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# Test Specifications for the Redesigned SAT<sup>®</sup>

SAT<sup>®</sup>



## The College Board

The College Board is a mission-driven not-for-profit organization that connects students to college success and opportunity. Founded in 1900, the College Board was created to expand access to higher education. Today, the membership association is made up of over 6,000 of the world's leading education institutions and is dedicated to promoting excellence and equity in education. Each year, the College Board helps more than seven million students prepare for a successful transition to college through programs and services in college readiness and college success — including the SAT® and the Advanced Placement Program®. The organization also serves the education community through research and advocacy on behalf of students, educators, and schools.

For further information, visit [www.collegeboard.org](http://www.collegeboard.org).

1	<b>Executive Summary</b>
.....	
8	<b>SECTION I Behind the Redesign</b>
8	Linking Assessment and Instruction
13	The Story Behind the Redesigned SAT
15	Principles Driving the Redesign
16	High-Level Design Changes for the SAT
18	Scores Reported by the Redesigned SAT
20	The Redesigned SAT Insight Score Summary
21	Concordance
22	Summary
.....	
24	<b>SECTION II The Redesigned SAT: Evidentiary Foundation</b>
24	Evidentiary Foundation for the Redesigned SAT's Evidence-Based Reading and Writing Tests and Essay
32	Evidentiary Foundation for the Redesigned SAT's Math Test
38	Summary
.....	
40	<b>SECTION III Test Specifications: SAT Evidence-Based Reading and Writing and SAT Essay</b>
40	A Transparent Blueprint
40	SAT Reading Test
43	Test Summary
45	Key Features
54	Lower Text Complexity Example
56	Higher Text Complexity Example
58	SAT Writing and Language Test
61	Test Summary
64	Key Features
69	SAT Essay
71	Test Summary
72	Key Features
80	Summary
81	<b>Appendix B: Sample Test Materials: Reading, Writing and Language, and Essay</b>
81	Sample Reading Set 1
88	Sample Reading Set 2
97	Sample Reading Set 3
102	Lower Text Complexity Example
104	Higher Text Complexity Example
106	Sample Writing and Language Set 1
113	Sample Writing and Language Set 2
119	Sample Essay Prompt 1
122	Annotated Version of Prompt 1's Passage

125	Sample Essay Prompt 2
128	Annotated Version of Prompt 2's Passage
.....	
131	<b>SECTION IV Test Specifications: SAT Math Test</b>
132	Test Summary
135	Detailed Description of the Content and Skills Measured by the SAT Math Test
155	Summary
156	<b>Appendix B: Math Sample Questions</b>
156	Sample Questions: Heart of Algebra
168	Sample Questions: Problem Solving and Data Analysis
173	Sample Problem Set
178	Sample Questions: Passport to Advanced Math
187	Sample Questions: Additional Topics in Math
.....	
193	<b>SECTION V Our Commitment</b>
.....	
196	<b>APPENDIX A The Craft of Developing the SAT: How We Do It</b>
197	Guiding Principles
198	The Development Process for the Redesigned SAT
199	The Test Development Process

## Executive Summary

SECTION I	Behind the Redesign
SECTION II	The Redesigned SAT: Evidentiary Foundation
SECTION III	Test Specifications: SAT Evidence-Based Reading and Writing and SAT Essay
SECTION IV	Test Specifications: SAT Math Test
SECTION V	Our Commitment
APPENDIX A	The Craft of Developing the SAT: How We Do It

These draft test specifications, sample questions and other materials are just that — drafts — and will systematically evolve over time. These sample questions are meant to illustrate the shifts in the redesigned SAT® and are not a full reflection of what will be tested. Actual questions used on the exam are going through extensive reviews and pretesting to help ensure that they are clear and fair and that they measure what is intended. The test specifications as well as the research foundation defining what is measured on the test will continue to be refined based on ongoing research.

## Executive Summary

The SAT® is the College Board's flagship college and career readiness assessment. For nearly a century, it has been used successfully worldwide in combination with factors such as high school GPA to assess student preparedness for and to predict student success in postsecondary education. Each year the SAT is taken by more than 1.6 million students and used by thousands of high school counselors and postsecondary admission officers around the world.

Recent SAT results tell a troubling story about students' readiness for and likelihood for success in their postsecondary endeavors. Notably, 57 percent of SAT takers in the 2013 cohort lacked the academic skills to succeed in college-entry, credit-bearing courses without remediation in at least one subject, and the success rates for such remediation leading to postsecondary completion are far too low. At the same time, the nature of life and work in the United States has transformed to the point where at least some degree of postsecondary education or training is increasingly required for access to middle-class jobs. In short, far too few students are ready to succeed in the kinds of education and training that they will need to participate effectively in an increasingly competitive economy — a circumstance that represents a tragedy for those individuals whose potential isn't being realized and a serious threat to the nation's economy and democracy.

Recognizing that it can and must do more to help all students not only be ready for college and workforce training programs but also succeed in them, the College Board is committing to an opportunity agenda that is focused on propelling students into opportunities they have earned in high school. One of the major components of this agenda has been the redesign of the SAT.

Drawing on extensive input and advice from its members, its partner organizations (such as the National Merit Scholarship Corporation, which cosponsors the PSAT/NMSQT®), and postsecondary and K–12 experts, the College Board determined that the SAT needed to meet three challenges. First, the test must provide to higher education a more comprehensive and informative picture of student readiness for college-level work while sustaining, and ideally improving, the ability of the test to predict college success. Second, the test must become more clearly

### The Redesigned SAT

This document is part of an ongoing series of materials describing the redesign of the SAT being undertaken by the College Board. This initial release is intended to offer readers a detailed overview of the rationale for and the aims and nature of the redesign, as well as information about key elements of the various components comprising the new test. Subsequent releases in the series will provide additional information for various audiences on specific topics related to the redesign.

It's important to note that while the content of this document represents the current state of the redesigned SAT, certain elements of the redesigned test are the subject of ongoing research in the months leading up to its first operational administration in 2016. Some features of the new test, such as timing, length, and scores to be reported, may still be adjusted pending the outcome of our studies.

and transparently focused on the knowledge, skills, and understandings that the best available research evidence indicates are essential for college and career readiness and success. Third, the test must better reflect, through its questions and tasks, the kinds of meaningful, engaging, rigorous work that students must undertake in the best high school courses being taught today, thereby creating a robust and durable bond between assessment and instruction. Undergirding these aims is the belief that all teachers and students must be empowered to focus on the real learning of vital knowledge, skills, and understandings through challenging, vibrant daily work rather than encouraged to cover vast swaths of material superficially or engage in narrow, short-term test preparation divorced from real learning. To these ends, the redesigned SAT has been designed for greater focus, relevance, and transparency while retaining the test's tradition of being a valuable predictor of college and career readiness and success.

Based on a wealth of evidence about essential prerequisites for student success in postsecondary education, the redesigned SAT requires students to:

- » read, analyze, and use reasoning to comprehend challenging literary and informational texts, including texts on science and history/social studies topics, to demonstrate and expand their knowledge and understanding;
- » revise and edit extended texts across a range of academic and career-related subjects for expression of ideas and to show facility with a core set of grammar, usage, and punctuation conventions;
- » show command of a focused but powerful set of knowledge, skills, and understandings in math and apply that ability to solve problems situated in science, social studies, and career-related contexts;
- » make careful and considered use of evidence as they read and write;
- » demonstrate skill in analyzing data, including data represented graphically in tables, graphs, charts, and the like, in reading, writing, and math contexts; and
- » reveal an understanding of relevant words in context and how word choice helps shape meaning and tone.

The result is a profoundly meaningful assessment that is thoroughly transparent and aligned to critical high school outcomes and best instructional practices.



All these changes are firmly grounded in evidence about what is needed for all students to be ready for and to succeed in college and workforce training programs. Research strongly supports the emphasis of the redesigned SAT's English language arts/literacy components on (1) a specified range of text complexity consistent with college and workforce training requirements, (2) source analysis and skilled use of evidence, (3) data in informational graphics, (4) words in context, (5) language conventions and effective language use more generally, and (6) literacy across the disciplines. Evidence is equally supportive of the emphasis of the redesigned SAT's math component on (1) a set of essential math knowledge, skills, and understandings in algebra, advanced topics, and additional topics in math, (2) problem solving and data analysis in addressing real-life problems (e.g., 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), and (3) using the calculator as a tool, discerning when and when not to use a calculator to solve problems efficiently, and performing important mathematical tasks without a calculator.

To assess students' achievement in these and other areas, the redesigned SAT is organized into four components: a Reading Test, a Writing and Language Test, a Math Test, and an Essay direct-writing task, which is optional.

The redesigned SAT's **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. Passages are authentic texts selected from high-quality, previously published sources. One notable feature of the test is its use of texts representing a range of complexities to better determine whether students are ready for the reading challenge posed by college courses and workforce training programs. On each assessment, one passage will be drawn from a U.S. founding document (a text such as the Declaration of Independence, the Constitution, or the Bill of Rights) or a text that is part of the Great Global Conversation (a text such as one by Lincoln or King, or by an author from outside the United States writing on a topic such as freedom, justice, or liberty). Another feature of the test is its inclusion of informational graphics, which students must interpret and/or relate to passage content. Additionally, students must show a command of textual evidence, in part by identifying the portion of a text that serves as the best evidence for the answer to another question. Students must also determine the meaning of words and phrases in the context of extended prose passages and to determine how word choice shapes meaning, tone, and impact. These words and phrases are neither highly obscure nor specific

to any one domain; instead, they are widely applicable across disciplines, and their meaning is derived in large part through the context in which they are used. Paired passages, an important element of the current SAT's Critical Reading section, remain a consistent part of the redesigned SAT's Reading Test.

