student is expected to:</p>	
<p>3.A. describe and perform transformations of figures in a plane using coordinate notation;</p>	
<p>3.B. determine the image or pre-image of a given two-dimensional figure under a composition of rigid transformations, a composition of non-rigid transformations, and a composition of both, including dilations where the center can be any point in the plane;</p>	
<p>3.C. identify the sequence of transformations that will carry a given pre-image onto an image on and off the coordinate plane; and</p>	
<p>3.D. identify and distinguish between reflectional and rotational symmetry in a plane figure.</p>	
<p>4. Logical argument and constructions. The student uses the process skills with deductive reasoning to understand geometric relationships. The student is expected to:</p>	
<p>4.A. distinguish between undefined terms, definitions, postulates, conjectures, and theorems;</p>	

State Standard ID and Description	PSAT/NMSQT and PSAT 10 Math Tests
4.B. identify and determine the validity of the converse, inverse, and contrapositive of a conditional statement and recognize the connection between a biconditional statement and a true conditional statement with a true converse;	
4.C. verify that a conjecture is false using a counterexample; and	
4.D. compare geometric relationships between Euclidean and spherical geometries, including parallel lines and the sum of the angles in a triangle.	
5. Logical argument and constructions. The student uses constructions to validate conjectures about geometric figures. The student is expected to:	
5.A. investigate patterns to make conjectures about geometric relationships, including angles formed by parallel lines cut by a transversal, criteria required for triangle congruence, special segments of triangles, diagonals of quadrilaterals, interior and exterior angles of polygons, and special segments and angles of circles choosing from a variety of tools;	Additional Topics in Math Lines, angles, and triangles
5.B. construct congruent segments, congruent angles, a segment bisector, an angle bisector, perpendicular lines, the perpendicular bisector of a line segment, and a line parallel to a given line through a point not on a line using a compass and a straightedge;	
5.C. use the constructions of congruent segments, congruent angles, angle bisectors, and perpendicular bisectors to make conjectures about geometric relationships; and	
5.D. verify the Triangle Inequality theorem using constructions and apply the theorem to solve problems.	Additional Topics in Math Lines, angles, and triangles
6. Proof and congruence. The student uses the process skills with deductive reasoning to prove and apply theorems by using a variety of methods such as coordinate, transformational, and axiomatic and formats such as two-column, paragraph, and flow chart. The student is expected to:	
6.A. verify theorems about angles formed by the intersection of lines and line segments, including vertical angles, and angles formed by parallel lines cut by a transversal and prove equidistance between the endpoints of a segment and points on its perpendicular bisector and apply these relationships to solve problems;	Additional Topics in Math Lines, angles, and triangles
6.B. prove two triangles are congruent by applying the Side-Angle-Side, Angle-Side-Angle, Side-Side-Side, Angle-Angle-Side, and Hypotenuse-Leg congruence conditions;	Additional Topics in Math Lines, angles, and triangles

State Standard ID and Description	PSAT/NMSQT and PSAT 10 Math Tests
6.C. apply the definition of congruence, in terms of rigid transformations, to identify congruent figures and their corresponding sides and angles;	
6.D. verify theorems about the relationships in triangles, including proof of the Pythagorean Theorem, the sum of interior angles, base angles of isosceles triangles, midsegments, and medians, and apply these relationships to solve problems; and	Additional Topics in Math Lines, angles, and triangles Right triangles and trigonometry
6.E. prove a quadrilateral is a parallelogram, rectangle, square, or rhombus using opposite sides, opposite angles, or diagonals and apply these relationships to solve problems.	
7. Similarity, proof, and trigonometry. The student uses the process skills in applying similarity to solve problems. The student is expected to:	
7.A. apply the definition of similarity in terms of a dilation to identify similar figures and their proportional sides and the congruent corresponding angles; and	Additional Topics in Math Lines, angles, and triangles
7.B. apply the Angle-Angle criterion to verify similar triangles and apply the proportionality of the corresponding sides to solve problems.	Additional Topics in Math Lines, angles, and triangles
8. Similarity, proof, and trigonometry. The student uses the process skills with deductive reasoning to prove and apply theorems by using a variety of methods such as coordinate, transformational, and axiomatic and formats such as two-column, paragraph, and flow chart. The student is expected to:	
8.A. prove theorems about similar triangles, including the Triangle Proportionality theorem, and apply these theorems to solve problems; and	Additional Topics in Math Lines, angles, and triangles
8.B. identify and apply the relationships that exist when an altitude is drawn to the hypotenuse of a right triangle, including the geometric mean, to solve problems.	Additional Topics in Math Lines, angles, and triangles
9. Similarity, proof, and trigonometry. The student uses the process skills to understand and apply relationships in right triangles. The student is expected to:	
9.A. determine the lengths of sides and measures of angles in a right triangle by applying the trigonometric ratios sine, cosine, and tangent to solve problems; and	
9.B. apply the relationships in special right triangles 30° - 60° - 90° and 45° - 45° - 90° and the Pythagorean theorem, including Pythagorean triples, to solve problems.	Additional Topics in Math Right angles and trigonometry

State Standard ID and Description	PSAT/NMSQT and PSAT 10 Math Tests
<p>10. Two-dimensional and three-dimensional figures. The student uses the process skills to recognize characteristics and dimensional changes of two- and three-dimensional figures. The student is expected to:</p>	
<p>10.A. identify the shapes of two-dimensional cross-sections of prisms, pyramids, cylinders, cones, and spheres and identify three-dimensional objects generated by rotations of two-dimensional shapes; and</p>	
<p>10.B. determine and describe how changes in the linear dimensions of a shape affect its perimeter, area, surface area, or volume, including proportional and non-proportional dimensional change.</p>	<p>Additional Topics in Math Area and volume</p>
<p>11. Two-dimensional and three-dimensional figures. The student uses the process skills in the application of formulas to determine measures of two- and three-dimensional figures. The student is expected to:</p>	
<p>11.A. apply the formula for the area of regular polygons to solve problems using appropriate units of measure;</p>	<p>Additional Topics in Math Area and volume</p>
<p>11.B. determine the area of composite two-dimensional figures comprised of a combination of triangles, parallelograms, trapezoids, kites, regular polygons, or sectors of circles to solve problems using appropriate units of measure;</p>	<p>Additional Topics in Math Area and volume</p>
<p>11.C. apply the formulas for the total and lateral surface area of three-dimensional figures, including prisms, pyramids, cones, cylinders, spheres, and composite figures, to solve problems using appropriate units of measure; and</p>	<p>Additional Topics in Math Area and volume</p>
<p>11.D. apply the formulas for the volume of three-dimensional figures, including prisms, pyramids, cones, cylinders, spheres, and composite figures, to solve problems using appropriate units of measure.</p>	<p>Additional Topics in Math Area and volume</p>
<p>12. Circles. The student uses the process skills to understand geometric relationships and apply theorems and equations about circles. The student is expected to:</p>	
<p>12.A. apply theorems about circles, including relationships among angles, radii, chords, tangents, and secants, to solve non-contextual problems;</p>	
<p>12.B. apply the proportional relationship between the measure of an arc length of a circle and the circumference of the circle to solve problems;</p>	
<p>12.C. apply the proportional relationship between the measure of the area of a sector of a circle and the area of the circle to solve problems;</p>	

State Standard ID and Description	PSAT/NMSQT and PSAT 10 Math Tests
12.D. describe radian measure of an angle as the ratio of the length of an arc intercepted by a central angle and the radius of the circle; and	
12.E. show that the equation of a circle with center at the origin and radius r is $x^2 + y^2 = r^2$ and determine the equation for the graph of a circle with radius r and center (h, k) , $(x - h)^2 + (y - k)^2 = r^2$.	
13. Probability. The student uses the process skills to understand probability in real-world situations and how to apply independence and dependence of events. The student is expected to:	
13.A. develop strategies to use permutations and combinations to solve contextual problems;	
13.B. determine probabilities based on area to solve contextual problems;	Problem Solving and Data Analysis Probability and conditional probability
13.C. identify whether two events are independent and compute the probability of the two events occurring together with or without replacement;	Problem Solving and Data Analysis Probability and conditional probability
13.D. apply conditional probability in contextual problems; and	Problem Solving and Data Analysis Probability and conditional probability
13.E. apply independence in contextual problems.	Problem Solving and Data Analysis Probability and conditional probability

Table 47: TEKS in Mathematical Models with Applications Aligned to PSAT/NMSQT and PSAT 10

State Standard ID and Description	PSAT/NMSQT and PSAT 10 Math Tests
<p>2. Mathematical modeling in personal finance. The student uses mathematical processes with graphical and numerical techniques to study patterns and analyze data related to personal finance. The student is expected to:</p>	
<p>2.A. use rates and linear functions to solve problems involving personal finance and budgeting, including compensations and deductions;</p>	<p>Heart of Algebra Linear functions</p> <p>Problem Solving and Data Analysis Ratios, rates, proportional relationships, and units</p>
<p>2.B. solve problems involving personal taxes; and</p>	<p>Problem Solving and Data Analysis Percentages</p>
<p>2.C. analyze data to make decisions about banking, including options for online banking, checking accounts, overdraft protection, processing fees, and debit card/ATM fees.</p>	
<p>3. Mathematical modeling in personal finance. The student uses mathematical processes with algebraic formulas, graphs, and amortization modeling to solve problems involving credit. The student is expected to:</p>	
<p>3.A. use formulas to generate tables to display series of payments for loan amortizations resulting from financed purchases;</p>	
<p>3.B. analyze personal credit options in retail purchasing and compare relative advantages and disadvantages of each option;</p>	
<p>3.C. use technology to create amortization models to investigate home financing and compare buying a home to renting a home; and</p>	
<p>3.D. use technology to create amortization models to investigate automobile financing and compare buying a vehicle to leasing a vehicle.</p>	
<p>4. Mathematical modeling in personal finance. The student uses mathematical processes with algebraic formulas, numerical techniques, and graphs to solve problems related to financial planning. The student is expected to:</p>	
<p>4.A. analyze and compare coverage options and rates in insurance;</p>	

State Standard ID and Description	PSAT/NMSQT and PSAT 10 Math Tests
4.B. investigate and compare investment options, including stocks, bonds, annuities, certificates of deposit, and retirement plans; and	
4.C. analyze types of savings options involving simple and compound interest and compare relative advantages of these options.	Passport to Advanced Math Nonlinear functions
5. Mathematical modeling in science and engineering. The student applies mathematical processes with algebraic techniques to study patterns and analyze data as it applies to science. The student is expected to:	
5.A. use proportionality and inverse variation to describe physical laws such as Hook's Law, Newton's Second Law of Motion, and Boyle's Law;	Heart of Algebra Linear functions Problem Solving and Data Analysis Ratios, rates, proportional relationships, and units
5.B. use exponential models available through technology to model growth and decay in areas, including radioactive decay; and	Passport to Advanced Math Nonlinear functions
5.C. use quadratic functions to model motion.	Passport to Advanced Math Nonlinear functions
6. Mathematical modeling in science and engineering. The student applies mathematical processes with algebra and geometry to study patterns and analyze data as it applies to architecture and engineering. The student is expected to:	
6.A. use similarity, geometric transformations, symmetry, and perspective drawings to describe mathematical patterns and structure in architecture;	Additional Topics in Math Lines, angles, and triangles
6.B. use scale factors with two-dimensional and three-dimensional objects to demonstrate proportional and non-proportional changes in surface area and volume as applied to fields;	Additional Topics in Math Area and volume
6.C. use the Pythagorean Theorem and special right-triangle relationships to calculate distances; and	Additional Topics in Math Right triangles and trigonometry
6.D. use trigonometric ratios to calculate distances and angle measures as applied to fields.	

State Standard ID and Description	PSAT/NMSQT and PSAT 10 Math Tests
<p>7. Mathematical modeling in fine arts. The student uses mathematical processes with algebra and geometry to study patterns and analyze data as it applies to fine arts. The student is expected to:</p>	
<p>7.A. use trigonometric ratios and functions available through technology to model periodic behavior in art and music;</p>	
<p>7.B. use similarity, geometric transformations, symmetry, and perspective drawings to describe mathematical patterns and structure in art and photography;</p>	<p>Additional Topics in Math Lines, angles, and triangles</p>
<p>7.C. use geometric transformations, proportions, and periodic motion to describe mathematical patterns and structure in music; and</p>	<p>Problem Solving and Data Analysis Ratios, rates, proportional relationships, and units</p>
<p>7.D. use scale factors with two-dimensional and three-dimensional objects to demonstrate proportional and non-proportional changes in surface area and volume as applied to fields.</p>	<p>Additional Topics in Math Area and volume</p>
<p>8. Mathematical modeling in social sciences. The student applies mathematical processes to determine the number of elements in a finite sample space and compute the probability of an event. The student is expected to:</p>	
<p>8.A. determine the number of ways an event may occur using combinations, permutations, and the Fundamental Counting Principle;</p>	
<p>8.B. compare theoretical to empirical probability; and</p>	
<p>8.C. use experiments to determine the reasonableness of a theoretical model such as binomial or geometric.</p>	
<p>9. Mathematical modeling in social sciences. The student applies mathematical processes and mathematical models to analyze data as it applies to social sciences. The student is expected to:</p>	
<p>9.A. interpret information from various graphs, including line graphs, bar graphs, circle graphs, histograms, scatterplots, dot plots, stem-and-leaf plots, and box and whisker plots, to draw conclusions from the data and determine the strengths and weaknesses of conclusions;</p>	<p>Problem Solving and Data Analysis One-variable data: Distributions and measures of center and spread</p>

State Standard ID and Description	PSAT/NMSQT and PSAT 10 Math Tests
9.B. analyze numerical data using measures of central tendency (mean, median, and mode) and variability (range, interquartile range or IQR, and standard deviation) in order to make inferences with normal distributions;	<p>Problem Solving and Data Analysis</p> <p>One-variable data: Distributions and measures of center and spread</p>
9.C. distinguish the purposes and differences among types of research, including surveys, experiments, and observational studies;	
9.D. use data from a sample to estimate population mean or population proportion	<p>Problem Solving and Data Analysis</p> <p>Inference from sample statistics and margin of error</p>
9.E. analyze marketing claims based on graphs and statistics from electronic and print media and justify the validity of stated or implied conclusions; and	
9.F. use regression methods available through technology to model linear and exponential functions, interpret correlations, and make predictions.	
<p>10. Mathematical modeling in social sciences. The student applies mathematical processes to design a study and use graphical, numerical, and analytical techniques to communicate the results of the study. The student is expected to:</p>	
10.A. formulate a meaningful question, determine the data needed to answer the question, gather the appropriate data, analyze the data, and draw reasonable conclusions; and	
10.B. communicate methods used, analyses conducted, and conclusions drawn for a data-analysis project through the use of one or more of the following: a written report, a visual display, an oral report, or a multi-media presentation.	

Table 48: TEKS in Advanced Quantitative Reasoning Aligned to PSAT/NMSQT and PSAT 10

State Standard ID and Description	PSAT/NMSQT and PSAT 10 Math Tests
<p>2. Numeric reasoning. The student applies the process standards in mathematics to generate new understandings by extending existing knowledge. The student generates new mathematical understandings through problems involving numerical data that arise in everyday life, society, and the workplace. The student extends existing knowledge and skills to analyze real-world situations. The student is expected to:</p>	
<p>2.A. use precision and accuracy in real-life situations related to measurement and significant figures;</p>	
<p>2.B. apply and analyze published ratings, weighted averages, and indices to make informed decisions;</p>	
<p>2.C. solve problems involving quantities that are not easily measured using proportionality;</p>	
<p>2.D. solve geometric problems involving indirect measurement, including similar triangles, the Pythagorean Theorem, Law of Sines, Law of Cosines, and the use of dynamic geometry software;</p>	<p>Additional Topics in Math Lines, angles, and triangles Right triangles and trigonometry</p>
<p>2.E. solve problems involving large quantities using combinatorics;</p>	
<p>2.F. use arrays to efficiently manage large collections of data and add, subtract, and multiply matrices to solve applied problems, including geometric transformations;</p>	
<p>2.G. analyze various voting and selection processes to compare results in given situations; and</p>	
<p>2.H. select and apply an algorithm of interest to solve real-life problems such as problems using recursion or iteration involving population growth or decline, fractals, and compound interest; the validity in recorded and transmitted data using checksums and hashing; sports rankings, weighted class rankings, and search engine rankings; and problems involving scheduling or routing situations using vertex-edge graphs, critical paths, Euler paths, and minimal spanning trees and communicate to peers the application of the algorithm in precise mathematical and nontechnical language.</p>	

State Standard ID and Description	PSAT/NMSQT and PSAT 10 Math Tests
<p>3. Algebraic reasoning (expressions, equations, and generalized relationships). The student applies the process standards in mathematics to create and analyze mathematical models of everyday situations to make informed decisions related to earning, investing, spending, and borrowing money by appropriate, proficient, and efficient use of tools, including technology. The student uses mathematical relationships to make connections and predictions. The student judges the validity of a prediction and uses mathematical models to represent, analyze, and solve dynamic real-world problems. The student is expected to:</p>	
<p>3.A. collect numerical bivariate data to create a scatterplot, select a function to model the data, justify the model selection, and use the model to interpret results and make predictions;</p>	<p>Problem Solving and Data Analysis Two-variable data: Models and scatterplots</p>
<p>3.B. describe the degree to which uncorrelated variables may or may not be related and analyze situations where correlated variables do or do not indicate a cause-and-effect relationship;</p>	
<p>3.C. determine or analyze an appropriate growth or decay model for problem situations, including linear, exponential, and logistic functions;</p>	<p>Heart of Algebra Linear functions Passport to Advanced Math Nonlinear functions</p>
<p>3.D. determine or analyze an appropriate cyclical model for problem situations that can be modeled with periodic functions;</p>	
<p>3.E. determine or analyze an appropriate piecewise model for problem situations;</p>	
<p>3.F. create, represent, and analyze mathematical models for various types of income calculations to determine the best option for a given situation;</p>	
<p>3.G. create, represent, and analyze mathematical models for expenditures, including those involving credit, to determine the best option for a given situation; and</p>	
<p>3.H. create, represent, and analyze mathematical models and appropriate representations, including formulas and amortization tables, for various types of loans and investments to determine the best option for a given situation.</p>	

State Standard ID and Description	PSAT/NMSQT and PSAT 10 Math Tests
<p>4. Probabilistic and statistical reasoning. The student uses the process standards in mathematics to generate new understandings of probability and statistics. The student analyzes statistical information and evaluates risk and return to connect mathematical ideas and make informed decisions. The student applies a problem-solving model and statistical methods to design and conduct a study that addresses one or more particular question(s). The student uses multiple representations to communicate effectively the results of student-generated statistical studies and the critical analysis of published statistical studies. The student is expected to:</p>	
<p>4.A. use a two-way frequency table as a sample space to identify whether two events are independent and to interpret the results;</p>	
<p>4.B. use the Addition Rule, $P(A \text{ or } B) = P(A) + P(B) - P(A \text{ and } B)$, in mathematical and real-world problems;</p>	
<p>4.C. calculate conditional probabilities and probabilities of compound events using tree diagrams, Venn diagrams, area models, and formulas;</p>	<p>Problem Solving and Data Analysis Probability and conditional probability</p>
<p>4.D. interpret conditional probabilities and probabilities of compound events by analyzing representations to make decisions in problem situations;</p>	<p>Problem Solving and Data Analysis Probability and conditional probability</p>
<p>4.E. use probabilities to make and justify decisions about risks in everyday life;</p>	
<p>4.F. calculate expected value to analyze mathematical fairness, payoff, and risk;</p>	
<p>4.G. determine the validity of logical arguments that include compound conditional statements by constructing truth tables;</p>	
<p>4.H. identify limitations and lack of relevant information in studies reporting statistical information, especially when studies are reported in condensed form;</p>	
<p>4.I. interpret and compare statistical results using appropriate technology given a margin of error;</p>	
<p>4.J. identify potential misuses of statistics to justify particular conclusions, including assertions of a cause-and-effect relationship rather than an association, and missteps or fallacies in logical reasoning;</p>	

State Standard ID and Description	PSAT/NMSQT and PSAT 10 Math Tests
4.K. describe strengths and weaknesses of sampling techniques, data and graphical displays, and interpretations of summary statistics and other results appearing in a study, including reports published in the media;	Problem Solving and Data Analysis Inference from sample statistics and margin of error
4.L. determine the need for and purpose of a statistical investigation and what type of statistical analysis can be used to answer a specific question or set of questions;	
4.M. identify the population of interest for a statistical investigation, select an appropriate sampling technique, and collect data;	
4.N. identify the variables to be used in a study;	
4.O. determine possible sources of statistical bias in a study and how bias may affect the validity of the results;	
4.P. create data displays for given data sets to investigate, compare, and estimate center, shape, spread, and unusual features of the data;	
4.Q. analyze possible sources of data variability, including those that can be controlled and those that cannot be controlled;	
4.R. report results of statistical studies to a particular audience, including selecting an appropriate presentation format, creating graphical data displays, and interpreting results in terms of the question studied;	
4.S. justify the design and the conclusion(s) of statistical studies, including the methods used; and	
4.T. communicate statistical results in oral and written formats using appropriate statistical and nontechnical language.	

Table 49: TEKS in Statistics Aligned to PSAT/NMSQT and PSAT 10

Texas TEKS Standards for Mathematics: Statistics	PSAT/NMSQT and PSAT 10 Math Tests
<p>2. Statistical process sampling and experimentation. The student applies mathematical processes to apply understandings about statistical studies, surveys, and experiments to design and conduct a study and use graphical, numerical, and analytical techniques to communicate the results of the study. The student is expected to:</p>	
<p>2.A. compare and contrast the benefits of different sampling techniques, including random sampling and convenience sampling methods;</p>	
<p>2.B. distinguish among observational studies, surveys, and experiments;</p>	
<p>2.C. analyze generalizations made from observational studies, surveys, and experiments;</p>	
<p>2.D. distinguish between sample statistics and population parameters;</p>	
<p>2.E. formulate a meaningful question, determine the data needed to answer the question, gather the appropriate data, analyze the data, and draw reasonable conclusions;</p>	
<p>2.F. communicate methods used, analyses conducted, and conclusions drawn for a data-analysis project through the use of one or more of the following: a written report, a visual display, an oral report, or a multi-media presentation; and</p>	
<p>2.G. critically analyze published findings for appropriateness of study design implemented, sampling methods used, or the statistics applied.</p>	
<p>3. Variability. The student applies the mathematical process standards when describing and modeling variability. The student is expected to:</p>	
<p>3.A. distinguish between mathematical models and statistical models;</p>	
<p>3.B. construct a statistical model to describe variability around the structure of a mathematical model for a given situation;</p>	
<p>3.C. distinguish among different sources of variability, including measurement, natural, induced, and sampling variability; and</p>	
<p>3.D. describe and model variability using population and sampling distributions.</p>	
<p>4. Categorical and quantitative data. The student applies the mathematical process standards to represent and analyze both categorical and quantitative data. The student is expected to:</p>	

Texas TEKS Standards for Mathematics: Statistics	PSAT/NMSQT and PSAT 10 Math Tests
4.A. distinguish between categorical and quantitative data;	
4.B. represent and summarize data and justify the representation;	<p>Problem Solving and Data Analysis</p> <p>One variable data: Distributions and measures of center and spread</p>
4.C. analyze the distribution characteristics of quantitative data, including determining the possible existence and impact of outliers;	<p>Problem Solving and Data Analysis</p> <p>One variable data: Distributions and measures of center and spread</p>
4.D. compare and contrast different graphical or visual representations given the same data set;	<p>Problem Solving and Data Analysis</p> <p>One variable data: Distributions and measures of center and spread</p>
4.E. compare and contrast meaningful information derived from summary statistics given a data set; and	
4.F. analyze categorical data, including determining marginal and conditional distributions, using two-way tables.	<p>Problem Solving and Data Analysis</p> <p>Probability and conditional probability</p>
<p>5. Probability and random variables. The student applies the mathematical process standards to connect probability and statistics. The student is expected to:</p>	
5.A. determine probabilities, including the use of a two-way table;	<p>Problem Solving and Data Analysis</p> <p>Probability and conditional probability</p>
5.B. describe the relationship between theoretical and empirical probabilities using the Law of Large Numbers;	
5.C. construct a distribution based on a technology-generated simulation or collected samples for a discrete random variable; and	

Texas TEKS Standards for Mathematics: Statistics	PSAT/NMSQT and PSAT 10 Math Tests
5.D. compare statistical measures such as sample mean and standard deviation from a technology-simulated sampling distribution to the theoretical sampling distribution.	
6. Inference. The student applies the mathematical process standards to make inferences and justify conclusions from statistical studies. The student is expected to:	
6.A. explain how a sample statistic and a confidence level are used in the construction of a confidence interval;	
6.B. explain how changes in the sample size, confidence level, and standard deviation affect the margin of error of a confidence interval;	<p>Problem Solving and Data Analysis</p> <p>Inference from sample statistics and margin of error</p>
6.C. calculate a confidence interval for the mean of a normally distributed population with a known standard deviation;	
6.D. calculate a confidence interval for a population proportion;	
6.E. interpret confidence intervals for a population parameter, including confidence intervals from media or statistical reports;	
6.F. explain how a sample statistic provides evidence against a claim about a population parameter when using a hypothesis test;	
6.G. construct null and alternative hypothesis statements about a population parameter;	
6.H. explain the meaning of the p-value in relation to the significance level in providing evidence to reject or fail to reject the null hypothesis in the context of the situation;	
6.I. interpret the results of a hypothesis test using technology-generated results such as large sample tests for proportion, mean, difference between two proportions, and difference between two independent means; and	
6.J. describe the potential impact of Type I and Type II Errors.	
7. Bivariate data. The student applies the mathematical process standards to analyze relationships among bivariate quantitative data. The student is expected to:	

Texas TEKS Standards for Mathematics: Statistics	PSAT/NMSQT and PSAT 10 Math Tests
7.A. analyze scatterplots for patterns, linearity, outliers, and influential points;	<p>Problem Solving and Data Analysis</p> <p>Two-variable data: Models and scatterplots</p>
7.B. transform a linear parent function to determine a line of best fit;	
7.C. compare different linear models for the same set of data to determine best fit, including discussions about error;	<p>Problem Solving and Data Analysis</p> <p>Two-variable data: Models and scatterplots</p>
7.D. compare different methods for determining best fit, including median-median and absolute value;	
7.E. describe the relationship between influential points and lines of best fit using dynamic graphing technology; and	
7.F. identify and interpret the reasonableness of attributes of lines of best fit within the context, including slope and y-intercept.	<p>Problem Solving and Data Analysis</p> <p>Two-variable data: Models and scatterplots</p>

Table 50: TEKS in Algebraic Reasoning Aligned to PSAT/NMSQT and PSAT 10

Texas TEKS Standards for Mathematics: Algebraic Reasoning	PSAT/NMSQT and PSAT 10 Math Tests
<p>2. Patterns and structure. The student applies mathematical processes to connect finite differences or common ratios to attributes of functions. The student is expected to:</p>	
<p>2.A. determine the patterns that identify the relationship between a function and its common ratio or related finite differences as appropriate, including linear, quadratic, cubic, and exponential functions;</p>	
<p>2.B. classify a function as linear, quadratic, cubic, and exponential when a function is represented tabularly using finite differences or common ratios as appropriate;</p>	<p>Problem Solving and Data Analysis Two-variable data: Models and scatterplots</p>
<p>2.C. determine the function that models a given table of related values using finite differences and its restricted domain and range; and</p>	<p>Problem Solving and Data Analysis Two-variable data: Models and scatterplots</p>
<p>2.D. determine a function that models real-world data and mathematical contexts using finite differences such as the age of a tree and its circumference, figurative numbers, average velocity, and average acceleration.</p>	
<p>3. Patterns and structure. The student applies mathematical processes to understand the connections among representations of functions and combinations of functions, including the constant function, $f(x) = x$, $f(x) = x^2$, $f(x) = \sqrt{x}$, $f(x) = \frac{1}{x}$, $f(x) = x^3$, $f(x) = \sqrt[3]{x}$, $f(x) = b^x$, $f(x) = x$, and $f(x) = \log_b x$ where b is 10 or e; functions and their inverses; and key attributes of these functions. The student is expected to:</p>	
<p>3.A. compare and contrast the key attributes, including domain, range, maxima, minima, and intercepts, of a set of functions such as a set comprised of a linear, a quadratic, and an exponential function or a set comprised of an absolute value, a quadratic, and a square root function tabularly, graphically, and symbolically;</p>	
<p>3.B. compare and contrast the key attributes of a function and its inverse when it exists, including domain, range, maxima, minima, and intercepts, tabularly, graphically, and symbolically;</p>	