The redesigned SAT's **Writing and Language Test** is a passage-based assessment of students' ability to revise and edit a range of texts in a variety of subject areas — both academic and career related — for expression of ideas and for conformity to important conventions of standard written English grammar, usage, and punctuation. Passages are written specifically for the test so that errors (rhetorical or mechanical) can be introduced into them for students to recognize and correct. The Writing and Language Test shares with the Reading Test an emphasis on informational graphics (which students must consider as they decide how or whether to revise or edit a text), command of evidence (which students must demonstrate by retaining, adding, revising, or deleting information and ideas in a text), and word meanings and rhetorical word choice. Like the Reading Test, the Writing and Language Test includes passages across a range of text complexities consistent with measuring students' readiness for and likelihood for success in college and workforce training programs.

The redesigned SAT's **Essay** task is an optional component of the exam. To perform the task, students must read and produce a written analysis of a provided source text. Passages are authentic texts selected from high-quality, previously published sources and generally represent portions of arguments written for a broad audience — texts that examine in an accessible way ideas, debates, trends, and the like in the arts, the sciences, and civic, cultural, and political life. In response to these passages, students must produce a clear and cogent written analysis in which they explain how the author of a text builds an argument to persuade an audience through the use of evidence, reasoning, stylistic and persuasive elements, and/or other features the students themselves identify. It is important to note that students are not asked to offer their own opinion on the topic of the passage but are instead expected to analyze how the author constructs an argument. The task's use of a source text is critical because it requires students to demonstrate a command of objective textual evidence and an understanding of challenging information and ideas; this is in sharp contrast to assessments that merely ask students to demonstrate that they understand the form that evidence should take by supplying their own unverifiable ideas, experiences, and facts. To make the task clearer and more transparent, its wording remains largely consistent from

administration to administration. This allows students to focus their attention on the unique source text and their analysis of it. Students' responses will be evaluated on the skill they demonstrate in reading, analysis, and writing.

The redesigned SAT's **Math Test** focuses strongly on algebra and devotes particular attention to the heart of the subject, which research shows is disproportionately important for college and career readiness and success: students' ability to analyze, fluently solve, and create linear equations and inequalities. Problems within the Heart of Algebra category of the Math Test may also call for an understanding of solving a problem as a process of reasoning.

The Math Test also includes a significant focus on problem solving and data analysis. Problems in the Problem Solving and Data Analysis category require significant reasoning about ratios, rates, and proportional relationships. In keeping with the need to stress widely applicable college and career prerequisites, Problem Solving and Data Analysis problems also emphasize interpreting and synthesizing data and applying core concepts and methods of statistics in science, social studies, and career-related contexts.

As a test that provides an entry point to postsecondary work, the new Math Test includes topics that are central to students progressing to later, more advanced mathematics. Chief among these topics/skills are an understanding of the structure of expressions and the ability to analyze, manipulate, and rewrite these expressions. The Passport to Advanced Math problems privilege these key abilities, which serve students well in algebra and beyond.

While the overwhelming majority of problems on the Math Test fall into the previous three categories, the test also addresses additional topics in high school mathematics. Once again, research evidence about relevance to postsecondary education and work governs the inclusion of these topics in the test. These topics include geometry questions on congruence, similarity, right triangles, and the Pythagorean Theorem as well as questions about complex numbers and trigonometric functions.

In the Math Test, item sets (text, data, and/or graphics plus related questions) allow the effective measurement of related skills and thus help inspire productive, cohesive practice that reflects and encourages the best of classroom work.

The Math Test contains two portions: one in which the student may use a calculator and another in which the student may not. The no-calculator portion allows the redesigned SAT to assess fluencies valued by postsecondary instructors and includes conceptual questions for which a calculator is not needed. Meanwhile, the calculator portion gives insight into students' capacity for strategic use of the tool to address problems efficiently.

Considered together, these components of the redesigned SAT provide a rich view of students' readiness for college and workforce training programs, embody a careful consideration of the best available evidence about the essential prerequisites for postsecondary work, and reflect key elements of best instructional practices. In brief, the redesigned SAT is a critical part of a productive relationship between assessment and instruction in which each informs the other in a deep and constructive way.

To help realize that vision, the College Board is committed to making the redesigned SAT a leading light in the field of assessment. It will be *transparent* in design so that all will know what is on it and why. It will be a *challenging yet appropriate* and *fair* assessment of what students know and can do. It will continue to measure students' *critical thinking* and *problem-solving abilities* and retain the strong *predictive value* that the SAT has long been known for. It will continue to be *research driven* and *evidence based* in design and content. It will provide a more comprehensive *picture of student readiness* than ever before. Finally, it will be an integral part of the College Board's broader agenda of promoting *equity and opportunity*.

This document represents an important first step toward meeting the goal of transparency. Section I offers an overview of the reasons behind the redesign, the exacting process used to undertake it, and many of the new test's key features. Section II provides a précis of the evidence base supporting important redesign decisions. Sections III and IV offer detailed information about the individual components of the battery of tests. Section V concludes the main document with important commitments that the College Board is making in carrying out the redesign. Two appendices provide supporting information. The first appendix contains a summary of the test development process used to construct the redesigned SAT. The second appendix consists of a wide range of samples to illustrate the types of materials in each test of the redesigned SAT.

## Executive Summary

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SECTION IV	Test Specifications: SAT Math Test
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## Behind the Redesign

### Linking Assessment and Instruction

The SAT has come a long way in the last 88 years, evolving with the times to become the valid, reliable, and widely respected measure of college and career readiness that it is today. Serving more than 1.6 million students and thousands of high school counselors and postsecondary admission officers around the world each year, the SAT plays critical roles in measuring student achievement and readiness and in helping students make successful transitions into college and workforce training programs after high school graduation.

Unfortunately, recent data from the SAT suggest that far too many high school students are unprepared for those transitions. According to the College Board's *2013 SAT Report on College & Career Readiness*, more than half (57 percent) of SAT takers in the 2013 cohort lacked the academic skills to succeed in college-entry, credit-bearing courses without remediation in at least one subject. Indeed, no discernible improvement in students' readiness levels can be seen over the period from 2009 to 2013, a time when average SAT scores have remained virtually unchanged. It's alarming but not surprising, then, that over 30 percent of entering college students require remediation (ranging from 26.3 percent for public four-year institutions to 40.8 percent for public two-year institutions) — a trap from which few students, particularly poor and minority students, escape with the requisite foundation of skills to enter credit-bearing courses and complete a college degree.<sup>1</sup>

The rate of successful completion of college and workforce training programs must also be radically improved if students' and the nation's future are to be secured. Fortunately, the two goals are intertwined. Our research has shown, for example, that good preparation is linked to success in college: when students are prepared to enter college-entry,

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<sup>1</sup> The College Board, *2013 SAT Report on College & Career Readiness* (New York: Author, 2013), 3, <http://media.collegeboard.com/homeOrg/content/pdf/sat-report-college-career-readiness-2013.pdf>; David Radwin, Jennifer Wine, Peter Siegel, and Michael Bryan, *2011-12 National Postsecondary Student Aid Study (NPSAS:12): Student Financial Aid Estimates for 2011-12 (NCES 2013-165)* (Washington, DC: U.S. Department of Education, Institute of Education Sciences, National Center for Education Statistics, 2013), <http://nces.ed.gov/pubsearch>.

credit-bearing courses, they are much more likely to enter, persist, and complete a degree compared to those who are not prepared.<sup>2</sup>

Postsecondary readiness and completion are critical means to the end of preparing all students for life after the classroom — a task made more challenging and urgent by the changing nature of the workplace. What’s more, given the rapidly changing technological demands of many jobs, students need not only preparation for specific careers but also the foundational reading, writing, language, and mathematics skills that will allow them to adapt more readily to a quickly evolving marketplace. Importantly, these foundational skills are also essential for successful participation in our society and for the strength of our democracy.

There’s a great deal of work ahead of us if we want to realize the full potential of our nation’s youth and to reclaim the kind of security and prosperity that many Americans once took for granted. We can’t continue to allow vast numbers of our country’s students to fall behind academically. It’s therefore critical that we do everything possible to ensure that all students are on a trajectory to gain meaningful access to postsecondary courses and workforce training programs, complete degrees and certifications, and participate successfully in an increasingly competitive and fluid global economy.

## ASSESSMENT AND OPPORTUNITY

Our mission at the College Board is to foster equity and excellence and to provide students with opportunities to succeed in college and careers. We know that to accomplish this mission, we need to go beyond delivering assessment to delivering opportunity.

All of our work — in assessment, instruction, and access — will therefore be focused not only on getting students into college and career training opportunities but also on ensuring that they have the knowledge, skills, and understandings needed to complete postsecondary work successfully, to open doors of opportunity for themselves, and to keep those doors open throughout their lives. The commitment and engagement of our membership and the partnerships we maintain with education leaders, teachers, school counselors,

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2 Jeffrey Wyatt et al., *SAT Benchmarks: Development of a College Readiness Benchmark and Its Relationship to Secondary and Postsecondary School Performance* (College Board Research Report 2011-5) (New York: The College Board, 2011), 23, <http://research.collegeboard.org/sites/default/files/publications/2012/7/researchreport-2011-5-sat-college-readiness-benchmark-secondary-performance.pdf>; Krista D. Mattern, Emily J. Shaw, and Jessica Marini, *Does College Readiness Translate to College Completion?* (New York: The College Board, in press).



admission officers, financial aid staff, and others will help widen and deepen the impact of this work.

As a critical first step, we've redesigned the SAT, our flagship college and career readiness assessment. The SAT needs to promote opportunities for students by becoming more closely linked with rich, rigorous course work. It also must become a force within a larger system that delivers far more educational opportunities to students who have earned them.

We believe strongly that our opportunity agenda must be founded on the bedrock of what is truly required for postsecondary readiness and success. Among the findings repeatedly validated by high-quality research are the following:

1. Students who focus on learning fewer, more important things in depth have a stronger foundation on which to build when they proceed to college and career. This kind of clarity in instruction, centered on the essentials of college and career readiness, is a hallmark of classrooms and teachers that dramatically impact achievement and prepare students for college and career success.
2. Students who take rigorous courses as part of their K–12 education are much more likely to be ready for and succeed in college and workforce training programs than are students who don't take rigorous courses.
3. Students who fall behind academically need early, productive interventions that help them develop academic and noncognitive skills needed to succeed.
4. Students who are prepared for postsecondary education must be made aware of and empowered to take advantage of the opportunities they've earned.<sup>3</sup>

We know from our work with higher education as well as from other sources that there is a critical set of knowledge, skills, and understandings that disproportionately predicts student success in college and workforce training programs. Based on a wealth of evidence about essential prerequisites for student success in postsecondary education, we conclude that students must be able to:

### College and Career Readiness: A Goal for All

High school graduates who are college and career ready have a high likelihood of successfully entering some type of postsecondary education (i.e., four-year institution, two-year institution, trade school, technical school, and/or workforce training program) without remediation. Research shows that the threshold reading and math skills required for college readiness are essentially the same as those required for career training readiness, meaning that sharply differentiated forms of preparation aren't required.\*

The College Board will continue to support efforts to promote college and career readiness and success for all students — most importantly, the vital work that goes on in thousands of classrooms across the nation every day. In all its undertakings in this area, including the redesign of the SAT, the College Board favors evidence-based approaches that use the best available information about what's required for college and career readiness and success. In so doing, we draw on numerous sources: results of national high school and postsecondary curriculum surveys, including surveys conducted periodically by the College Board; feedback from our membership, our partner organizations, and independent subject-matter experts; analyses of College Board longitudinal data on successful college graduates; and scholarly research.

<sup>3</sup> National Research Council, *Learning and Understanding: Improving Advanced Study of Mathematics and Science in U.S. High Schools* (Washington, DC: National Academy Press, 2002), 9–10, <http://nap.edu/catalog/10129.html>; Wyatt et al., *SAT Benchmarks*, 19; K. Smith et al., "Validating the Application of Growth Models to College Board Data" (presentation, Annual Conference of the Northeastern Educational Research Association, Rocky Hill, CT, October 2012); Caroline Hoxby and Sarah Turner, *Expanding College Opportunities for High-Achieving, Low Income Students* (Stanford, CA: Stanford Institute for Economic Policy Research, 2013), 38, <http://siepr.stanford.edu/?q=/system/files/shared/pubs/papers/12-014paper.pdf>.

\* ACT, Inc., *Ready for College and Ready for Work: Same or Different?* (Iowa City: IA: Author, 2006), 3–6, <http://www.act.org/research/policymakers/pdf/ReadinessBrief.pdf>; Achieve, Inc. *Make the Case: College Ready AND Career Ready* (Washington, DC: Author, 2013), 1–3, <http://www.futurereadyproject.org/sites/frp/files/Flex-CollegeReady%26CareerReady.pdf>.



- » read, analyze, and use reasoning to comprehend challenging literary and informational texts, including texts on science and history/social studies topics, to demonstrate and expand their knowledge and understanding;
- » revise and edit extended texts across a range of academic and career-related subjects for expression of ideas and to show facility with a core set of grammar, usage, and punctuation conventions;
- » show command of a focused but powerful set of knowledge, skills, and understandings in math and apply that ability to solve problems situated in science, social studies, and career-related contexts;
- » make careful and considered use of evidence as they read and write;
- » demonstrate skill in analyzing data, including data represented graphically in tables, graphs, charts, and the like, in reading, writing, and math contexts; and
- » reveal an understanding of relevant words in context and how word choice helps shape meaning and tone.

Evidence such as this of what’s truly important for college and career readiness pervades the work of the College Board in both instruction and assessment and will be the focus not just of the SAT but also of the models of student work that we will partner with educators to develop and offer in grades 6–12 — models that will illustrate how to prepare all students for the real demands of first-year, credit-bearing college courses and workforce training programs. The ELA/literacy and mathematics knowledge, skills, and understandings identified by this evidence are the building blocks for all of the complex and integrated work that students will do in college and career, whether that is developing and presenting an argument about the causes of the Civil War for their U.S. history course, designing and implementing a lab experiment to test a hypothesis about gene mutations for their biology class, analyzing a master painter’s work for their studio art course, drafting a business plan for a startup company, or creating computer code that will automatically answer simple questions for a local business.

However, to realize these aims and to effect real improvement in student performance, more needs to happen than just a redesign of the SAT, as important as that is. Basic change must also take place in how teaching and learning relate to assessment. We firmly believe that rates of college and career readiness and postsecondary success will not improve if teachers and students are distracted by the need to speed through impossibly broad course content and spend time on narrowly cast test preparation in an understandable but misguided effort to boost scores at the expense

of mastery of critical knowledge, skills, and understandings. Further, we believe that rates of college and career readiness and postsecondary success will improve only if our nation's teachers are empowered to help the full range of students practice the kinds of rigorous, engaging daily work through which academic excellence can genuinely and reliably be attained.

The redesigned SAT will aid these necessary reforms by supporting a fundamental shift in K–12 education from a focus on “test prep” in the limited sense to a focus on rich, challenging course work for all students. To do this, the redesigned SAT will be better and more clearly aligned to best practices in classroom instruction so that the most effective preparation for the SAT is the development of the ELA/literacy and math skills taught in great courses across the disciplines. In these ways, the SAT will become more fully integrated into an instruction-and-assessment approach that is designed to link students to the educational opportunities they have earned. No longer will the SAT stand apart from the work of teachers in their classrooms.

Although helping students who are on course to be college and career ready by the end of high school is important work, there are all too many students who have fallen off that pace. We therefore pledge ourselves to do more for students who are behind. These efforts will include attending not only to these students' individual academic needs but also to the nonacademic factors that research shows affect achievement.

Assessment must do more than simply provide a score or a ranking; it must become a force that helps deliver opportunity. To reach its full potential, the SAT must grow beyond what it has long been — a valid and reliable measure of what research tells us is necessary for college and career readiness and success — and evolve into a vehicle that propels students into opportunities they have earned by helping them, for example, apply to more colleges, take advantage of the advanced courses they're prepared for, gain access to fee waivers for the test and for college applications (which are provided in collaboration with our members in higher education), and be aware of and obtain access to a greater array of scholarships.

## The Story Behind the Redesigned SAT

When students leave high school unprepared for college, career, and life, we as a society all suffer. To address this problem, we in the education community must all take responsibility. Therefore, when it came time to redesign the SAT to better achieve the goal of college and career readiness and success for all students, we at the College Board sought input and advice from our members in K–12 and postsecondary education: admission officers, financial aid officers, faculty, teachers, high school and college counselors, principals, administrators, significant partnership organizations such as the National Merit Scholarship Corporation, and others.

### HIGHER EDUCATION FEEDBACK

We started the work of assessment redesign by consulting with more than 250 enrollment leaders, representing a broad cross section of higher education institutions, through a multiyear advisory working group, one-on-one interviews, group meetings, and surveys.

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#### MULTIPLE BENEFITS FOR ALL

Everyone benefits from a more meaningful and modern SAT. By taking into account the major shifts taking place in high school instruction, standards, and assessment, the redesigned SAT offers students, parents, admission officers, teachers, and counselors a better indicator of student progress toward becoming college and career ready. It also provides better information about students' strengths and weaknesses relating to the knowledge, skills, and understandings that are essential to college and career readiness and future success.

For **students and parents**, the redesigned SAT offers a more effective vehicle to showcase students' academic strengths and readiness for college and careers. Because it is closely aligned to both high school instruction and post-high school requirements, the redesigned SAT serves as evidence of the hard work students have performed in high school, showing how rigorous course work and focused instruction can help provide opportunities for future success. Combined with high school grades and other factors that inform

admission decisions, the redesigned SAT gives students an opportunity to put their best foot forward in the admission process and demonstrate how well they have attained the knowledge, skills, and understandings necessary for postsecondary-level work.

For **admission officers**, the redesigned SAT provides a more detailed and comprehensive picture of each student's level of college readiness, helping colleges more easily identify students who are a good match for their institution and the programs of study it offers. The redesigned SAT is also more flexible, taking into account the different ways that admission officers use assessment results.

For **K–12 educators and counselors**, the redesigned SAT offers clearer connections to classroom instruction, its questions and tasks more closely resembling the best of classroom teaching and better measuring the powerful knowledge, skills, and understandings needed in postsecondary education, work, and life.