Texas TEKS Standards for Mathematics: Algebraic Reasoning	PSAT/NMSQT and PSAT 10 Math Tests
3.C. verify that two functions are inverses of each other tabularly and graphically such as situations involving compound interest and interest rate, velocity and braking distance, and Fahrenheit-Celsius conversions;	
3.D. represent a resulting function tabularly, graphically, and symbolically when functions are combined or separated using arithmetic operations such as combining a 20% discount and a 6% sales tax on a sale to determine $h(x)$, the total sale, $f(x) = 0.8x$, $g(x) = 0.06(0.8x)$, and $h(x) = f(x) + g(x)$;	Heart of Algebra Linear functions Passport to Advanced Math Nonlinear functions
3.E. model a situation using function notation when the output of one function is the input of a second function such as determining a function $h(x) = g(f(x)) = 1.06(0.8x)$ for the final purchase price, $h(x)$ of an item with price x dollars representing a 20% discount, $f(x) = 0.8x$ followed by a 6% sales tax, $g(x) = 1.06x$; and	
3.F. compare and contrast a function and possible functions that can be used to build it tabularly, graphically, and symbolically such as a quadratic function that results from multiplying two linear functions.	
4. Number and algebraic methods. The student applies mathematical processes to simplify and perform operations on functions represented in a variety of ways, including real-world situations. The student is expected to:	
4.A. connect tabular representations to symbolic representations when adding, subtracting, and multiplying polynomial functions arising from mathematical and real-world situations such as applications involving surface area and volume;	
4.B. compare and contrast the results when adding two linear functions and multiplying two linear functions that are represented tabularly, graphically, and symbolically;	Heart of Algebra Linear functions Passport to Advanced Math Nonlinear functions
4.C. determine the quotient of a polynomial function of degree three and of degree four when divided by a polynomial function of degree one and of degree two when represented tabularly and symbolically; and	
4.D. determine the linear factors of a polynomial function of degree two and of degree three when represented symbolically and tabularly and graphically where appropriate.	Passport to Advanced Math Equivalent expressions
5. Number and algebraic methods. The student applies mathematical processes to represent, simplify, and perform operations on matrices and to solve systems of equations using matrices. The student is expected to:	

Texas TEKS Standards for Mathematics: Algebraic Reasoning	PSAT/NMSQT and PSAT 10 Math Tests
5.A. add and subtract matrices;	
5.B. multiply matrices;	
5.C. multiply matrices by a scalar;	
5.D. represent and solve systems of two linear equations arising from mathematical and real-world situations using matrices; and	
5.E. represent and solve systems of three linear equations arising from mathematical and real-world situations using matrices and technology.	
6. Number and algebraic methods. The student applies mathematical processes to estimate and determine solutions to equations resulting from functions and real-world applications with fluency. The student is expected to:	
6.A. estimate a reasonable input value that results in a given output value for a given function, including quadratic, rational, and exponential functions;	Heart of Algebra Linear functions Passport to Advanced Math Nonlinear functions
6.B. solve equations arising from questions asked about functions that model real-world applications, including linear and quadratic functions, tabularly, graphically, and symbolically; and	Heart of Algebra Linear functions Passport to Advanced Math Nonlinear functions
6.C. approximate solutions to equations arising from questions asked about exponential, logarithmic, square root, and cubic functions that model real-world applications tabularly and graphically.	Problem Solving and Data Analysis Two-variable data: Models and scatterplots
7. Modeling from data. The student applies mathematical processes to analyze and model data based on real-world situations with corresponding functions. The student is expected to:	
7.A. represent domain and range of a function using interval notation, inequalities, and set (builder) notation;	
7.B. compare and contrast between the mathematical and reasonable domain and range of functions modeling real-world situations, including linear, quadratic, exponential, and rational functions;	

Texas TEKS Standards for Mathematics: Algebraic Reasoning	PSAT/NMSQT and PSAT 10 Math Tests
<p>7.C. determine the accuracy of a prediction from a function that models a set of data compared to the actual data using comparisons between average rates of change and finite differences such as gathering data from an emptying tank and comparing the average rate of change of the volume or the second differences in the volume to key attributes of the given model;</p>	
<p>7.D. determine an appropriate function model, including linear, quadratic, and exponential functions, for a set of data arising from real-world situations using finite differences and average rates of change; and</p>	<p>Problem Solving and Data Analysis Two-variable data: Models and scatterplots</p>
<p>7.E. determine if a given linear function is a reasonable model for a set of data arising from a real-world situation.</p>	<p>Problem Solving and Data Analysis Two-variable data: Models and scatterplots</p>

Table 51: TEKS in Grade 6 Aligned to PSAT 8/9

State Standard ID and Description	PSAT 8/9 Math Test
<p>6.2. Number and operations. The student applies mathematical process standards to represent and use rational numbers in a variety of forms. The student is expected to:</p>	
<p>6.2.A. classify whole numbers, integers, and rational numbers using a visual representation such as a Venn diagram to describe relationships between sets of numbers;</p>	
<p>6.2.B. identify a number, its opposite, and its absolute value;</p>	
<p>6.2.C. locate, compare, and order integers and rational numbers using a number line;</p>	<p>Heart of Algebra Linear functions Linear equations in two variables</p>
<p>6.2.D. order a set of rational numbers arising from mathematical and real-world contexts; and</p>	
<p>6.2.E. extend representations for division to include fraction notation such as a/b represents the same number as $a \div b$ where $b \neq 0$.</p>	
<p>6.3. Number and operations. The student applies mathematical process standards to represent addition, subtraction, multiplication, and division while solving problems and justifying solutions. The student is expected to:</p>	
<p>6.3.A. recognize that dividing by a rational number and multiplying by its reciprocal result in equivalent values;</p>	<p>Problem Solving and Data Analysis Ratios, rates, proportional relationships, and units</p>
<p>6.3.B. determine, with and without computation, whether a quantity is increased or decreased when multiplied by a fraction, including values greater than or less than one;</p>	
<p>6.3.C. represent integer operations with concrete models and connect the actions with the models to standardized algorithms;</p>	
<p>6.3.D. add, subtract, multiply, and divide integers fluently; and</p>	<p>Heart of Algebra Linear equations in one variable Linear functions Linear equations in two variables</p>

State Standard ID and Description	PSAT 8/9 Math Test
6.3.E. multiply and divide positive rational numbers fluently.	<p>Problem Solving and Data Analysis</p> <p>Ratios, rates, proportional relationships, and units</p>
<p>6.4. Proportionality. The student applies mathematical process standards to develop an understanding of proportional relationships in problem situations. The student is expected to:</p>	
6.4.A. compare two rules verbally, numerically, graphically, and symbolically in the form of $y = ax$ or $y = x + a$ in order to differentiate between additive and multiplicative relationships;	<p>Heart of Algebra</p> <p>Linear functions</p>
6.4.B. apply qualitative and quantitative reasoning to solve prediction and comparison of real-world problems involving ratios and rates;	<p>Problem Solving and Data Analysis</p> <p>Ratios, rates, proportional relationships, and units</p>
6.4.C. give examples of ratios as multiplicative comparisons of two quantities describing the same attribute;	<p>Problem Solving and Data Analysis</p> <p>Ratios, rates, proportional relationships, and units</p>
6.4.D. give examples of rates as the comparison by division of two quantities having different attributes, including rates as quotients;	<p>Problem Solving and Data Analysis</p> <p>Ratios, rates, proportional relationships, and units</p>
6.4.E. represent ratios and percents with concrete models, fractions, and decimals;	<p>Problem Solving and Data Analysis</p> <p>Ratios, rates, proportional relationships, and units</p> <p>Percentages</p>
6.4.F. represent benchmark fractions and percents such as 1%, 10%, 25%, $33\frac{1}{3}\%$, and multiples of these values using 10 by 10 grids, strip diagrams, number lines, and numbers;	<p>Problem Solving and Data Analysis</p> <p>Ratios, rates, proportional relationships, and units</p> <p>Percentages</p>

State Standard ID and Description	PSAT 8/9 Math Test
6.4.G. generate equivalent forms of fractions, decimals, and percents using real-world problems, including problems that involve money; and	<p>Problem Solving and Data Analysis</p> <p>Ratios, rates, proportional relationships, and units</p> <p>Percentages</p>
6.4.H. convert units within a measurement system, including the use of proportions and unit rates.	<p>Problem Solving and Data Analysis</p> <p>Ratios, rates, proportional relationships, and units</p>
<p>6.5. Proportionality. The student applies mathematical process standards to solve problems involving proportional relationships. The student is expected to:</p>	
6.5.A. represent mathematical and real-world problems involving ratios and rates using scale factors, tables, graphs, and proportions;	<p>Problem Solving and Data Analysis</p> <p>Ratios, rates, proportional relationships, and units</p>
6.5.B. solve real-world problems to find the whole given a part and the percent, to find the part given the whole and the percent, and to find the percent given the part and the whole, including the use of concrete and pictorial models; and	<p>Problem Solving and Data Analysis</p> <p>Ratios, rates, proportional relationships, and units</p> <p>Percentages</p>
6.5.C. use equivalent fractions, decimals, and percents to show equal parts of the same whole.	<p>Problem Solving and Data Analysis</p> <p>Ratios, rates, proportional relationships, and units</p> <p>Percentages</p>
<p>6.6. Expressions, equations, and relationships. The student applies mathematical process standards to use multiple representations to describe algebraic relationships. The student is expected to:</p>	
6.6.A. identify independent and dependent quantities from tables and graphs;	<p>Heart of Algebra</p> <p>Linear functions</p>
6.6.B. write an equation that represents the relationship between independent and dependent quantities from a table; and	<p>Heart of Algebra</p> <p>Linear functions</p>

State Standard ID and Description	PSAT 8/9 Math Test
6.6.C. represent a given situation using verbal descriptions, tables, graphs, and equations in the form $y = kx$ or $y = x + b$.	Heart of Algebra Linear functions
6.7. Expressions, equations, and relationships. The student applies mathematical process standards to develop concepts of expressions and equations. The student is expected to:	
6.7.A. generate equivalent numerical expressions using order of operations, including whole number exponents and prime factorization;	Passport to Advanced Math Equivalent expressions
6.7.B. distinguish between expressions and equations verbally, numerically, and algebraically;	Heart of Algebra Linear equations in one variable Linear functions Linear equations in two variables
6.7.C. determine if two expressions are equivalent using concrete models, pictorial models, and algebraic representations; and	Passport to Advanced Math Equivalent expressions
6.7.D. generate equivalent expressions using the properties of operations: inverse, identity, commutative, associative, and distributive properties.	Passport to Advanced Math Equivalent expressions
6.8. Expressions, equations, and relationships. The student applies mathematical process standards to use geometry to represent relationships and solve problems. The student is expected to:	
6.8.A. extend previous knowledge of triangles and their properties to include the sum of angles of a triangle, the relationship between the lengths of sides and measures of angles in a triangle, and determining when three lengths form a triangle;	
6.8.B. model area formulas for parallelograms, trapezoids, and triangles by decomposing and rearranging parts of these shapes;	
6.8.C. write equations that represent problems related to the area of rectangles, parallelograms, trapezoids, and triangles and volume of right rectangular prisms where dimensions are positive rational numbers; and	Heart of Algebra Linear functions
6.8.D. determine solutions for problems involving the area of rectangles, parallelograms, trapezoids, and triangles and volume of right rectangular prisms where dimensions are positive rational numbers.	
6.9. Expressions, equations, and relationships. The student applies mathematical process standards to use equations and inequalities to represent situations. The student is expected to:	

State Standard ID and Description	PSAT 8/9 Math Test
6.9.A. write one-variable, one-step equations and inequalities to represent constraints or conditions within problems;	Heart of Algebra Linear equations in one variable Linear inequalities in one or two variables
6.9.B. represent solutions for one-variable, one-step equations and inequalities on number lines; and	Heart of Algebra Linear equations in one variable Linear inequalities in one or two variables
6.9.C. write corresponding real-world problems given one-variable, one-step equations or inequalities.	
6.10. Expressions, equations, and relationships. The student applies mathematical process standards to use equations and inequalities to solve problems. The student is expected to:	
6.10.A. model and solve one-variable, one-step equations and inequalities that represent problems, including geometric concepts; and	Heart of Algebra Linear equations in one variable Linear inequalities in one or two variables
6.10.B. determine if the given value(s) make(s) one-variable, one-step equations or inequalities true.	Heart of Algebra Linear equations in one variable Linear inequalities in one or two variables
6.11. Measurement and data. The student applies mathematical process standards to use coordinate geometry to identify locations on a plane.	
The student is expected to graph points in all four quadrants using ordered pairs of rational numbers.	Heart of Algebra Linear functions Linear equations in two variables
6.12. Measurement and data. The student applies mathematical process standards to use numerical or graphical representations to analyze problems. The student is expected to:	

State Standard ID and Description	PSAT 8/9 Math Test
6.12.A. represent numeric data graphically, including dot plots, stem-and-leaf plots, histograms, and box plots;	<p>Problem Solving and Data Analysis</p> <p>One-variable data: Distributions and measures of center and spread</p>
6.12.B. use the graphical representation of numeric data to describe the center, spread, and shape of the data distribution;	<p>Problem Solving and Data Analysis</p> <p>One-variable data: Distributions and measures of center and spread</p>
6.12.C. summarize numeric data with numerical summaries, including the mean and median (measures of center) and the range and interquartile range (IQR) (measures of spread), and use these summaries to describe the center, spread, and shape of the data distribution; and	<p>Problem Solving and Data Analysis</p> <p>One-variable data: Distributions and measures of center and spread</p>
6.12.D. summarize categorical data with numerical and graphical summaries, including the mode, the percent of values in each category (relative frequency table), and the percent bar graph, and use these summaries to describe the data distribution.	<p>Problem Solving and Data Analysis</p> <p>Ratios, rates, proportional relationships, and units</p> <p>Percentages</p> <p>One-variable data: Distributions and measures of center and spread</p>
<p>6.13. Measurement and data. The student applies mathematical process standards to use numerical or graphical representations to solve problems. The student is expected to:</p>	
6.13.A. interpret numeric data summarized in dot plots, stem-and-leaf plots, histograms, and box plots; and	<p>Problem Solving and Data Analysis</p> <p>One-variable data: Distributions and measures of center and spread</p>
6.13.B. distinguish between situations that yield data with and without variability.	
<p>6.14. Personal financial literacy. The student applies mathematical process standards to develop an economic way of thinking and problem solving useful in one's life as a knowledgeable consumer and investor. The student is expected to:</p>	

State Standard ID and Description	PSAT 8/9 Math Test
6.14.A. compare the features and costs of a checking account and a debit card offered by different local financial institutions;	
6.14.B. distinguish between debit cards and credit cards;	
6.14.C. balance a check register that includes deposits, withdrawals, and transfers;	
6.14.D. explain why it is important to establish a positive credit history;	
6.14.E. describe the information in a credit report and how long it is retained;	
6.14.F. describe the value of credit reports to borrowers and to lenders;	
6.14.G. explain various methods to pay for college, including through savings, grants, scholarships, student loans, and work-study; and	
6.14.H. compare the annual salary of several occupations requiring various levels of post-secondary education or vocational training and calculate the effects of the different annual salaries on lifetime income.	