- » The Higher Education Advisory Working Group is composed of 30 representative higher education leaders from institutions across the nation. The group provides direct, in-depth feedback on such matters as implementation and reporting, scores and validation, and communications. Members of this group were gathered from the SAT Advisory Committee, Board of Trustees, Guidance and Admission Assembly Council, College Scholarship Service Assembly Council, College Board regional councils, the AP Higher Education Advisory Committee, and other organizations with specific areas of expertise.
- » We engaged more than 80 member institutions in face-to-face interviews and discussions during a higher education listening tour. We surveyed an additional 1,640 institutions on test design. Following this initial data gathering, we convened meetings with campus enrollment leaders at more than 250 institutions. We also held meetings with higher education associations, including NACAC (National Association for College Admission Counseling), COFHE (Consortium on Financing Higher Education), ACAOPU (Association of Chief Admissions Officers of Public Universities), and the Enrollment Planning Network.

## K–12 FEEDBACK

Our colleagues and partners in K–12 have also deeply informed the redesign of the SAT, influencing both the content of the new exam and related tools, reports, and services that support the broader goal of college and career readiness and success for all students.

- » We worked with our K–12 colleagues on the Guidance and Admission Assembly Council, Academic Advisory Committees, the Academic Assembly Council, and the SAT Committee to inform our work. These groups provided guidance and feedback from counselors, teachers, and curriculum leaders about the principles and constructs of the exam as well as communication toolkits and other related support. We worked with the previously established SAT Test Development Committees, which are composed of higher education and K–12 faculty, to discuss specific issues of test design and to review test questions, tasks, and forms. Our Superintendents Advisory Committee gave us the perspective from the district leadership level. We are also convening a dedicated K–12 Working Group to delve more deeply into the specifics of tools, rollout, and professional development. This group will comprise two subgroups: a district/state policymakers group and a school implementation team composed of counselors, teachers, and curriculum directors.

- » We also solicited feedback from other K–12 partners. In particular, we met with a large number of chief state school officers and their academic and data advisory teams to discuss elements of the redesign. We incorporated the feedback and input of current state and district clients of the SAT and PSAT/NMSQT to define development priorities. We also learned important lessons from some of our deepest partnerships — for example, the Florida Partnership, our partnership with Hillsborough County (Florida) Public Schools, and our i3-funded (U.S. Department of Education Investing in Innovation) partnership with Oakland (California) Unified School District.
- » We carried out specific research on a range of issues related to college and career readiness and success, including convening focus groups, holding formal interviews, and conducting quantitative surveys.

Through these and other efforts, a new model of readiness, relevance, and access took form. What we heard was a clarion call for a new assessment that would focus clearly and wholly on what matters for college and career readiness and success, that would reflect rigorous instructional practice, and that would deliver more opportunities to more students than ever before.

## Principles Driving the Redesign

Seven principles have driven the redesign of the SAT:

- » **FOCUS.** The assessment measures what really matters as defined by the latest and best available evidence of what is essential to readiness for postsecondary education, including drawing from evidence underlying the best of state standards focused on the essentials for college and career readiness.
- » **TRANSPARENCY.** What the assessment measures will not be a mystery; what the test assesses will be made absolutely clear.
- » **COMMAND OF EVIDENCE.** The assessment focuses consistently on students' ability to understand and use evidence in reading, writing, and math in a broad array of contexts, including literature and literary nonfiction, global/international issues, and history/social studies, science, and career-related texts and topics.
- » **DEMONSTRATED ACHIEVEMENT.** The assessment allows students to demonstrate what they have learned in school and the complex ELA/literacy and mathematics knowledge, skills, and understandings that they can apply.

- » **RICH APPLICATIONS.** Real-world literacy requires a deep reading, careful analysis, and thorough understanding of a wide variety of sources, including both text and data; real-world mathematics requires sustained chains of reasoning and application. The redesigned SAT showcases problems in which literacy and numeracy unlock insights within rich, authentic contexts.
- » **RELEVANCE.** The assessment will measure college and career readiness skills relevant to a wide range of college majors and careers.
- » **CRAFT.** The assessment models good instruction. It demands the same types of deep thinking and analysis that instructional best practices require. It is well written and promotes genuine insight and discovery as questions are answered and tasks are performed. Passages used as the basis of questions and tasks are high in quality and provide a rich, appropriately challenging basis for the assessment. The questions and tasks themselves are clear, fair, and well constructed. The entire test is developed with care and precision. (See Appendix A for a description of the test development process.)

The first principle, focus, is discussed in detail in Section II of this document, in which we describe the evidentiary foundation for the tests in the redesigned SAT. Each of the remaining principles will be illustrated in the detailed descriptions of the test components provided in Sections III and IV.

## High-Level Design Changes for the SAT

While specifics of the redesigned SAT will be detailed in subsequent sections of this document, a high-level comparison between the current and the redesigned SAT is provided here to highlight major design features of the two tests. It is important to note that while the information in these tables and throughout the document represents our best understanding of the nature and features of the redesigned SAT, some specific elements, such as timing, length, and reported scores, are subject to revision based on the ongoing research process that guides the redesign.

Two major structural changes in the redesigned SAT are worth noting here. First, all selected response items will have four alternative responses, not the five found in the current SAT. Our research has indicated that the fifth answer choice added little to the measurement value of questions and, in some cases, actually detracted from the quality of the question content.

Second, the correction for guessing used to score the current SAT will not be used to score the redesigned test. Under the new “rights-only” scoring

method, each correct answer will receive one point, and each incorrect answer will receive no points. This move to rights-only scoring, in which scores are based only on the number of questions test takers answer correctly, encourages students to give the best answer they have for every question without fear of being penalized for making their best effort.

These changes have been made to make the test-taking process more straightforward for students, to remove from that process any extraneous test-taking strategies that are irrelevant to the achievement constructs being measured, and to help students use their time efficiently as they take the test.

### COMPARISON OF THE MAJOR FEATURES OF THE CURRENT SAT AND REDESIGNED SAT

Category	Current SAT	Redesigned SAT
<b>Total Testing Time</b> (Subject to research)	3 hours and 45 minutes	3 hours (plus 50 minutes for the Essay [optional])
<b>Components</b>	<ul style="list-style-type: none"> <li>a) Critical Reading</li> <li>b) Writing</li> <li>c) Mathematics</li> <li>d) Essay</li> </ul>	<ul style="list-style-type: none"> <li>a) Evidence-Based Reading and Writing               <ul style="list-style-type: none"> <li>» Reading Test</li> <li>» Writing and Language Test</li> </ul> </li> <li>b) Math</li> <li>c) Essay (optional)</li> </ul>
<b>Important Features</b>	<ul style="list-style-type: none"> <li>» Emphasis on general reasoning skills</li> <li>» Emphasis on vocabulary, often in limited contexts</li> <li>» Complex scoring (a point for a correct answer and a deduction for an incorrect answer; blank responses have no impact on scores)</li> </ul>	<ul style="list-style-type: none"> <li>» Continued emphasis on reasoning alongside a clearer, stronger focus on the knowledge, skills, and understandings most important for college and career readiness and success</li> <li>» Greater emphasis on the meaning of words in extended contexts and on how word choice shapes meaning, tone, and impact</li> <li>» Rights-only scoring (a point for a correct answer but no deduction for an incorrect answer; blank responses have no impact on scores)</li> </ul>
<b>Essay</b>	<ul style="list-style-type: none"> <li>» Required and given at the beginning of the SAT</li> <li>» 25 minutes to write the essay</li> <li>» Tests writing skill; students take a position on a presented issue</li> </ul>	<ul style="list-style-type: none"> <li>» Optional and given at the end of the SAT; postsecondary institutions determine whether they will require the Essay for admission</li> <li>» 50 minutes to write the essay</li> <li>» Tests reading, analysis, and writing skills; students produce a written analysis of a provided source text</li> </ul>
<b>Score Reporting</b> (Subject to research)	<ul style="list-style-type: none"> <li>» Scale ranging from 600 to 2400</li> <li>» Scale ranging from 200 to 800 for Critical Reading; 200 to 800 for Mathematics; 200 to 800 for Writing</li> <li>» Essay results scaled to multiple-choice Writing</li> </ul>	<ul style="list-style-type: none"> <li>» Scale ranging from 400 to 1600</li> <li>» Scale ranging from 200 to 800 for Evidence-Based Reading and Writing; 200 to 800 for Math; 2 to 8 on each of three traits for Essay*</li> <li>» Essay results reported separately</li> </ul>
<b>Subscore Reporting</b>	None	Subscores for every test, providing added insight for students, parents, admission officers, educators, and counselors

\*Combined score of two raters, each scoring on a scale of 1 to 4.

**COMPARISON OF TEST LENGTH AND TIMING: CURRENT SAT AND REDESIGNED SAT**

Current SAT			Redesigned SAT		
Component	Time Allotted (minutes)	Number of Questions/Tasks	Component	Time Allotted (minutes)	Number of Questions/Tasks
Critical Reading	70	67	Reading	65	52
Writing	60	49	Writing and Language	35	44
Essay	25	1	Essay (optional)	50	1
Mathematics	70	54	Math	80	58
<b>Total</b>	<b>225</b>	<b>171</b>	<b>Total</b>	<b>180</b> <b>(230 with Essay)</b>	<b>154</b> <b>(155 with Essay)</b>
Total Score		0			1
Section Scores		2			2
Test Scores		N/A			3 plus Essay scores
Cross-Test Scores		N/A			2
Subscores		N/A			7

## Scores Reported by the Redesigned SAT

The SAT has been redesigned to provide more information by reporting more scores than ever before. The redesigned SAT will report a total score, section (domain) scores, test scores, cross-test scores, and subscores. These “Insight Scores” reported from the redesigned SAT are intended to provide additional information about student achievement and readiness that will convey a cohesive profile of student readiness. The provisional list of scores, subject to further research, is described below.