Table 52: TEKS in Grade 7 Aligned to PSAT 8/9

State Standard ID and Description	PSAT 8/9 Math Test
<p>7.2. Number and operations. The student applies mathematical process standards to represent and use rational numbers in a variety of forms.</p>	
<p>The student is expected to extend previous knowledge of sets and subsets using a visual representation to describe relationships between sets of rational numbers.</p>	
<p>7.3. Number and operations. The student applies mathematical process standards to add, subtract, multiply, and divide while solving problems and justifying solutions. The student is expected to:</p>	
<p>7.3.A. add, subtract, multiply, and divide rational numbers fluently; and</p>	<p>Heart of Algebra</p> <p>Linear equations in one variable</p> <p>Linear functions</p> <p>Linear equations in two variables</p> <p>Problem Solving and Data Analysis</p> <p>Ratios, rates, proportional relationships, and units</p>
<p>7.3.B. apply and extend previous understandings of operations to solve problems using addition, subtraction, multiplication, and division of rational numbers.</p>	<p>Heart of Algebra</p> <p>Linear equations in one variable</p> <p>Linear functions</p> <p>Linear equations in two variables</p> <p>Problem Solving and Data Analysis</p> <p>Ratios, rates, proportional relationships, and units</p>
<p>7.4. Proportionality. The student applies mathematical process standards to represent and solve problems involving proportional relationships. The student is expected to:</p>	
<p>7.4.A. represent constant rates of change in mathematical and real-world problems given pictorial, tabular, verbal, numeric, graphical, and algebraic representations, including $d = rt$;</p>	<p>Heart of Algebra</p> <p>Linear functions</p> <p>Problem Solving and Data Analysis</p> <p>Ratios, rates, proportional relationships, and units</p>

State Standard ID and Description	PSAT 8/9 Math Test
7.4.B. calculate unit rates from rates in mathematical and real-world problems;	<p>Problem Solving and Data Analysis</p> <p>Ratios, rates, proportional relationships, and units</p>
7.4.C. determine the constant of proportionality ($k = y/x$) within mathematical and real-world problems;	<p>Heart of Algebra</p> <p>Linear functions</p> <p>Problem Solving and Data Analysis</p> <p>Ratios, rates, proportional relationships, and units</p>
7.4.D. solve problems involving ratios, rates, and percents, including multi-step problems involving percent increase and percent decrease, and financial literacy problems; and	<p>Problem Solving and Data Analysis</p> <p>Ratios, rates, proportional relationships, and units</p> <p>Percentages</p>
7.4.E. convert between measurement systems, including the use of proportions and the use of unit rates.	<p>Problem Solving and Data Analysis</p> <p>Ratios, rates, proportional relationships, and units</p>
<p>7.5. Proportionality. The student applies mathematical process standards to use geometry to describe or solve problems involving proportional relationships. The student is expected to:</p>	
7.5.A. generalize the critical attributes of similarity, including ratios within and between similar shapes;	<p>Problem Solving and Data Analysis</p> <p>Ratios, rates, proportional relationships, and units</p>
7.5.B. describe π as the ratio of the circumference of a circle to its diameter; and	
7.5.C. solve mathematical and real-world problems involving similar shape and scale drawings.	<p>Problem Solving and Data Analysis</p> <p>Ratios, rates, proportional relationships, and units</p>
<p>7.6. Proportionality. The student applies mathematical process standards to use probability and statistics to describe or solve problems involving proportional relationships. The student is expected to:</p>	

State Standard ID and Description	PSAT 8/9 Math Test
7.6.A. represent sample spaces for simple and compound events using lists and tree diagrams;	<p>Problem Solving and Data Analysis</p> <p>Probability and conditional probability</p>
7.6.B. select and use different simulations to represent simple and compound events with and without technology;	
7.6.C. make predictions and determine solutions using experimental data for simple and compound events;	<p>Problem Solving and Data Analysis</p> <p>Probability and conditional probability</p>
7.6.D. make predictions and determine solutions using theoretical probability for simple and compound events;	<p>Problem Solving and Data Analysis</p> <p>Probability and conditional probability</p>
7.6.E. find the probabilities of a simple event and its complement and describe the relationship between the two;	<p>Problem Solving and Data Analysis</p> <p>Probability and conditional probability</p>
7.6.F. use data from a random sample to make inferences about a population;	<p>Problem Solving and Data Analysis</p> <p>Inference from sample statistics and margin of error</p>
7.6.G. solve problems using data represented in bar graphs, dot plots, and circle graphs, including part-to-whole and part-to-part comparisons and equivalents;	<p>Problem Solving and Data Analysis</p> <p>Ratios, rates, proportional relationships, and units</p> <p>One-variable data: Distributions and measures of center and spread</p>
7.6.H. solve problems using qualitative and quantitative predictions and comparisons from simple experiments; and	
7.6.I. determine experimental and theoretical probabilities related to simple and compound events using data and sample spaces.	<p>Problem Solving and Data Analysis</p> <p>Probability and conditional probability</p>

State Standard ID and Description	PSAT 8/9 Math Test
<p>7.7. Expressions, equations, and relationships. The student applies mathematical process standards to represent linear relationships using multiple representations.</p>	
<p>The student is expected to represent linear relationships using verbal descriptions, tables, graphs, and equations that simplify to the form $y = mx + b$.</p>	<p>Heart of Algebra Linear functions</p>
<p>7.8. Expressions, equations, and relationships. The student applies mathematical process standards to develop geometric relationships with volume. The student is expected to:</p>	
<p>7.8.A. model the relationship between the volume of a rectangular prism and a rectangular pyramid having both congruent bases and heights and connect that relationship to the formulas;</p>	
<p>7.8.B. explain verbally and symbolically the relationship between the volume of a triangular prism and a triangular pyramid having both congruent bases and heights and connect that relationship to the formulas; and</p>	
<p>7.8.C. use models to determine the approximate formulas for the circumference and area of a circle and connect the models to the actual formulas.</p>	
<p>7.9. Expressions, equations, and relationships. The student applies mathematical process standards to solve geometric problems. The student is expected to:</p>	
<p>7.9.A. solve problems involving the volume of rectangular prisms, triangular prisms, rectangular pyramids, and triangular pyramids;</p>	
<p>7.9.B. determine the circumference and area of circles;</p>	
<p>7.9.C. determine the area of composite figures containing combinations of rectangles, squares, parallelograms, trapezoids, triangles, semicircles, and quarter circles; and</p>	
<p>7.9.D. solve problems involving the lateral and total surface area of a rectangular prism, rectangular pyramid, triangular prism, and triangular pyramid by determining the area of the shape's net.</p>	
<p>7.10. Expressions, equations, and relationships. The student applies mathematical process standards to use one-variable equations and inequalities to represent situations. The student is expected to:</p>	

State Standard ID and Description	PSAT 8/9 Math Test
7.10.A. write one-variable, two-step equations and inequalities to represent constraints or conditions within problems;	Heart of Algebra Linear equations in one variable Linear inequalities in one or two variables
7.10.B. represent solutions for one-variable, two-step equations and inequalities on number lines; and	Heart of Algebra Linear equations in one variable Linear inequalities in one or two variables
7.10.C. write a corresponding real-world problem given a one-variable, two-step equation or inequality.	
7.11. Expressions, equations, and relationships. The student applies mathematical process standards to solve one-variable equations and inequalities. The student is expected to:	
7.11.A. model and solve one-variable, two-step equations and inequalities;	Heart of Algebra Linear equations in one variable Linear inequalities in one or two variables
7.11.B. determine if the given value(s) make(s) one-variable, two-step equations and inequalities true; and	Heart of Algebra Linear equations in one variable Linear inequalities in one or two variables
7.11.C. write and solve equations using geometry concepts, including the sum of the angles in a triangle, and angle relationships.	Heart of Algebra Linear equations in one variable
7.12. Measurement and data. The student applies mathematical process standards to use statistical representations to analyze data. The student is expected to:	
7.12.A. compare two groups of numeric data using comparative dot plots or box plots by comparing their shapes, centers, and spreads;	Problem Solving and Data Analysis One-variable data: Distributions and measures of center and spread

State Standard ID and Description	PSAT 8/9 Math Test
7.12.B. use data from a random sample to make inferences about a population; and	<p>Problem Solving and Data Analysis</p> <p>Inference from sample statistics and margin of error</p>
7.12.C. compare two populations based on data in random samples from these populations, including informal comparative inferences about differences between the two populations.	<p>Problem Solving and Data Analysis</p> <p>One-variable data: Distributions and measures of center and spread</p>
<p>7.13. Personal financial literacy. The student applies mathematical process standards to develop an economic way of thinking and problem solving useful in one's life as a knowledgeable consumer and investor. The student is expected to:</p>	
7.13.A. calculate the sales tax for a given purchase and calculate income tax for earned wages;	<p>Problem Solving and Data Analysis</p> <p>Percentages</p>
7.13.B. identify the components of a personal budget, including income; planned savings for college, retirement, and emergencies; taxes; and fixed and variable expenses, and calculate what percentage each category comprises of the total budget;	<p>Problem Solving and Data Analysis</p> <p>Percentages</p>
7.13.C. create and organize a financial assets and liabilities record and construct a net worth statement;	
7.13.D. use a family budget estimator to determine the minimum household budget and average hourly wage needed for a family to meet its basic needs in the student's city or another large city nearby;	<p>Heart of Algebra</p> <p>Linear functions</p> <p>Linear equations in two variables</p> <p>Linear inequalities in one or two variables</p>
7.13.E. calculate and compare simple interest and compound interest earnings; and	<p>Problem Solving and Data Analysis</p> <p>Percentages</p>
7.13.F. analyze and compare monetary incentives, including sales, rebates, and coupons.	<p>Problem Solving and Data Analysis</p> <p>Percentages</p>

Table 53: TEKS in Grade 8 Aligned to PSAT 8/9

State Standard ID and Description	PSAT 8/9 Math Test
<p>8.2. Number and operations. The student applies mathematical process standards to represent and use real numbers in a variety of forms. The student is expected to:</p>	
<p>8.2.A. extend previous knowledge of sets and subsets using a visual representation to describe relationships between sets of real numbers;</p>	
<p>8.2.B. approximate the value of an irrational number, including π and square roots of numbers less than 225, and locate that rational number approximation on a number line;</p>	
<p>8.2.C. convert between standard decimal notation and scientific notation; and</p>	
<p>8.2.D. order a set of real numbers arising from mathematical and real-world contexts.</p>	
<p>8.3. Proportionality. The student applies mathematical process standards to use proportional relationships to describe dilations. The student is expected to:</p>	
<p>8.3.A. generalize that the ratio of corresponding sides of similar shapes are proportional, including a shape and its dilation;</p>	<p>Problem Solving and Data Analysis Ratios, rates, proportional relationships, and units</p>
<p>8.3.B. compare and contrast the attributes of a shape and its dilation(s) on a coordinate plane; and</p>	
<p>8.3.C. use an algebraic representation to explain the effect of a given positive rational scale factor applied to two-dimensional figures on a coordinate plane with the origin as the center of dilation.</p>	
<p>8.4. Proportionality. The student applies mathematical process standards to explain proportional and non-proportional relationships involving slope. The student is expected to:</p>	
<p>8.4.A. use similar right triangles to develop an understanding that slope, m, given as the rate comparing the change in y-values to the change in x-values is the same for any two points on the same line;</p>	<p>Heart of Algebra Linear functions Linear equations in two variables</p>

State Standard ID and Description	PSAT 8/9 Math Test
8.4.B. graph proportional relationships, interpreting the unit rate as the slope of the line that models the relationship; and	<p>Heart of Algebra</p> <p>Linear functions</p> <p>Problem Solving and Data Analysis</p> <p>Two-variable data: Models and scatterplots</p>
8.4.C. use data from a table or graph to determine the rate of change or slope and y-intercept in mathematical and real-world problems.	<p>Heart of Algebra</p> <p>Linear functions</p> <p>Linear equations in two variables</p> <p>Problem Solving and Data Analysis</p> <p>Two-variable data: Models and scatterplots</p>
8.5. Proportionality. The student applies mathematical process standards to use proportional and non-proportional relationships to develop foundational concepts of functions. The student is expected to:	
8.5.A. represent linear proportional situations with tables, graphs, and equations in the form of $y = kx$;	<p>Heart of Algebra</p> <p>Linear functions</p>
8.5.B. represent linear non-proportional situations with tables, graphs, and equations in the form of $y = mx + b$, where $b \neq 0$;	<p>Heart of Algebra</p> <p>Linear functions</p>
8.5.C. contrast bivariate sets of data that suggest a linear relationship with bivariate sets of data that do not suggest a linear relationship from a graphical representation;	<p>Problem Solving and Data Analysis</p> <p>Two-variable data: Models and scatterplots</p>
8.5.D. use a trend line that approximates the linear relationship between bivariate sets of data to make predictions;	<p>Heart of Algebra</p> <p>Linear functions</p> <p>Problem Solving and Data Analysis</p> <p>Two-variable data: Models and scatterplots</p>

State Standard ID and Description	PSAT 8/9 Math Test
8.5.E. solve problems involving direct variation;	Heart of Algebra Linear functions Problem Solving and Data Analysis Ratios, rates, proportional relationships, and units
8.5.F. distinguish between proportional and non-proportional situations using tables, graphs, and equations in the form $y = kx$ or $y = mx + b$, where $b \neq 0$;	Heart of Algebra Linear functions
8.5.G. identify functions using sets of ordered pairs, tables, mappings, and graphs;	
8.5.H. identify examples of proportional and non-proportional functions that arise from mathematical and real-world problems; and	Heart of Algebra Linear functions
8.5.I. write an equation in the form $y = mx + b$ to model a linear relationship between two quantities using verbal, numerical, tabular, and graphical representations.	Heart of Algebra Linear functions Problem Solving and Data Analysis Two-variable data: Models and scatterplots
8.6. Expressions, equations, and relationships. The student applies mathematical process standards to develop mathematical relationships and make connections to geometric formulas. The student is expected to:	
8.6.A. describe the volume formula $V = Bh$ of a cylinder in terms of its base area and its height;	
8.6.B. model the relationship between the volume of a cylinder and a cone having both congruent bases and heights and connect that relationship to the formulas; and	
8.6.C. use models and diagrams to explain the Pythagorean theorem.	
8.7. Expressions, equations, and relationships. The student applies mathematical process standards to use geometry to solve problems. The student is expected to:	
8.7.A. solve problems involving the volume of cylinders, cones, and spheres;	

State Standard ID and Description	PSAT 8/9 Math Test
8.7.B. use previous knowledge of surface area to make connections to the formulas for lateral and total surface area and determine solutions for problems involving rectangular prisms, triangular prisms, and cylinders;	
8.7.C. use the Pythagorean Theorem and its converse to solve problems; and	
8.7.D. determine the distance between two points on a coordinate plane using the Pythagorean Theorem.	
8.8. Expressions, equations, and relationships. The student applies mathematical process standards to use one-variable equations or inequalities in problem situations. The student is expected to:	
8.8.A. write one-variable equations or inequalities with variables on both sides that represent problems using rational number coefficients and constants;	Heart of Algebra Linear equations in one variable Linear inequalities in one or two variables
8.8.B. write a corresponding real-world problem when given a one-variable equation or inequality with variables on both sides of the equal sign using rational number coefficients and constants;	
8.8.C. model and solve one-variable equations with variables on both sides of the equal sign that represent mathematical and real-world problems using rational number coefficients and constants; and	Heart of Algebra Linear equations in one variable Linear inequalities in one or two variables
8.8.D. use informal arguments to establish facts about the angle sum and exterior angle of triangles, the angles created when parallel lines are cut by a transversal, and the angle-angle criterion for similarity of triangles.	
8.9. Expressions, equations, and relationships. The student applies mathematical process standards to use multiple representations to develop foundational concepts of simultaneous linear equations.	
The student is expected to identify and verify the values of x and y that simultaneously satisfy two linear equations in the form $y = mx + b$ from the intersections of the graphed equations.	Heart of Algebra Systems of two linear equations in two variables
8.10. Two-dimensional shapes. The student applies mathematical process standards to develop transformational geometry concepts. The student is expected to:	

State Standard ID and Description	PSAT 8/9 Math Test
8.10.A. generalize the properties of orientation and congruence of rotations, reflections, translations, and dilations of two-dimensional shapes on a coordinate plane;	
8.10.B. differentiate between transformations that preserve congruence and those that do not;	
8.10.C. explain the effect of translations, reflections over the x - or y -axis, and rotations limited to 90° , 180° , 270° , and 360° as applied to two-dimensional shapes on a coordinate plane using an algebraic representation; and	
8.10.D. model the effect on linear and area measurements of dilated two-dimensional shapes.	
8.11. Measurement and data. The student applies mathematical process standards to use statistical procedures to describe data. The student is expected to:	
8.11.A. construct a scatterplot and describe the observed data to address questions of association such as linear, non-linear, and no association between bivariate data;	Problem Solving and Data Analysis Two-variable data: Models and scatterplots
8.11.B. determine the mean absolute deviation and use this quantity as a measure of the average distance data are from the mean using a data set of no more than 10 data points; and	
8.11.C. simulate generating random samples of the same size from a population with known characteristics to develop the notion of a random sample being representative of the population from which it was selected.	Problem Solving and Data Analysis Inference from sample statistics and margin of error
8.12. Personal financial literacy. The student applies mathematical process standards to develop an economic way of thinking and problem solving useful in one's life as a knowledgeable consumer and investor. The student is expected to:	
8.12.A. solve real-world problems comparing how interest rate and loan length affect the cost of credit;	Passport to Advanced Math Nonlinear functions
8.12.B. calculate the total cost of repaying a loan, including credit cards and easy access loans, under various rates of interest and over different periods using an online calculator;	

State Standard ID and Description	PSAT 8/9 Math Test
8.12.C. explain how small amounts of money invested regularly, including money saved for college and retirement, grow over time;	
8.12.D. calculate and compare simple interest and compound interest earnings;	Passport to Advanced Math Percentages Nonlinear functions
8.12.E. identify and explain the advantages and disadvantages of different payment methods;	
8.12.F. analyze situations to determine if they represent financially responsible decisions and identify the benefits of financial responsibility and the costs of financial irresponsibility; and	
8.12.G. estimate the cost of a two-year and four-year college education, including family contribution, and devise a periodic savings plan for accumulating the money needed to contribute to the total cost of attendance for at least the first year of college.	

Table 54: TEKS in Algebra I Aligned to PSAT 8/9

State Standard ID and Description	PSAT 8/9 Math Test
<p>2. Linear functions, equations, and inequalities. The student applies the mathematical process standards when using properties of linear functions to write and represent in multiple ways, with and without technology, linear equations, inequalities, and systems of equations. The student is expected to:</p>	
<p>2.A. determine the domain and range of a linear function in mathematical problems; determine reasonable domain and range values for real-world situations, both continuous and discrete; and represent domain and range using inequalities;</p>	
<p>2.B. write linear equations in two variables in various forms, including $y = mx + b$, $Ax + By = C$, and $y - y_1 = m(x - x_1)$, given one point and the slope and given two points;</p>	<p>Heart of Algebra Linear functions Linear equations in two variables</p>
<p>2.C. write linear equations in two variables given a table of values, a graph, and a verbal description;</p>	<p>Heart of Algebra Linear functions Linear equations in two variables</p>
<p>2.D. write and solve equations involving direct variation;</p>	<p>Heart of Algebra Linear functions Problem Solving and Data Analysis Ratios, rates, proportional relationships, and units</p>
<p>2.E. write the equation of a line that contains a given point and is parallel to a given line;</p>	<p>Heart of Algebra Linear equations in two variables</p>
<p>2.F. write the equation of a line that contains a given point and is perpendicular to a given line;</p>	<p>Heart of Algebra Linear equations in two variables</p>
<p>2.G. write an equation of a line that is parallel or perpendicular to the x- or y-axis and determine whether the slope of the line is zero or undefined;</p>	<p>Heart of Algebra Linear equations in two variables</p>
<p>2.H. write linear inequalities in two variables given a table of values, a graph, and a verbal description; and</p>	<p>Heart of Algebra Linear inequalities in one or two variables</p>

State Standard ID and Description	PSAT 8/9 Math Test
2.I. write systems of two linear equations given a table of values, a graph, and a verbal description.	Heart of Algebra Systems of linear equations in two variables
3. Linear functions, equations, and inequalities. The student applies the mathematical process standards when using graphs of linear functions, key features, and related transformations to represent in multiple ways and solve, with and without technology, equations, inequalities, and systems of equations. The student is expected to:	
3.A. determine the slope of a line given a table of values, a graph, two points on the line, and an equation written in various forms, including $y = mx + b$, $Ax + By = C$, and $y - y_1 = m(x - x_1)$;	Heart of Algebra Linear functions Linear equations in two variables
3.B. calculate the rate of change of a linear function represented tabularly, graphically, or algebraically in context of mathematical and real-world problems;	Heart of Algebra Linear functions
3.C. graph linear functions on the coordinate plane and identify key features, including x-intercept, y-intercept, zeros, and slope, in mathematical and real-world problems;	Heart of Algebra Linear functions
3.D. graph the solution set of linear inequalities in two variables on the coordinate plane;	Heart of Algebra Linear inequalities in one or two variables
3.E. determine the effects on the graph of the parent function $f(x) = x$ when $f(x)$ is replaced by $a \cdot f(x)$, $f(x) + d$, $f(x - c)$, $f(bx)$ for specific values of a , b , c , and d ;	Heart of Algebra Linear functions
3.F. graph systems of two linear equations in two variables on the coordinate plane and determine the solutions if they exist;	Heart of Algebra Systems of linear equations in two variables
3.G. estimate graphically the solutions to systems of two linear equations with two variables in real-world problems; and	Heart of Algebra Systems of linear equations in two variables
3.H. graph the solution set of systems of two linear inequalities in two variables on the coordinate plane.	Heart of Algebra Linear inequalities in one or two variables

State Standard ID and Description	PSAT 8/9 Math Test
<p>4. Linear functions, equations, and inequalities. The student applies the mathematical process standards to formulate statistical relationships and evaluate their reasonableness based on real-world data. The student is expected to:</p>	
<p>4.A. calculate, using technology, the correlation coefficient between two quantitative variables and interpret this quantity as a measure of the strength of the linear association;</p>	
<p>4.B. compare and contrast association and causation in real-world problems; and</p>	
<p>4.C. write, with and without technology, linear functions that provide a reasonable fit to data to estimate solutions and make predictions for real-world problems.</p>	<p>Problem Solving and Data Analysis Two-variable data: Models and scatterplots</p>
<p>5. Linear functions, equations, and inequalities. The student applies the mathematical process standards to solve, with and without technology, linear equations and evaluate the reasonableness of their solutions. The student is expected to:</p>	
<p>5.A. solve linear equations in one variable, including those for which the application of the distributive property is necessary and for which variables are included on both sides;</p>	<p>Heart of Algebra Linear equations in one variable</p>
<p>5.B. solve linear inequalities in one variable, including those for which the application of the distributive property is necessary and for which variables are included on both sides; and</p>	<p>Heart of Algebra Linear inequalities in one or two variables</p>
<p>5.C. solve systems of two linear equations with two variables for mathematical and real-world problems.</p>	<p>Heart of Algebra Systems of linear equations in two variables</p>
<p>6. Quadratic functions and equations. The student applies the mathematical process standards when using properties of quadratic functions to write and represent in multiple ways, with and without technology, quadratic equations. The student is expected to:</p>	
<p>6.A. determine the domain and range of quadratic functions and represent the domain and range using inequalities;</p>	

State Standard ID and Description	PSAT 8/9 Math Test
<p>6.B. write equations of quadratic functions given the vertex and another point on the graph, write the equation in vertex form, $f(x) = a(x - h)^2 + k$, and rewrite the equation from vertex form to standard form, $f(x) = ax^2 + bx + c$; and</p>	<p>Passport to Advanced Math Nonlinear functions</p>
<p>6.C. write quadratic functions when given real solutions and graphs of their related equations.</p>	<p>Passport to Advanced Math Nonlinear functions</p>
<p>7. Quadratic functions and equations. The student applies the mathematical process standards when using graphs of quadratic functions and their related transformations to represent in multiple ways and determine, with and without technology, the solutions to equations. The student is expected to:</p>	
<p>7.A. graph quadratic functions on the coordinate plane and use the graph to identify key attributes, if possible, including x-intercept, y-intercept, zeros, maximum value, minimum values, vertex, and the equation of the axis of symmetry;</p>	
<p>7.B. describe the relationship between the linear factors of quadratic expressions and the zeros of their associated quadratic functions; and</p>	
<p>7.C. determine the effects on the graph of the parent function $f(x) = x^2$ when $f(x)$ is replaced by $a \cdot f(x)$, $f(x) + d$, $f(x - c)$, or $f(bx)$ for specific values of a, b, c, and d.</p>	
<p>8. Quadratic functions and equations. The student applies the mathematical process standards to solve, with and without technology, quadratic equations and evaluate the reasonableness of their solutions. The student formulates statistical relationships and evaluates their reasonableness based on real-world data. The student is expected to:</p>	
<p>8.A. solve quadratic equations having real solutions by factoring, taking square roots, completing the square, and applying the quadratic formula; and</p>	<p>Passport to Advanced Math Nonlinear equations in one variable and systems of equations in two variables</p>
<p>8.B. write, using technology, quadratic functions that provide a reasonable fit to data to estimate solutions and make predictions for real-world problems.</p>	