### TOTAL SCORE

The redesigned SAT will report a total score that will be the sum of two section scores: (1) Evidence-Based Reading and Writing and (2) Math. The SAT total score will be reported on a scale ranging from 400 to 1600. The scores for the Essay will be reported separately and not be factored into the total score.



## SECTION SCORES

The redesigned SAT will report two section (domain) scores: (1) Evidence-Based Reading and Writing, which will be the sum of the Reading Test score and the Writing and Language Test score, and (2) Math, which will be the Math Test score. Each of the two section scores will be reported on a scale ranging from 200 to 800. The scores for the Essay will be reported separately and will not be factored into the section scores.

## TEST SCORES

The redesigned SAT will report three test scores, each on a scale ranging from 10 to 40: (1) Reading Test score; (2) Writing and Language Test score; (3) Math Test score. The fourth test, the Essay, will be reported separately. Current plans call for the Essay component to report three scores in three domains: Reading, Analysis, and Writing.

The SAT will be the anchor of a vertically aligned, longitudinal assessment system that is designed to monitor student growth across grades in each of these areas annually.

## CROSS-TEST SCORES

Pending the results of research, the redesigned SAT will also report two cross-test scores: (1) Analysis in History/Social Studies and (2) Analysis in Science. Each of these scores will be reported on a scale ranging from 10 to 40. These scores are based on selected questions in the SAT Reading, Writing and Language, and Math Tests and will reflect the application of reading, writing, language, and math skills in history/social studies and science contexts.

## SUBSCORES

The redesigned SAT will report multiple subscores for Reading, Writing and Language, and Math. The Reading and Writing and Language Tests will contribute questions to two subscores: (1) Command of Evidence and (2) Words in Context. The Writing and Language Test will also report two additional subscores: (1) Expression of Ideas and (2) Standard English Conventions.

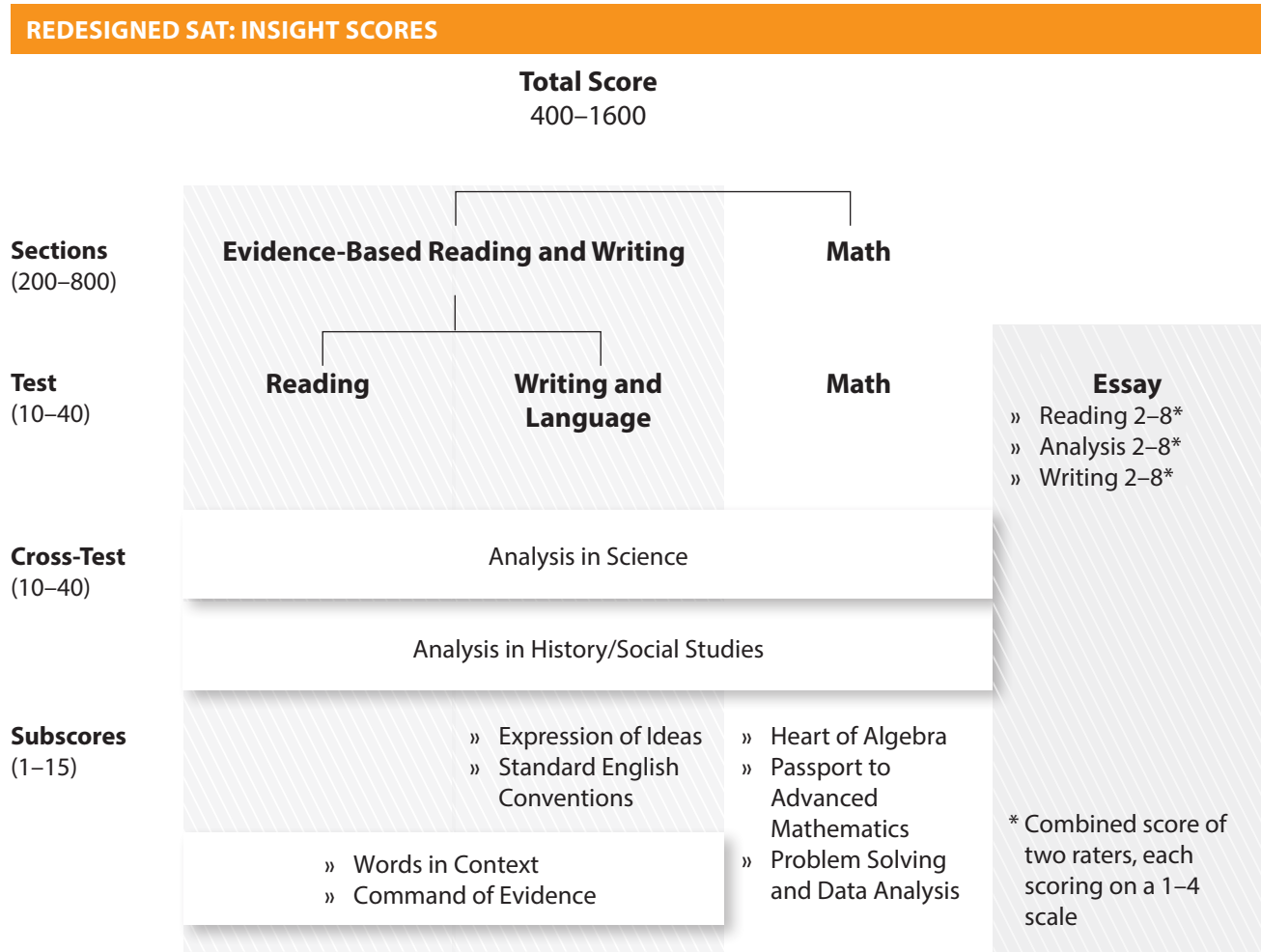
The Math Test will report three subscores: (1) Heart of Algebra, (2) Problem Solving and Data Analysis, and (3) Passport to Advanced Math.

In total, pending the results of research, the redesigned SAT will report seven subscores, each on a scale ranging from 1 to 15.

## The Redesigned SAT Insight Score Summary

The table below summarizes the scores expected to be reported on the redesigned SAT, pending the results of research. In total, we hope to report:

- » one total score;
- » two section scores;
- » three test scores (plus additional Essay scores);
- » two cross-test scores; and seven subscores.



In addition to these scores, students will have access to other helpful interpretative information about their performance. For example, a student's numerical score will be explained in terms of the knowledge, skills, and understandings that the score likely represents. Providing both numerical and content-based interpretations of student performance not only better defines what students know and can do but also helps students and teachers identify the knowledge, skills, and understandings students can focus on learning next to increase their achievement.

## Concordance

Because the redesigned SAT is a different test than the current SAT, a numerical score on one test will not be equivalent to the same numerical score on the other. Therefore, to help higher education admission officers, K–12 educators and counselors, and students and parents transition to the new test scores, we will be providing a concordance between the scores on the current SAT and the redesigned SAT that shows how to relate the scores of one test to the scores of the other. In particular, the concordance will help high school counselors and admission officers maintain continuity between data collected from the current SAT and the redesigned SAT, and will provide admission officers with a convenient way to evaluate applicants, especially those who will comprise the entering college class of 2017 (some of whom will have taken the current test while others will have taken the new test). The concordance information will be released immediately after the first operational administration of the redesigned SAT in 2016. The data format of the concordance information will be released earlier, in 2014, to help postsecondary institutions prepare to receive, process, and integrate this information into their data systems. We will also provide a concordance linking scores on the redesigned SAT and the ACT test; this concordance will be derived from the concordance between the current SAT and the redesigned SAT.

## Summary

Our students and our nation face significant challenges if the goal of college and career readiness for all is not met. Moreover, just getting students ready for college and workforce training programs isn't enough; we need to help equip them with the tools to succeed in their postsecondary programs and in life more generally. To that end, the College Board is committed to an opportunity agenda that is focused on helping students take advantage of the opportunities they have earned. This agenda includes a redesign of our flagship college and career readiness assessment, the SAT.

The redesigned SAT will (1) more clearly and transparently focus on a set of knowledge, skills, and understandings that research evidence has shown to be essential for college and career readiness and success, (2) model and connect with meaningful, engaging work worth doing in rigorous high school classrooms, (3) sustain if not improve the prediction of postsecondary success, and (4) monitor students' college and career readiness to identify those students who are falling behind. The redesign was deeply influenced by both K–12 and postsecondary educators. The new test has also been purpose-built to convey important information about students' relative strengths and needs, doing so in part through a series of Insight Scores and in part by anchoring a vertically aligned, longitudinal assessment system, both of which have been designed to provide more information about students than ever before. All in all, the redesigned SAT has been created to serve as a force that propels students into the opportunities they have earned.

## Executive Summary

SECTION I	Behind the Redesign
<b>SECTION II</b>	<b>The Redesigned SAT: Evidentiary Foundation</b>
SECTION III	Test Specifications: SAT Evidence-Based Reading and Writing and SAT Essay
SECTION IV	Test Specifications: SAT Math Test
SECTION V	Our Commitment
APPENDIX A	The Craft of Developing the SAT: How We Do It

These draft test specifications, sample questions and other materials are just that — drafts — and will systematically evolve over time. These sample questions are meant to illustrate the shifts in the redesigned SAT® and are not a full reflection of what will be tested. Actual questions used on the exam are going through extensive reviews and pretesting to help ensure that they are clear and fair and that they measure what is intended. The test specifications as well as the research foundation defining what is measured on the test will continue to be refined based on ongoing research.

## The Redesigned SAT: Evidentiary Foundation

In this section, we turn to a discussion of the evidence base supporting the fundamental changes being made to the SAT. This discussion, focusing first on Evidence-Based Reading and Writing and Essay and then on Math, helps relate central features of the new test to the design principles described in Section I.