State Standard ID and Description	PSAT 8/9 Math Test
<p>9. Exponential functions and equations. The student applies the mathematical process standards when using properties of exponential functions and their related transformations to write, graph, and represent in multiple ways exponential equations and evaluate, with and without technology, the reasonableness of their solutions. The student formulates statistical relationships and evaluates their reasonableness based on real-world data. The student is expected to:</p>	
<p>9.A. determine the domain and range of exponential functions of the form $f(x) = a \cdot b^x$ and represent the domain and range using inequalities;</p>	
<p>9.B. interpret the meaning of the values of a and b in exponential functions of the form $f(x) = a \cdot b^x$ in real-world problems;</p>	<p>Passport to Advanced Math Nonlinear functions</p>
<p>9.C. write exponential functions in the form $f(x) = a \cdot b^x$ (where b is a rational number) to describe problems arising from mathematical and real-world situations, including growth and decay;</p>	
<p>9.D. graph exponential functions that model growth and decay and identify key features, including y-intercept and asymptote, in mathematical and real-world problems; and</p>	<p>Passport to Advanced Math Nonlinear functions</p>
<p>9.E. write, using technology, exponential functions that provide a reasonable fit to data and make predictions for real-world problems.</p>	
<p>10. Number and algebraic methods. The student applies the mathematical process standards and algebraic methods to rewrite in equivalent forms and perform operations on polynomial expressions. The student is expected to:</p>	
<p>10.A. add and subtract polynomials of degree one and degree two;</p>	<p>Passport to Advanced Math Equivalent expressions</p>
<p>10.B. multiply polynomials of degree one and degree two;</p>	<p>Passport to Advanced Math Equivalent expressions</p>
<p>10.C. determine the quotient of a polynomial of degree one and polynomial of degree two when divided by a polynomial of degree one and polynomial of degree two when the degree of the divisor does not exceed the degree of the dividend;</p>	
<p>10.D. rewrite polynomial expressions of degree one and degree two in equivalent forms using the distributive property;</p>	<p>Passport to Advanced Math Equivalent expressions</p>
<p>10.E. factor, if possible, trinomials with real factors in the form $ax^2 + bx + c$, including perfect square trinomials of degree two; and</p>	<p>Passport to Advanced Math Equivalent expressions</p>

State Standard ID and Description	PSAT 8/9 Math Test
10.F. decide if a binomial can be written as the difference of two squares and, if possible, use the structure of a difference of two squares to rewrite the binomial.	Passport to Advanced Math Equivalent expressions
11. Number and algebraic methods. The student applies the mathematical process standards and algebraic methods to rewrite algebraic expressions into equivalent forms. The student is expected to:	
11.A. simplify numerical radical expressions involving square roots; and	
11.B. simplify numeric and algebraic expressions using the laws of exponents, including integral and rational exponents.	Passport to Advanced Math Equivalent expressions
12. Number and algebraic methods. The student applies the mathematical process standards and algebraic methods to write, solve, analyze, and evaluate equations, relations, and functions. The student is expected to:	
12.A. decide whether relations represented verbally, tabularly, graphically, and symbolically define a function;	
12.B. evaluate functions, expressed in function notation, given one or more elements in their domains;	Heart of Algebra Linear functions Passport to Advanced Math Nonlinear functions
12.C. identify terms of arithmetic and geometric sequences when the sequences are given in function form using recursive processes;	
12.D. write a formula for the n th term of arithmetic and geometric sequences, given the value of several of their terms; and	
12.E. solve mathematic and scientific formulas, and other literal equations, for a specified variable.	Heart of Algebra Linear functions Linear equations in two variables Passport to Advanced Math Nonlinear equations in one variable and systems of equations in two variables Nonlinear functions

Table 55: TEKS in Algebra II Aligned to PSAT 8/9

State Standard ID and Description	PSAT 8/9 Math Test
<p>2. Attributes of functions and their inverses. The student applies mathematical processes to understand that functions have distinct key attributes and understand the relationship between a function and its inverse. The student is expected to:</p>	
<p>2.A. graph the functions $f(x) = \sqrt{x}$, $f(x) = \frac{1}{x}$, $f(x) = x^3$, $f(x) = \sqrt[3]{x}$, $f(x) = bx$, $f(x) = x$, and $f(x) = \log_b x$ where b is 2, 10, and e, and, when applicable, analyze the key attributes such as domain, range, intercepts, symmetries, asymptotic behavior, and maximum and minimum given an interval;</p>	<p>Passport to Advanced Math Nonlinear functions</p>
<p>2.B. graph and write the inverse of a function using notation such as $f^{-1}(x)$;</p>	
<p>2.C. describe and analyze the relationship between a function and its inverse (quadratic and square root, logarithmic and exponential), including the restriction(s) on domain, which will restrict its range; and</p>	
<p>2.D. use the composition of two functions, including the necessary restrictions on the domain, to determine if the functions are inverses of each other.</p>	
<p>3. Systems of equations and inequalities. The student applies mathematical processes to formulate systems of equations and inequalities, use a variety of methods to solve, and analyze reasonableness of solutions. The student is expected to:</p>	
<p>3.A. formulate systems of equations, including systems consisting of three linear equations in three variables and systems consisting of two equations, the first linear and the second quadratic;</p>	
<p>3.B. solve systems of three linear equations in three variables by using Gaussian elimination, technology with matrices, and substitution;</p>	
<p>3.C. solve, algebraically, systems of two equations in two variables consisting of a linear equation and a quadratic equation;</p>	<p>Passport to Advanced Math Nonlinear equations in one variable and systems of equations in two variables</p>
<p>3.D. determine the reasonableness of solutions to systems of a linear equation and a quadratic equation in two variables;</p>	
<p>3.E. formulate systems of at least two linear inequalities in two variables;</p>	

State Standard ID and Description	PSAT 8/9 Math Test
3.F. solve systems of two or more linear inequalities in two variables; and	
3.G. determine possible solutions in the solution set of systems of two or more linear inequalities in two variables.	
4. Quadratic and square root functions, equations, and inequalities. The student applies mathematical processes to understand that quadratic and square root functions, equations, and quadratic inequalities can be used to model situations, solve problems, and make predictions. The student is expected to:	
4.A. write the quadratic function given three specified points in the plane;	
4.B. write the equation of a parabola using given attributes, including vertex, focus, directrix, axis of symmetry, and direction of opening;	
4.C. determine the effect on the graph of $f(x) = \sqrt{x}$ when $f(x)$ is replaced by $a \cdot f(x)$, $f(x) + d$, $f(x - c)$, or $f(bx)$ for specific values of a , b , c , and d ;	
4.D. transform a quadratic function $f(x) = ax^2 + bx + c$ to the form $f(x) = a(x - h)^2 + k$ to identify the different attributes of $f(x)$;	
4.E. formulate quadratic and square root equations using technology given a table of data;	
4.F. solve quadratic and square root equations;	Passport to Advanced Math Nonlinear equations in one variable and systems of equations in two variables
4.G. identify extraneous solutions of square root equations; and	
4.H. solve quadratic inequalities.	
5. Exponential and logarithmic functions and equations. The student applies mathematical processes to understand that exponential and logarithmic functions can be used to model situations and solve problems. The student is expected to:	
5.A. determine the effects on the key attributes on the graphs of $f(x) = bx$ and $f(x) = \log_b x$ where b is 2, 10, and e when $f(x)$ is replaced by $a \cdot f(x)$, $f(x) + d$, or $f(x - c)$, for specific positive and negative real values of a , c , and d ;	
5.B. formulate exponential and logarithmic equations that model real-world situations, including exponential relationships written in recursive notation;	

State Standard ID and Description	PSAT 8/9 Math Test
5.C. rewrite exponential equations as their corresponding logarithmic equations and logarithmic equations as their corresponding exponential equations;	
5.D. solve exponential equations of the form $f(x) = a \cdot b^x$ where a is a nonzero real number and b is greater than zero and not equal to one and single logarithmic equations having real solutions; and	Passport to Advanced Math Nonlinear functions
5.E. determine the reasonableness of a solution to a logarithmic equation.	
6. Cubic, cube root, absolute value and rational functions, equations, and inequalities. The student applies mathematical processes to understand that cubic, cube root, absolute value and rational functions, equations, and inequalities can be used to model situations, solve problems, and make predictions. The student is expected to:	
6.A. analyze the effect on the graphs of $f(x) = x^3$ and $f(x) = \sqrt[3]{x}$ when $f(x)$ is replaced by $a \cdot f(x)$, $f(x) + d$, $f(x - c)$, and $f(x) + d$ for specific positive and negative real values of a , b , c , and d ;	
6.B. solve cube root equations that have real roots;	
6.C. analyze the effect on the graphs of $f(x) = x $ when $f(x)$ is replaced by $a \cdot f(x)$, $f(x) + d$, $f(x - c)$, and $f(x) + d$ for specific positive and negative real values of a , b , c , and d ;	
6.D. formulate absolute value linear equations;	
6.E. solve absolute value linear equations;	
6.F. solve absolute value linear inequalities;	
6.G. analyze the effect on the graphs of $f(x) = \frac{1}{x}$ when $f(x)$ is replaced by $a \cdot f(x)$, $f(x) + d$, $f(x - c)$, and $f(x) + d$ for specific positive and negative real values of a , b , c , and d ;	
6.H. formulate rational equations that model real-world situations;	
6.I. solve rational equations that have real solutions;	
6.J. determine the reasonableness of a solution to a rational equation;	
6.K. determine the asymptotic restrictions on the domain of a rational function and represent domain and range using interval notation, inequalities, and set notation; and	
6.L. formulate and solve equations involving inverse variation.	

State Standard ID and Description	PSAT 8/9 Math Test
<p>7. Number and algebraic methods. The student applies mathematical processes to simplify and perform operations on expressions and to solve equations. The student is expected to:</p>	
<p>7.A. add, subtract, and multiply complex numbers;</p>	
<p>7.B. add, subtract, and multiply polynomials;</p>	<p>Passport to Advanced Math Equivalent expressions</p>
<p>7.C. determine the quotient of a polynomial of degree three and of degree four when divided by a polynomial of degree one and of degree two;</p>	
<p>7.D. determine the linear factors of a polynomial function of degree three and of degree four using algebraic methods;</p>	<p>Passport to Advanced Math Equivalent expressions</p>
<p>7.E. determine linear and quadratic factors of a polynomial expression of degree three and of degree four, including factoring the sum and difference of two cubes and factoring by grouping;</p>	<p>Passport to Advanced Math Equivalent expressions</p>
<p>7.F. determine the sum, difference, product, and quotient of rational expressions with integral exponents of degree one and of degree two;</p>	
<p>7.G. rewrite radical expressions that contain variables to equivalent forms;</p>	
<p>7.H. solve equations involving rational exponents; and</p>	
<p>7.I. write the domain and range of a function in interval notation, inequalities, and set notation.</p>	
<p>8. Data. The student applies mathematical processes to analyze data, select appropriate models, write corresponding functions, and make predictions. The student is expected to:</p>	
<p>8.A. analyze data to select the appropriate model from among linear, quadratic, and exponential models;</p>	
<p>8.B. use regression methods available through technology to write a linear function, a quadratic function, and an exponential function from a given set of data; and</p>	
<p>8.C. predict and make decisions and critical judgments from a given set of data using linear, quadratic, and exponential models.</p>	<p>Problem Solving and Data Analysis Two-variable data: Models and scatterplots</p>

Table 56: TEKS in Geometry Aligned to PSAT 8/9

State Standard ID and Description	PSAT 8/9 Math Test
<p>2. Coordinate and transformational geometry. The student uses the process skills to understand the connections between algebra and geometry and uses the one- and two-dimensional coordinate systems to verify geometric conjectures. The student is expected to:</p>	
<p>2.A. determine the coordinates of a point that is a given fractional distance less than one from one end of a line segment to the other in one- and two-dimensional coordinate systems, including finding the midpoint;</p>	
<p>2.B. derive and use the distance, slope, and midpoint formulas to verify geometric relationships, including congruence of segments and parallelism or perpendicularity of pairs of lines; and</p>	<p>Heart of Algebra Linear equations in two variables</p>
<p>2.C. determine an equation of a line parallel or perpendicular to a given line that passes through a given point.</p>	<p>Heart of Algebra Linear equations in two variables</p>
<p>3. Coordinate and transformational geometry. The student uses the process skills to generate and describe rigid transformations (translation, reflection, and rotation) and non-rigid transformations (dilations that preserve similarity and reductions and enlargements that do not preserve similarity). The student is expected to:</p>	
<p>3.A. describe and perform transformations of figures in a plane using coordinate notation;</p>	
<p>3.B. determine the image or pre-image of a given two-dimensional figure under a composition of rigid transformations, a composition of non-rigid transformations, and a composition of both, including dilations where the center can be any point in the plane;</p>	
<p>3.C. identify the sequence of transformations that will carry a given pre-image onto an image on and off the coordinate plane; and</p>	
<p>3.D. identify and distinguish between reflectional and rotational symmetry in a plane figure.</p>	
<p>4. Logical argument and constructions. The student uses the process skills with deductive reasoning to understand geometric relationships. The student is expected to:</p>	
<p>4.A. distinguish between undefined terms, definitions, postulates, conjectures, and theorems;</p>	

State Standard ID and Description	PSAT 8/9 Math Test
4.B. identify and determine the validity of the converse, inverse, and contrapositive of a conditional statement and recognize the connection between a biconditional statement and a true conditional statement with a true converse;	
4.C. verify that a conjecture is false using a counterexample; and	
4.D. compare geometric relationships between Euclidean and spherical geometries, including parallel lines and the sum of the angles in a triangle.	
5. Logical argument and constructions. The student uses constructions to validate conjectures about geometric figures. The student is expected to:	
5.A. investigate patterns to make conjectures about geometric relationships, including angles formed by parallel lines cut by a transversal, criteria required for triangle congruence, special segments of triangles, diagonals of quadrilaterals, interior and exterior angles of polygons, and special segments and angles of circles choosing from a variety of tools;	
5.B. construct congruent segments, congruent angles, a segment bisector, an angle bisector, perpendicular lines, the perpendicular bisector of a line segment, and a line parallel to a given line through a point not on a line using a compass and a straightedge;	
5.C. use the constructions of congruent segments, congruent angles, angle bisectors, and perpendicular bisectors to make conjectures about geometric relationships; and	
5.D. verify the Triangle Inequality theorem using constructions and apply the theorem to solve problems.	
6. Proof and congruence. The student uses the process skills with deductive reasoning to prove and apply theorems by using a variety of methods such as coordinate, transformational, and axiomatic and formats such as two-column, paragraph, and flow chart. The student is expected to:	
6.A. verify theorems about angles formed by the intersection of lines and line segments, including vertical angles, and angles formed by parallel lines cut by a transversal and prove equidistance between the endpoints of a segment and points on its perpendicular bisector and apply these relationships to solve problems;	
6.B. prove two triangles are congruent by applying the Side-Angle-Side, Angle-Side-Angle, Side-Side-Side, Angle-Angle-Side, and Hypotenuse-Leg congruence conditions;	

State Standard ID and Description	PSAT 8/9 Math Test
6.C. apply the definition of congruence, in terms of rigid transformations, to identify congruent figures and their corresponding sides and angles;	
6.D. verify theorems about the relationships in triangles, including proof of the Pythagorean Theorem, the sum of interior angles, base angles of isosceles triangles, midsegments, and medians, and apply these relationships to solve problems; and	
6.E. prove a quadrilateral is a parallelogram, rectangle, square, or rhombus using opposite sides, opposite angles, or diagonals and apply these relationships to solve problems.	
7. Similarity, proof, and trigonometry. The student uses the process skills in applying similarity to solve problems. The student is expected to:	
7.A. apply the definition of similarity in terms of a dilation to identify similar figures and their proportional sides and the congruent corresponding angles; and	
7.B. apply the Angle-Angle criterion to verify similar triangles and apply the proportionality of the corresponding sides to solve problems.	
8. Similarity, proof, and trigonometry. The student uses the process skills with deductive reasoning to prove and apply theorems by using a variety of methods such as coordinate, transformational, and axiomatic and formats such as two-column, paragraph, and flow chart. The student is expected to:	
8.A. prove theorems about similar triangles, including the Triangle Proportionality theorem, and apply these theorems to solve problems; and	
8.B. identify and apply the relationships that exist when an altitude is drawn to the hypotenuse of a right triangle, including the geometric mean, to solve problems.	
9. Similarity, proof, and trigonometry. The student uses the process skills to understand and apply relationships in right triangles. The student is expected to:	
9.A. determine the lengths of sides and measures of angles in a right triangle by applying the trigonometric ratios sine, cosine, and tangent to solve problems; and	
9.B. apply the relationships in special right triangles 30° - 60° - 90° and 45° - 45° - 90° and the Pythagorean theorem, including Pythagorean triples, to solve problems.	

State Standard ID and Description	PSAT 8/9 Math Test
<p>10. Two-dimensional and three-dimensional figures. The student uses the process skills to recognize characteristics and dimensional changes of two- and three-dimensional figures. The student is expected to:</p>	
<p>10.A. identify the shapes of two-dimensional cross-sections of prisms, pyramids, cylinders, cones, and spheres and identify three-dimensional objects generated by rotations of two-dimensional shapes; and</p>	
<p>10.B. determine and describe how changes in the linear dimensions of a shape affect its perimeter, area, surface area, or volume, including proportional and non-proportional dimensional change.</p>	
<p>11. Two-dimensional and three-dimensional figures. The student uses the process skills in the application of formulas to determine measures of two- and three-dimensional figures. The student is expected to:</p>	
<p>11.A. apply the formula for the area of regular polygons to solve problems using appropriate units of measure;</p>	
<p>11.B. determine the area of composite two-dimensional figures comprised of a combination of triangles, parallelograms, trapezoids, kites, regular polygons, or sectors of circles to solve problems using appropriate units of measure;</p>	
<p>11.C. apply the formulas for the total and lateral surface area of three-dimensional figures, including prisms, pyramids, cones, cylinders, spheres, and composite figures, to solve problems using appropriate units of measure; and</p>	
<p>11.D. apply the formulas for the volume of three-dimensional figures, including prisms, pyramids, cones, cylinders, spheres, and composite figures, to solve problems using appropriate units of measure.</p>	
<p>12. Circles. The student uses the process skills to understand geometric relationships and apply theorems and equations about circles. The student is expected to:</p>	
<p>12.A. apply theorems about circles, including relationships among angles, radii, chords, tangents, and secants, to solve non-contextual problems;</p>	
<p>12.B. apply the proportional relationship between the measure of an arc length of a circle and the circumference of the circle to solve problems;</p>	
<p>12.C. apply the proportional relationship between the measure of the area of a sector of a circle and the area of the circle to solve problems;</p>	

State Standard ID and Description	PSAT 8/9 Math Test
12.D. describe radian measure of an angle as the ratio of the length of an arc intercepted by a central angle and the radius of the circle; and	
12.E. show that the equation of a circle with center at the origin and radius r is $x^2 + y^2 = r^2$ and determine the equation for the graph of a circle with radius r and center (h, k) , $(x - h)^2 + (y - k)^2 = r^2$.	
13. Probability. The student uses the process skills to understand probability in real-world situations and how to apply independence and dependence of events. The student is expected to:	
13.A. develop strategies to use permutations and combinations to solve contextual problems;	
13.B. determine probabilities based on area to solve contextual problems;	Problem Solving and Data Analysis Probability and conditional probability
13.C. identify whether two events are independent and compute the probability of the two events occurring together with or without replacement;	Problem Solving and Data Analysis Probability and conditional probability
13.D. apply conditional probability in contextual problems; and	Problem Solving and Data Analysis Probability and conditional probability
13.E. apply independence in contextual problems.	Problem Solving and Data Analysis Probability and conditional probability

Table 57: TEKS in Mathematical Models with Applications Aligned to PSAT 8/9

State Standard ID and Description	PSAT 8/9 Math Test
<p>2. Mathematical modeling in personal finance. The student uses mathematical processes with graphical and numerical techniques to study patterns and analyze data related to personal finance. The student is expected to:</p>	
<p>2.A. use rates and linear functions to solve problems involving personal finance and budgeting, including compensations and deductions;</p>	<p>Heart of Algebra Linear functions Problem Solving and Data Analysis Ratios, rates, proportional relationships, and units</p>
<p>2.B. solve problems involving personal taxes; and</p>	<p>Problem Solving and Data Analysis Percentages</p>
<p>2.C. analyze data to make decisions about banking, including options for online banking, checking accounts, overdraft protection, processing fees, and debit card/ATM fees.</p>	
<p>3. Mathematical modeling in personal finance. The student uses mathematical processes with algebraic formulas, graphs, and amortization modeling to solve problems involving credit. The student is expected to:</p>	
<p>3.A. use formulas to generate tables to display series of payments for loan amortizations resulting from financed purchases;</p>	
<p>3.B. analyze personal credit options in retail purchasing and compare relative advantages and disadvantages of each option;</p>	
<p>3.C. use technology to create amortization models to investigate home financing and compare buying a home to renting a home; and</p>	
<p>3.D. use technology to create amortization models to investigate automobile financing and compare buying a vehicle to leasing a vehicle.</p>	
<p>4. Mathematical modeling in personal finance. The student uses mathematical processes with algebraic formulas, numerical techniques, and graphs to solve problems related to financial planning. The student is expected to:</p>	
<p>4.A. analyze and compare coverage options and rates in insurance;</p>	

State Standard ID and Description	PSAT 8/9 Math Test
4.B. investigate and compare investment options, including stocks, bonds, annuities, certificates of deposit, and retirement plans; and	
4.C. analyze types of savings options involving simple and compound interest and compare relative advantages of these options.	Passport to Advanced Math Nonlinear functions
5. Mathematical modeling in science and engineering. The student applies mathematical processes with algebraic techniques to study patterns and analyze data as it applies to science. The student is expected to:	
5.A. use proportionality and inverse variation to describe physical laws such as Hook's Law, Newton's Second Law of Motion, and Boyle's Law;	Heart of Algebra Linear functions Problem Solving and Data Analysis Ratios, rates, proportional relationships, and units
5.B. use exponential models available through technology to model growth and decay in areas, including radioactive decay; and	
5.C. use quadratic functions to model motion.	
6. Mathematical modeling in science and engineering. The student applies mathematical processes with algebra and geometry to study patterns and analyze data as it applies to architecture and engineering. The student is expected to:	
6.A. use similarity, geometric transformations, symmetry, and perspective drawings to describe mathematical patterns and structure in architecture;	
6.B. use scale factors with two-dimensional and three-dimensional objects to demonstrate proportional and non-proportional changes in surface area and volume as applied to fields;	
6.C. use the Pythagorean Theorem and special right-triangle relationships to calculate distances; and	
6.D. use trigonometric ratios to calculate distances and angle measures as applied to fields.	
7. Mathematical modeling in fine arts. The student uses mathematical processes with algebra and geometry to study patterns and analyze data as it applies to fine arts. The student is expected to:	
7.A. use trigonometric ratios and functions available through technology to model periodic behavior in art and music;	

State Standard ID and Description	PSAT 8/9 Math Test
7.B. use similarity, geometric transformations, symmetry, and perspective drawings to describe mathematical patterns and structure in art and photography;	
7.C. use geometric transformations, proportions, and periodic motion to describe mathematical patterns and structure in music; and	Problem Solving and Data Analysis Ratios, rates, proportional relationships, and units
7.D. use scale factors with two-dimensional and three-dimensional objects to demonstrate proportional and non-proportional changes in surface area and volume as applied to fields.	
8. Mathematical modeling in social sciences. The student applies mathematical processes to determine the number of elements in a finite sample space and compute the probability of an event. The student is expected to:	
8.A. determine the number of ways an event may occur using combinations, permutations, and the Fundamental Counting Principle;	
8.B. compare theoretical to empirical probability; and	
8.C. use experiments to determine the reasonableness of a theoretical model such as binomial or geometric.	
9. Mathematical modeling in social sciences. The student applies mathematical processes and mathematical models to analyze data as it applies to social sciences. The student is expected to:	
9.A. interpret information from various graphs, including line graphs, bar graphs, circle graphs, histograms, scatterplots, dot plots, stem-and-leaf plots, and box and whisker plots, to draw conclusions from the data and determine the strengths and weaknesses of conclusions;	Problem Solving and Data Analysis One-variable data: Distributions and measures of center and spread
9.B. analyze numerical data using measures of central tendency (mean, median, and mode) and variability (range, interquartile range or IQR, and standard deviation) in order to make inferences with normal distributions;	Problem Solving and Data Analysis One-variable data: Distributions and measures of center and spread
9.C. distinguish the purposes and differences among types of research, including surveys, experiments, and observational studies;	

State Standard ID and Description	PSAT 8/9 Math Test
9.D. use data from a sample to estimate population mean or population proportion	Problem Solving and Data Analysis Inference from sample statistics and margin of error
9.E. analyze marketing claims based on graphs and statistics from electronic and print media and justify the validity of stated or implied conclusions; and	
9.F. use regression methods available through technology to model linear and exponential functions, interpret correlations, and make predictions.	
10. Mathematical modeling in social sciences. The student applies mathematical processes to design a study and use graphical, numerical, and analytical techniques to communicate the results of the study. The student is expected to:	
10.A. formulate a meaningful question, determine the data needed to answer the question, gather the appropriate data, analyze the data, and draw reasonable conclusions; and	
10.B. communicate methods used, analyses conducted, and conclusions drawn for a data-analysis project through the use of one or more of the following: a written report, a visual display, an oral report, or a multi-media presentation.	

Table 58: TEKS in Advanced Quantitative Reasoning Aligned to PSAT 8/9

State Standard ID and Description	PSAT 8/9 Math Test
<p>2. Numeric reasoning. The student applies the process standards in mathematics to generate new understandings by extending existing knowledge. The student generates new mathematical understandings through problems involving numerical data that arise in everyday life, society, and the workplace. The student extends existing knowledge and skills to analyze real-world situations. The student is expected to:</p>	
<p>2.A. use precision and accuracy in real-life situations related to measurement and significant figures;</p>	
<p>2.B. apply and analyze published ratings, weighted averages, and indices to make informed decisions;</p>	
<p>2.C. solve problems involving quantities that are not easily measured using proportionality;</p>	
<p>2.D. solve geometric problems involving indirect measurement, including similar triangles, the Pythagorean Theorem, Law of Sines, Law of Cosines, and the use of dynamic geometry software;</p>	
<p>2.E. solve problems involving large quantities using combinatorics;</p>	
<p>2.F. use arrays to efficiently manage large collections of data and add, subtract, and multiply matrices to solve applied problems, including geometric transformations;</p>	
<p>2.G. analyze various voting and selection processes to compare results in given situations; and</p>	
<p>2.H. select and apply an algorithm of interest to solve real-life problems such as problems using recursion or iteration involving population growth or decline, fractals, and compound interest; the validity in recorded and transmitted data using checksums and hashing; sports rankings, weighted class rankings, and search engine rankings; and problems involving scheduling or routing situations using vertex-edge graphs, critical paths, Euler paths, and minimal spanning trees and communicate to peers the application of the algorithm in precise mathematical and nontechnical language.</p>	

State Standard ID and Description	PSAT 8/9 Math Test
<p>3. Algebraic reasoning (expressions, equations, and generalized relationships). The student applies the process standards in mathematics to create and analyze mathematical models of everyday situations to make informed decisions related to earning, investing, spending, and borrowing money by appropriate, proficient, and efficient use of tools, including technology. The student uses mathematical relationships to make connections and predictions. The student judges the validity of a prediction and uses mathematical models to represent, analyze, and solve dynamic real-world problems. The student is expected to:</p>	
<p>3.A. collect numerical bivariate data to create a scatterplot, select a function to model the data, justify the model selection, and use the model to interpret results and make predictions;</p>	<p>Problem Solving and Data Analysis Two-variable data: Models and scatterplots</p>
<p>3.B. describe the degree to which uncorrelated variables may or may not be related and analyze situations where correlated variables do or do not indicate a cause-and-effect relationship;</p>	
<p>3.C. determine or analyze an appropriate growth or decay model for problem situations, including linear, exponential, and logistic functions;</p>	<p>Heart of Algebra Linear functions</p>
<p>3.D. determine or analyze an appropriate cyclical model for problem situations that can be modeled with periodic functions;</p>	
<p>3.E. determine or analyze an appropriate piecewise model for problem situations;</p>	
<p>3.F. create, represent, and analyze mathematical models for various types of income calculations to determine the best option for a given situation;</p>	
<p>3.G. create, represent, and analyze mathematical models for expenditures, including those involving credit, to determine the best option for a given situation; and</p>	
<p>3.H. create, represent, and analyze mathematical models and appropriate representations, including formulas and amortization tables, for various types of loans and investments to determine the best option for a given situation.</p>	