It should be noted at the outset that what follows is not a point-by-point account of each element of the redesigned SAT and the research supporting it. Rather, the discussion more globally addresses important evidence undergirding several major design choices. This evidence base will be a living document; we will refine and update it as new evidence about the essential requirements for college and career readiness accumulates.

### Evidentiary Foundation for the Redesigned SAT's Evidence-Based Reading and Writing Tests and Essay

Two tests comprise the redesigned SAT's Evidence-Based Reading and Writing area:

- » A **Reading Test** focused on the assessment of students' comprehension and reasoning skills in relation to appropriately challenging prose passages (sometimes paired, or associated with one or more informational graphics) across a range of content areas, and
- » A **Writing and Language Test** focused on the assessment of students' revising and editing skills in the context of extended prose passages (sometimes associated with one or more informational graphics) across a range of content areas.

The optional **Essay** is focused on the assessment of students' skill in developing a cogent and clear written analysis of a provided source text.

Together, the SAT Reading and SAT Writing and Language Tests make up the Evidence-Based Reading and Writing section score of the SAT's battery of tests, with the Essay offering scores that complement those from the other two English language arts/literacy assessments.

A number of key design elements strongly supported by evidence are interwoven through the Evidence-Based Reading and Writing and Essay portions of the test. These include:

- » the use of a specified range of text complexity aligned to college and career readiness levels of reading;
- » 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 relevant words in context and on word choice for rhetorical effect;
- » attention to a core set of important English language conventions and to effective written expression; and
- » the requirement that students work with texts across a wide range of disciplines.

## TEXT COMPLEXITY

Numerous studies have highlighted the long-standing gap between the high level of challenge posed by the required readings in college-entry, credit-bearing courses and workforce training programs and the comparatively simpler readings used in much of K–12 education, including many high school courses. For example, Marilyn Jager Adams, reviewing in 2009 the research literature on the challenges students face reading complex texts, helped collect a range of scholarly evidence documenting a decades-long decline in K–12 text complexity even as college and career readiness demands on students' reading skills remained high. The disparity between high school and postsecondary expectations for text complexity has left too many students underprepared for the rigors of reading in college and careers. One sign of this problem can be found in recent SAT test data, which indicate that only about half of all test-takers attained a score on the Critical Reading test high enough for them to be considered college ready.<sup>1</sup>

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<sup>1</sup> Adams, "The Challenge of Advanced Texts: The Interdependence of Reading and Learning," in *Reading More, Reading Better: Are American Students Reading Enough of the Right Stuff?*, ed. Elfrieda H. Hiebert (New York: Guilford, 2009), 163–89; Jeffrey Wyatt et al., *SAT Benchmarks: Development of a College Readiness Benchmark and Its Relationship to Secondary and Postsecondary School Performance*, Research Report 2011–5 (New York: The College Board, 2011), 13, <https://research.collegeboard.org/sites/default/files/publications/2012/7/researchreport-2011-5-sat-college-readiness-benchmark-secondary-performance.pdf>.

The redesigned SAT will align the levels of text complexity represented in the test’s passages with the requirements of first-year college courses and workforce training programs. This alignment supports the emerging movement to close the preparedness gap by making text complexity a central part of the test design. Students taking the redesigned SAT’s Reading Test and Writing and Language Test will be asked to engage with passages selected, in part, to exhibit a range of text complexities up through and including levels comparable to those expected of students entering college and workforce training programs. Students taking the redesigned SAT’s Essay will be asked to engage with a passage that is rich and challenging, but not so difficult that high school juniors and seniors cannot produce an effective written response to it. To ensure that texts on the SAT are appropriately complex — challenging but not inaccessible to college- and career-ready test-takers — test development staff make use of feedback from secondary and postsecondary subject-matter experts and test data on student performance as well as quantitative and qualitative measures of text complexity. Considered together, the SAT Reading, SAT Writing and Language, and SAT Essay Tests are capable of determining whether students can read, improve, and analyze texts at levels of difficulty required of incoming postsecondary students.

## SOURCE ANALYSIS AND EVIDENCE USE

Students’ abilities to analyze source texts and, more broadly, to understand and make effective use of evidence in reading and writing are widely recognized as central to college and career readiness. National curriculum surveys conducted by the College Board and others demonstrate that postsecondary instructors rate high in importance such capacities as summarizing a text’s central argument or main idea, identifying rhetorical strategies used in a text, and recognizing logical flaws in an author’s argument, as well as writing analyses and evaluations of texts, using supporting details and examples, and developing a logical argument. Institutions such as Duke University, Cornell University, Texas A&M University, and the University of California, Berkeley have devoted considerable resources to developing the skills of source analysis and evidence use in their students.<sup>2</sup>

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2 College Board, *College Board Standards for College Success: English Language Arts* (New York: Author, 2006), [http://www.collegeboard.com/prod\\_downloads/about/association/academic/english-language-arts\\_cbscs.pdf](http://www.collegeboard.com/prod_downloads/about/association/academic/english-language-arts_cbscs.pdf); Mary Seburn, Sara Frain, and David T. Conley, *Job Training Programs Curriculum Study* (Eugene, OR: Educational Policy Improvement Center, 2013), <http://www.nagb.org/content/nagb/assets/documents/what-we-do/preparedness-research/judgmental-standard-setting-studies/job-training-programs-curriculum-study.pdf>; Achieve, Inc., The Education Trust, and Thomas B. Fordham Foundation, *The American Diploma Project: Ready or Not: Creating a High School Diploma that Counts* (Washington, DC: Achieve, Inc., 2004), <http://www.achieve.org/files/ReadyorNot.pdf>; YoungKoung Kim, Andrew Wiley, and Sheryl Packman,



The redesigned SAT prominently emphasizes source analysis and evidence use throughout the Evidence-Based Reading and Writing and Essay portions of the test. The SAT Reading Test not only requires students to answer questions based on what is stated and implied in texts (both passages and graphics) across a range of content areas but also includes a number of questions asking students to determine which portion of a text best supports the answer to a given question. The SAT Writing and Language Test includes questions asking students to develop, support, and refine claims and ideas in multiparagraph passages (some of which are associated with one or more graphics) and to retain, add, revise, or delete information in accordance with rhetorical purpose and accuracy of content (as, for example, when students are asked to verify or improve a passage’s explanation of a data table). In the SAT Essay, students are required to analyze a provided source text to determine how the author builds an argument to persuade an audience through the use of evidence, reasoning, and/or stylistic and persuasive devices (and potentially other aspects of the text identified by students themselves) and then to write a cogent and clear analysis supported by critical reasoning and evidence drawn from the source.

## ANALYSIS OF DATA IN GRAPHICS

The ability to understand and analyze quantitative information and ideas expressed graphically in tables, graphs, charts, and the like is an essential skill for college- and career-ready students. Susan N. Friel, Frances R. Curcio, and George W. Bright, for example, note that “the use of visual displays of quantitative data is pervasive in our highly technological society” and observe that “to be functionally literate, one needs the ability to read and understand statistical graphs and tables.” Iddo Gal echoes these sentiments, writing that “statistical literacy is a key ability expected of citizens in information-laden societies, and is often touted as an expected outcome of schooling and as a necessary component of adults’ numeracy and literacy.”<sup>3</sup>

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*National Curriculum Survey on English and Mathematics* (New York: The College Board, 2012), 7–15, <https://research.collegeboard.org/sites/default/files/publications/2012/7/researchreport-2011-13-curriculum-survey-english-mathematics.pdf>; ACT, Inc., *ACT National Curriculum Survey 2009* (Iowa City, IA: Author, 2009), 46–47, 57–58, <http://www.act.org/research/policymakers/pdf/NationalCurriculumSurvey2009.pdf>; “Working with Sources,” Duke University Thompson Writing Program, accessed January 10, 2014, <http://twp.duke.edu/writing-studio/resources/working-with-sources>; “Critically Analyzing Information Sources,” Cornell University Library, accessed January 10, 2014, <http://guides.library.cornell.edu/content.php?pid=318835&sid=2612843>; “Critically Analyzing Information Sources,” Texas A&M University Libraries, accessed January 10, 2014, <http://library.tamu.edu/help/help-yourself/using-materials-services/critically-analyzing-information-sources.html>; “Critical Evaluation of Resources,” University of California, Berkeley Library, last modified November 2009, <http://www.lib.berkeley.edu/instruct/guides/evaluation.html>.

3 College Board, *College Board Standards for College Success: English Language Arts* (New York: Author, 2006); College Board, *College Board Standards for College Success: Mathematics and Statistics* (New York: Author, 2006), [http://www.collegeboard.com/prod\\_downloads/about/association/academic/mathematics-statistics\\_cbcs.pdf](http://www.collegeboard.com/prod_downloads/about/association/academic/mathematics-statistics_cbcs.pdf); College Board, *College Board Standards for College Success: Science* (New York: Author, 2009), <http://professionals.collegeboard.com/profdownload/cbcs-science-standards-2009.pdf>; Friel,

The redesigned SAT supports attention to analysis of graphically displayed data in part by incorporating informational graphics into selected SAT Reading Test and SAT Writing and Language Test passages and questions. In the SAT Reading Test, students are expected to analyze and interpret data in tables, graphs, charts, and so on and to synthesize information and ideas presented graphically with those presented in a prose passage. In the SAT Writing and Language Test, students are asked to make particular choices about revising and editing prose passages in light of accompanying graphics. On this test, students may, for example, be asked to recognize and correct an error in a passage's interpretation of a table or to evaluate a graph's potential relevance to the topic of or claims in a passage. Coupled with the graphics used in the SAT Math Test, the graphics in the SAT Reading and SAT Writing and Language Tests assess students' capacity to analyze quantitative data across a wide range of content areas.

## WORDS IN CONTEXT

Studies going back nearly a century have documented the strong link between vocabulary and comprehension. With a broad and deep vocabulary, readers are more likely to understand what they read and, in turn, to derive the meaning of words in the contexts in which they appear. Indeed, the role of vocabulary in reading comprehension is difficult to overstate given the word richness of text. A quick comparison between oral and written language is instructive: while the conversation of college-educated adults contains an average of 17.3 rare words per thousand, even children's books exhibit almost double that frequency (30.9).<sup>4</sup>

Clearly, then, acquiring vocabulary from conversation alone is insufficient to attain skilled comprehension. Moreover, while some

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Curcio, and Bright, "Making Sense of Graphs: Critical Factors Influencing Comprehension and Instructional Implications," *Journal for Research in Mathematics Education* 32, no. 2 (March 2001): 124; Gal, "Adults' Statistical Literacy: Meanings, Components, Responsibilities," *International Statistical Review* 70, no. 1 (April 2002): 1–3.

4 Guy Montrose Whipple, ed., *Report of the National Committee on Reading: Twenty-Fourth Yearbook of the National Society for the Study of Education, Part 1* (Bloomington, IN: Public School Publishing Company, 1925); Wesley C. Becker, "Teaching Reading and Language to the Disadvantaged — What We Have Learned from Field Research," *Harvard Educational Review* 47, no. 4 (Winter 1977): 518–43; Keith E. Stanovich, "Matthew Effects in Reading: Some Consequences of Individual Differences in the Acquisition of Literacy," *Reading Research Quarterly* 21, no. 4 (Fall 1986): 360–406; National Reading Panel (U.S.), National Institute of Child Health and Human Development, *Report of the National Reading Panel: Teaching Children to Read; An Evidence-Based Assessment of the Scientific Research Literature on Reading and Its Implications for Reading Instruction; Reports of the Subgroups* (Washington, DC: National Institute of Child Health and Human Development, 2000), <http://www.nichd.nih.gov/publications/pubs/nrp/Documents/report.pdf>; National Center for Education Statistics, *The Nation's Report Card: Vocabulary Results from the 2009 and 2011 NAEP Reading Assessments*, NCEES 2013–452 (Washington, DC: Institute of Education Sciences, U.S. Department of Education, 2013), <http://nces.ed.gov/nationsreportcard/pdf/main2011/2013452.pdf>; Donald P. Hayes and Margaret G. Ahrens, "Vocabulary Simplification for Children: A Special Case of 'Motherese?'," *Journal of Child Language* 15, no. 2 (June 1988): 395–410.

researchers and educators have drawn needed attention to improving and increasing direct instruction in vocabulary, such instruction — here defined as formal vocabulary programs as well as words teachers select for emphasis and study from students’ texts — is insufficient as well. Estimates of how many words students learn either annually or during the course of a K–12 education show that far too many words are acquired to have been gained only from direct instruction. Since adequate vocabularies cannot be acquired from either conversation or direct instruction alone, students must develop the skills to gain the rest of what they need indirectly from their reading, and instruction should offer students opportunities to practice and nurture these skills in addition to direct vocabulary teaching.<sup>5</sup>

Which words deserve the most instructional attention becomes the next critical matter, given the vast number of words that could be taught and the all-too-real limits on instructional time. Isabel L. Beck, Margaret G. McKeown, and Linda Kucan have sensibly focused on what they refer to as Tier Two words — “words that are of high utility for mature language users and are found across a variety of domains” — because they appear frequently in written texts (but uncommonly in oral language) across a wide range of subjects. (By contrast, Tier One words require little instruction for most students because they are generally acquired through conversation, and Tier Three words are either limited to a certain domain of knowledge — and thus are best studied as part of work in that domain — or too rare to be found with any frequency in written text.) Although differing somewhat in the terms for and boundaries of their word levels, other researchers have reached a similar conclusion about the need to concentrate instruction on these high-utility words.<sup>6</sup>

It would be a mistake to conflate frequency with ease; the level of command of these more frequent words required by the exam will

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5 Isabel L. Beck, Margaret G. McKeown, and Linda Kucan, *Bringing Words to Life: Robust Vocabulary Instruction*, 2nd ed. (New York: Guilford, 2013), 1–18; William E. Nagy, Patricia A. Herman, and Richard C. Anderson, “Learning Words from Context,” *Reading Research Quarterly* 20, no. 2 (Winter 1985): 233–53; James F. Baumann and Edward J. Kameenui, “Research on Vocabulary Instruction: Ode to Voltaire,” in *Handbook of Research on Teaching the English Language Arts*, ed. James Flood et al. (New York: Macmillan, 1991), 604–32; Isabel Beck and Margaret McKeown, “Conditions of Vocabulary Acquisition,” in *Handbook of Reading Research*, vol. 2, ed. Rebecca Barr et al. (1991; reprint, Mahwah, NJ: Erlbaum, 1996), 789–814; Michael F. Graves, “Vocabulary Learning and Instruction,” *Review of Research in Education* 13 (1986): 49–89; Catherine E. Snow et al., *Is Literacy Enough?: Pathways to Academic Success for Adolescents* (Baltimore, MD: Brookes, 2007); Camille L. Z. Blachowicz et al., “Vocabulary: Questions from the Classroom,” *Reading Research Quarterly* 41, no. 4 (October/November/December 2006): 524–39; National Reading Panel, *Report*; Katherine Anne Dougherty Stahl, Steven A. Stahl, and Michael C. McKenna, “The Development of Phonological Awareness and Orthographic Processing in Reading Recovery,” *Literacy Teaching and Learning* 4, no. 1 (1999): 27–42.

6 Beck, McKeown, and Kucan, *Bringing Words to Life*, 19–25; Steven A. Stahl and William E. Nagy, *Teaching Word Meanings* (Mahwah, NJ: Erlbaum, 2006); I. S. P. Nation, *Learning Vocabulary in Another Language* (New York: Cambridge University Press, 2001). Both Stahl and Nagy’s and Nation’s approaches are discussed in *Bringing Words to Life* by Beck and her colleagues.

sometimes be very high. Students will encounter words in challenging passages and must read and understand them in context. The exam will assess an in-depth command of words and their multiple meanings and require sensitivity to context. The redesigned SAT, in short, will invite students to read widely and study words deeply rather than reward a superficial familiarity with obscure words.

The redesigned SAT supports a sharp focus on vocabulary in the Evidence-Based Reading and Writing and Essay portions of the test. In the SAT Reading Test, students are called on to determine the meaning of vocabulary in context, with an emphasis on Tier Two words and phrases. In the SAT Reading Test, SAT Writing and Language Test, and SAT Essay, students are also presented with other vocabulary-related challenges, including analyzing word choice rhetorically; improving the precision, concision, and context appropriateness of expression; and (in the Essay) using language to convey their own ideas clearly and carefully.

## LANGUAGE CONVENTIONS AND EFFECTIVE LANGUAGE USE

Skilled expression in language extends beyond vocabulary knowledge and use, as important as those are. It also includes understanding and observing the conventions of standard written English and, more generally, making informed, thoughtful language choices. Knowledge of conventions is more than just learning and adhering to language “rules” set forth in textbooks; conventions knowledge lends precision and clarity to writing, aids comprehension, and facilitates academic success. Laura R. Micciche, for example, rejects a simple dichotomy between the grammar and content of writing:

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The grammatical choices we make — including pronoun use, active or passive verb constructions, and sentence patterns — represent relations between writers and the world they live in. Word choice and sentence structure are an expression of the way we attend to the words of others, the way we position ourselves in relation to others. In this sense, writing involves cognitive skills at the level of idea development *and* at the sentence level. How we put our ideas into words and comprehensible forms is a dynamic process rather than one with clear boundaries between what we say and how we say it.

Surveying recent research on the benefits of the robust teaching of what she describes as “metalinguistic understanding,” Beverly Derewianka notes the wide-ranging value to students of having knowledge about language itself and describes the teacher’s role as “constantly expanding the students’ repertoire of choices in a classroom climate that fosters exploration, experimentation, discussion, choice and decision-making.” Mary J. Schleppegrell, writing in *The Language of Schooling*, observes that “language patterns themselves are rarely the focus of attention of students and teachers” and that “teachers’ expectations for language use are seldom made explicit, and much of what is expected regarding language use in school remains couched in teachers’ vague admonitions to ‘use your own words’ or to ‘be clear.’” This failure to be systematic and explicit can, she argues, have serious yet underappreciated implications for students, who might, for example, “be judged illogical or disorganized in their thinking” if they use informal language to express information and ideas when a formal response is (implicitly) expected by the teacher or the task.<sup>7</sup>

The redesigned SAT supports a thoughtful emphasis on language conventions and language use in several important ways. Effective language use and mastery of a core set of conventions linked with college and career readiness are two key elements of the SAT Writing and Language Test, which, among other aims, assesses students’ application of these skills in the context of high-quality multiparagraph passages that must be revised and edited. The SAT Reading Test includes questions that address students’ capacity to analyze word choice rhetorically. The SAT Essay includes effective language use among the criteria for evaluating students’ written analyses of source texts.