State Standard ID and Description	PSAT 8/9 Math Test
<p>4. Probabilistic and statistical reasoning. The student uses the process standards in mathematics to generate new understandings of probability and statistics. The student analyzes statistical information and evaluates risk and return to connect mathematical ideas and make informed decisions. The student applies a problem-solving model and statistical methods to design and conduct a study that addresses one or more particular question(s). The student uses multiple representations to communicate effectively the results of student-generated statistical studies and the critical analysis of published statistical studies. The student is expected to:</p>	
<p>4.A. use a two-way frequency table as a sample space to identify whether two events are independent and to interpret the results;</p>	
<p>4.B. use the Addition Rule, $P(A \text{ or } B) = P(A) + P(B) - P(A \text{ and } B)$, in mathematical and real-world problems;</p>	
<p>4.C. calculate conditional probabilities and probabilities of compound events using tree diagrams, Venn diagrams, area models, and formulas;</p>	<p>Problem Solving and Data Analysis Probability and conditional probability</p>
<p>4.D. interpret conditional probabilities and probabilities of compound events by analyzing representations to make decisions in problem situations;</p>	<p>Problem Solving and Data Analysis Probability and conditional probability</p>
<p>4.E. use probabilities to make and justify decisions about risks in everyday life;</p>	
<p>4.F. calculate expected value to analyze mathematical fairness, payoff, and risk;</p>	
<p>4.G. determine the validity of logical arguments that include compound conditional statements by constructing truth tables;</p>	
<p>4.H. identify limitations and lack of relevant information in studies reporting statistical information, especially when studies are reported in condensed form;</p>	
<p>4.I. interpret and compare statistical results using appropriate technology given a margin of error;</p>	
<p>4.J. identify potential misuses of statistics to justify particular conclusions, including assertions of a cause-and-effect relationship rather than an association, and missteps or fallacies in logical reasoning;</p>	

State Standard ID and Description	PSAT 8/9 Math Test
4.K. describe strengths and weaknesses of sampling techniques, data and graphical displays, and interpretations of summary statistics and other results appearing in a study, including reports published in the media;	Problem Solving and Data Analysis Inference from sample statistics and margin of error
4.L. determine the need for and purpose of a statistical investigation and what type of statistical analysis can be used to answer a specific question or set of questions;	
4.M. identify the population of interest for a statistical investigation, select an appropriate sampling technique, and collect data;	
4.N. identify the variables to be used in a study;	
4.O. determine possible sources of statistical bias in a study and how bias may affect the validity of the results;	
4.P. create data displays for given data sets to investigate, compare, and estimate center, shape, spread, and unusual features of the data;	
4.Q. analyze possible sources of data variability, including those that can be controlled and those that cannot be controlled;	
4.R. report results of statistical studies to a particular audience, including selecting an appropriate presentation format, creating graphical data displays, and interpreting results in terms of the question studied;	
4.S. justify the design and the conclusion(s) of statistical studies, including the methods used; and	
4.T. communicate statistical results in oral and written formats using appropriate statistical and nontechnical language.	

Table 59: TEKS in Statistics Aligned to PSAT 8/9

State Standard ID and Description	PSAT 8/9 Math Test
<p>2. Statistical process sampling and experimentation. The student applies mathematical processes to apply understandings about statistical studies, surveys, and experiments to design and conduct a study and use graphical, numerical, and analytical techniques to communicate the results of the study. The student is expected to:</p>	
<p>2.A. compare and contrast the benefits of different sampling techniques, including random sampling and convenience sampling methods;</p>	
<p>2.B. distinguish among observational studies, surveys, and experiments;</p>	
<p>2.C. analyze generalizations made from observational studies, surveys, and experiments;</p>	
<p>2.D. distinguish between sample statistics and population parameters;</p>	
<p>2.E. formulate a meaningful question, determine the data needed to answer the question, gather the appropriate data, analyze the data, and draw reasonable conclusions;</p>	
<p>2.F. communicate methods used, analyses conducted, and conclusions drawn for a data-analysis project through the use of one or more of the following: a written report, a visual display, an oral report, or a multi-media presentation; and</p>	
<p>2.G. critically analyze published findings for appropriateness of study design implemented, sampling methods used, or the statistics applied.</p>	
<p>3. Variability. The student applies the mathematical process standards when describing and modeling variability. The student is expected to:</p>	
<p>3.A. distinguish between mathematical models and statistical models;</p>	
<p>3.B. construct a statistical model to describe variability around the structure of a mathematical model for a given situation;</p>	
<p>3.C. distinguish among different sources of variability, including measurement, natural, induced, and sampling variability; and</p>	
<p>3.D. describe and model variability using population and sampling distributions.</p>	
<p>4. Categorical and quantitative data. The student applies the mathematical process standards to represent and analyze both categorical and quantitative data. The student is expected to:</p>	

State Standard ID and Description	PSAT 8/9 Math Test
4.A. distinguish between categorical and quantitative data;	
4.B. represent and summarize data and justify the representation;	<p>Problem Solving and Data Analysis</p> <p>One variable data: Distributions and measures of center and spread</p>
4.C. analyze the distribution characteristics of quantitative data, including determining the possible existence and impact of outliers;	<p>Problem Solving and Data Analysis</p> <p>One variable data: Distributions and measures of center and spread</p>
4.D. compare and contrast different graphical or visual representations given the same data set;	<p>Problem Solving and Data Analysis</p> <p>One variable data: Distributions and measures of center and spread</p>
4.E. compare and contrast meaningful information derived from summary statistics given a data set; and	
4.F. analyze categorical data, including determining marginal and conditional distributions, using two-way tables.	<p>Problem Solving and Data Analysis</p> <p>Probability and conditional probability</p>
<p>5. Probability and random variables. The student applies the mathematical process standards to connect probability and statistics. The student is expected to:</p>	
5.A. determine probabilities, including the use of a two-way table;	<p>Problem Solving and Data Analysis</p> <p>Probability and conditional probability</p>
5.B. describe the relationship between theoretical and empirical probabilities using the Law of Large Numbers;	
5.C. construct a distribution based on a technology-generated simulation or collected samples for a discrete random variable; and	

State Standard ID and Description	PSAT 8/9 Math Test
5.D. compare statistical measures such as sample mean and standard deviation from a technology-simulated sampling distribution to the theoretical sampling distribution.	
6. Inference. The student applies the mathematical process standards to make inferences and justify conclusions from statistical studies. The student is expected to:	
6.A. explain how a sample statistic and a confidence level are used in the construction of a confidence interval;	
6.B. explain how changes in the sample size, confidence level, and standard deviation affect the margin of error of a confidence interval;	<p>Problem Solving and Data Analysis</p> <p>Inference from sample statistics and margin of error</p>
6.C. calculate a confidence interval for the mean of a normally distributed population with a known standard deviation;	
6.D. calculate a confidence interval for a population proportion;	
6.E. interpret confidence intervals for a population parameter, including confidence intervals from media or statistical reports;	
6.F. explain how a sample statistic provides evidence against a claim about a population parameter when using a hypothesis test;	
6.G. construct null and alternative hypothesis statements about a population parameter;	
6.H. explain the meaning of the p-value in relation to the significance level in providing evidence to reject or fail to reject the null hypothesis in the context of the situation;	
6.I. interpret the results of a hypothesis test using technology-generated results such as large sample tests for proportion, mean, difference between two proportions, and difference between two independent means; and	
6.J. describe the potential impact of Type I and Type II Errors.	
7. Bivariate data. The student applies the mathematical process standards to analyze relationships among bivariate quantitative data. The student is expected to:	

State Standard ID and Description	PSAT 8/9 Math Test
7.A. analyze scatterplots for patterns, linearity, outliers, and influential points;	<p>Problem Solving and Data Analysis</p> <p>Two-variable data: Models and scatterplots</p>
7.B. transform a linear parent function to determine a line of best fit;	
7.C. compare different linear models for the same set of data to determine best fit, including discussions about error;	<p>Problem Solving and Data Analysis</p> <p>Two-variable data: Models and scatterplots</p>
7.D. compare different methods for determining best fit, including median-median and absolute value;	
7.E. describe the relationship between influential points and lines of best fit using dynamic graphing technology; and	
7.F. identify and interpret the reasonableness of attributes of lines of best fit within the context, including slope and y-intercept.	<p>Problem Solving and Data Analysis</p> <p>Two-variable data: Models and scatterplots</p>

Table 60: TEKS in Algebraic Reasoning Aligned to PSAT 8/9

State Standard ID and Description	PSAT 8/9 Math Test
<p>2. Patterns and structure. The student applies mathematical processes to connect finite differences or common ratios to attributes of functions. The student is expected to:</p>	
<p>2.A. determine the patterns that identify the relationship between a function and its common ratio or related finite differences as appropriate, including linear, quadratic, cubic, and exponential functions;</p>	
<p>2.B. classify a function as linear, quadratic, cubic, and exponential when a function is represented tabularly using finite differences or common ratios as appropriate;</p>	
<p>2.C. determine the function that models a given table of related values using finite differences and its restricted domain and range; and</p>	
<p>2.D. determine a function that models real-world data and mathematical contexts using finite differences such as the age of a tree and its circumference, figurative numbers, average velocity, and average acceleration.</p>	
<p>3. Patterns and structure. The student applies mathematical processes to understand the connections among representations of functions and combinations of functions, including the constant function, $f(x) = x$, $f(x) = x^2$, $f(x) = \sqrt{x}$, $f(x) = \frac{1}{x}$, $f(x) = x^3$, $f(x) = \sqrt[3]{x}$, $f(x) = b^x$, $f(x) = x$, and $f(x) = \log_b x$ where b is 10 or e; functions and their inverses; and key attributes of these functions. The student is expected to:</p>	
<p>3.A. compare and contrast the key attributes, including domain, range, maxima, minima, and intercepts, of a set of functions such as a set comprised of a linear, a quadratic, and an exponential function or a set comprised of an absolute value, a quadratic, and a square root function tabularly, graphically, and symbolically;</p>	
<p>3.B. compare and contrast the key attributes of a function and its inverse when it exists, including domain, range, maxima, minima, and intercepts, tabularly, graphically, and symbolically;</p>	
<p>3.C. verify that two functions are inverses of each other tabularly and graphically such as situations involving compound interest and interest rate, velocity and braking distance, and Fahrenheit-Celsius conversions;</p>	

State Standard ID and Description	PSAT 8/9 Math Test
<p>3.D. represent a resulting function tabularly, graphically, and symbolically when functions are combined or separated using arithmetic operations such as combining a 20% discount and a 6% sales tax on a sale to determine $h(x)$, the total sale, $f(x) = 0.8x$, $g(x) = 0.06(0.8x)$, and $h(x) = f(x) + g(x)$;</p>	<p>Heart of Algebra Linear functions Passport to Advanced Math Nonlinear functions</p>
<p>3.E. model a situation using function notation when the output of one function is the input of a second function such as determining a function $h(x) = g(f(x)) = 1.06(0.8x)$ for the final purchase price, $h(x)$ of an item with price x dollars representing a 20% discount, $f(x) = 0.8x$ followed by a 6% sales tax, $g(x) = 1.06x$; and</p>	
<p>3.F. compare and contrast a function and possible functions that can be used to build it tabularly, graphically, and symbolically such as a quadratic function that results from multiplying two linear functions.</p>	
<p>4. Number and algebraic methods. The student applies mathematical processes to simplify and perform operations on functions represented in a variety of ways, including real-world situations. The student is expected to:</p>	
<p>4.A. connect tabular representations to symbolic representations when adding, subtracting, and multiplying polynomial functions arising from mathematical and real-world situations such as applications involving surface area and volume;</p>	
<p>4.B. compare and contrast the results when adding two linear functions and multiplying two linear functions that are represented tabularly, graphically, and symbolically;</p>	<p>Heart of Algebra Linear functions Passport to Advanced Math Nonlinear functions</p>
<p>4.C. determine the quotient of a polynomial function of degree three and of degree four when divided by a polynomial function of degree one and of degree two when represented tabularly and symbolically; and</p>	
<p>4.D. determine the linear factors of a polynomial function of degree two and of degree three when represented symbolically and tabularly and graphically where appropriate.</p>	<p>Passport to Advanced Math Equivalent expressions</p>
<p>5. Number and algebraic methods. The student applies mathematical processes to represent, simplify, and perform operations on matrices and to solve systems of equations using matrices. The student is expected to:</p>	
<p>5.A. add and subtract matrices;</p>	
<p>5.B. multiply matrices;</p>	

State Standard ID and Description	PSAT 8/9 Math Test
5.C. multiply matrices by a scalar;	
5.D. represent and solve systems of two linear equations arising from mathematical and real-world situations using matrices; and	
5.E. represent and solve systems of three linear equations arising from mathematical and real-world situations using matrices and technology.	
6. Number and algebraic methods. The student applies mathematical processes to estimate and determine solutions to equations resulting from functions and real-world applications with fluency. The student is expected to:	
6.A. estimate a reasonable input value that results in a given output value for a given function, including quadratic, rational, and exponential functions;	Heart of Algebra Linear functions Passport to Advanced Math Nonlinear functions
6.B. solve equations arising from questions asked about functions that model real-world applications, including linear and quadratic functions, tabularly, graphically, and symbolically; and	Heart of Algebra Linear functions Passport to Advanced Math Nonlinear functions
6.C. approximate solutions to equations arising from questions asked about exponential, logarithmic, square root, and cubic functions that model real-world applications tabularly and graphically.	Problem Solving and Data Analysis Two-variable data: Models and scatterplots
7. Modeling from data. The student applies mathematical processes to analyze and model data based on real-world situations with corresponding functions. The student is expected to:	
7.A. represent domain and range of a function using interval notation, inequalities, and set (builder) notation;	
7.B. compare and contrast between the mathematical and reasonable domain and range of functions modeling real-world situations, including linear, quadratic, exponential, and rational functions;	

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7.C. determine the accuracy of a prediction from a function that models a set of data compared to the actual data using comparisons between average rates of change and finite differences such as gathering data from an emptying tank and comparing the average rate of change of the volume or the second differences in the volume to key attributes of the given model;	
7.D. determine an appropriate function model, including linear, quadratic, and exponential functions, for a set of data arising from real-world situations using finite differences and average rates of change; and	
7.E. determine if a given linear function is a reasonable model for a set of data arising from a real-world situation.	<p>Problem Solving and Data Analysis</p> <p>Two-variable data: Models and scatterplots</p>

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