## DISCIPLINARY LITERACY

Cynthia Shanahan, Timothy Shanahan, and Cynthia Misischia are prominent among those who have made the case in recent years that students’ literacy development should not be seen as merely the fostering of generic communication skills but instead should be grounded in making students familiar with the differing literacy demands of particular fields of study. These authors claim that reading, for example, is an importantly different activity when it is done in, say, a history, a mathematics, or a chemistry context: “In addition to the ‘domain knowledge’

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<sup>7</sup> Micciche, “Making a Case for Rhetorical Grammar,” *College Composition and Communication* 55, no. 4 (June 2004): 719 (emphasis in original); Derewianka, “Metalinguistic Understanding and Literacy Development,” *Reading Today Online*, September 12, 2013, <http://www.reading.org/general/Publications/blog/LRP/research-roundup/lrp/2013/09/13/metalinguistic-understanding-and-literacy-development>; Schleppegrell, *The Language of Schooling: A Functional Linguistics Perspective* (Mahwah, NJ: Erlbaum, 2004), 2.

of the disciplines . . . each discipline possesses specialized genre, vocabulary, traditions of communication, and standards of quality and precision, and each requires specific kinds of reading and writing to an extent greater than has been recognized by teachers or teacher preparation programs.” These notions also apply to career and technical education courses. For example, instructors of entry-level health courses surveyed in California rated the knowledge of appropriate terminology in the health care setting as being very important for postsecondary success in the health sciences and medical technology career cluster.<sup>8</sup>

In admission assessments, student comprehension of a range of texts has long proved predictive of readiness. The redesigned SAT supports an enhanced emphasis on disciplinary literacy through careful passage selection and question development. In the SAT Reading Test, SAT Writing and Language Test, and SAT Essay, students are expected to engage with and analyze appropriately challenging texts spanning numerous content areas, including U.S. and world literature, history/social studies, the humanities, science, and career-related topics. Moreover, while questions on the SAT Reading and SAT Writing and Language Tests do not require students to have prior knowledge of specific topics in the content areas, these questions do, where possible and beneficial, reflect differences in the ways various disciplines approach literacy. Reading questions relating to a literature selection, for example, might address theme, mood, figurative language, or characterization — concepts that are generally not relevant to the sciences. Reading questions relating to a science selection, on the other hand, might require students to delineate the experimental process described in a text, analyze research data (including data represented graphically), or determine which conclusion is best supported by a study’s findings — skills generally not required to comprehend literary texts.

## Evidentiary Foundation for the Redesigned SAT’s Math Test

The overall aim of the SAT Math Test 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

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8 Shanahan, Shanahan, and Misischia, “Analysis of Expert Readers in Three Disciplines: History, Mathematics, and Chemistry,” *Journal of Literacy Research* 43, no. 4 (December 2011): 395; Charis McGaughy, Rick Bryck, and Alicia de González, *California Diploma Project Technical Report III: Validity Study; Validity Study of the Health Sciences and Medical Technology Standards* (Eugene, OR: Educational Policy Improvement Center, 2012), [https://www.epiconline.org/publications/documents/CDP\\_ValidityStudyTechnicalReport\\_Final.pdf](https://www.epiconline.org/publications/documents/CDP_ValidityStudyTechnicalReport_Final.pdf).

below, the SAT Math Test will reward a much stronger command of fewer, more important topics. To succeed on the redesigned SAT, students will need to exhibit command of mathematical practices, fluency with mathematical procedures, and conceptual understanding of mathematical ideas. In keeping with the evidence, the exam will also provide opportunities for richer applied problems.

As with Evidence-Based Reading and Writing and Essay, a number of key design elements strongly supported by evidence are interwoven through the Math area. Among these are:

- » a focus on content that matters most for college and career readiness;
- » an emphasis on problem solving and data analysis; and
- » the inclusion of both calculator and no-calculator portions as well as attention to the use of a calculator as a tool.

## FOCUSING ON CONTENT THAT MATTERS MOST

There is a major disconnect today in mathematics between the K–12 and higher education systems. In a recent national survey, 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.<sup>9</sup>

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 redesigned SAT addresses the gap between postsecondary and K–12 expectations is through the exam's 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

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9 ACT, *National Curriculum Survey 2009*, 43.



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. As one survey noted:

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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.<sup>10</sup>

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 below. 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 in the redesigned SAT.<sup>11</sup>

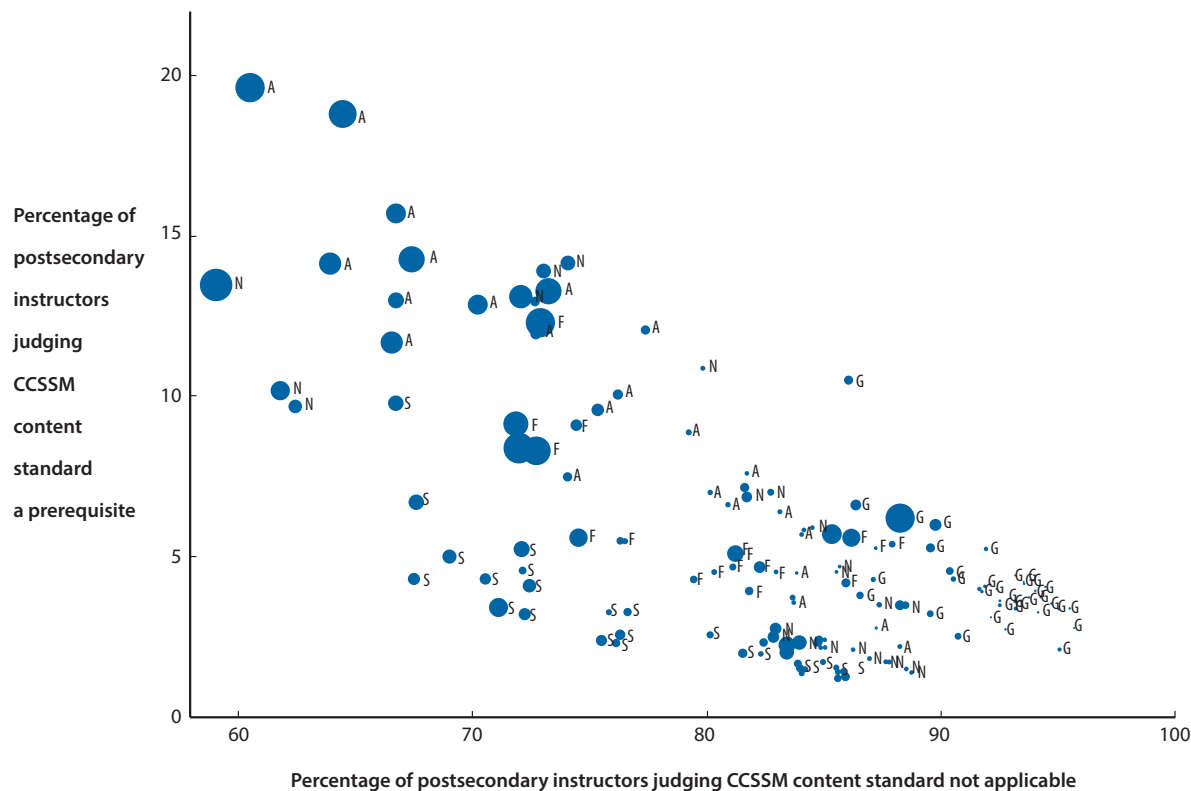
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10 David T. Conley, *Understanding University Success* (Eugene, OR: Center for Educational Policy Research, University of Oregon, 2003), <http://www.ode.state.or.us/teachlearn/subjects/science/curriculum/uusintroduction.pdf>; ACT, *National Curriculum Survey 2009*, 43.

11 Informed by postsecondary survey data in Conley et al., *Reaching the Goal: The Applicability and Importance of the Common Core State Standards to College and Career Readiness* (Eugene, OR: Educational Policy Improvement Center, 2011), <http://www.epiconline.org/publications/document-detail.dot?id=09535d00-466a-498f-ac44-98f4c372d9c1>.



### 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 ELA/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.”<sup>12</sup> The redesigned SAT embraces this principle.

12 Council of Chief State School Officers, *States’ Commitment to High-Quality Assessments Aligned to College- and Career-Readiness* (Washington, DC: Author, 2013), <http://www.ccsso.org/documents/2013/CCSSO%20Assessment%20Quality%20Principles%2010-1-13%20FINAL.pdf>.

## 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 are not doing well in producing quantitatively literate graduates. Quantitative literacy is part of participation in a democracy; it is important to employers, who need students who can use mathematics outside of the classroom; and it is important not only for science, technology, engineering, and mathematics (STEM) fields but also for a wide range of college majors.<sup>13</sup>

Also supporting the emphasis of the redesigned SAT on problem solving and data analysis is a recent study by the National Center on Education and the Economy, 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.<sup>14</sup>

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.<sup>15</sup> 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.

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13 David T. Conley and Charis McGaughy, *Analysis of Assignments from Entry-Level College Courses* (Eugene, OR: Educational Policy Improvement Center, in progress); Conley et al., *College Board Advanced Placement® Best Practices Course Study* (Eugene, OR: Educational Policy Improvement Center, 2006), <http://epiconline.org/publications/college-board-advanced-placement-best-practices-course-study>; National Council on Education and the Disciplines, *Mathematics and Democracy: The Case for Quantitative Literacy* (Princeton, NJ: Author, 2001), <http://www.maa.org/sites/default/files/pdf/QL/MathAndDemocracy.pdf>.

14 National Center on Education and the Economy, *What Does It Really Mean to Be College and Work Ready? The Mathematics Required of First Year Community College Students* (Washington, DC: Author, 2013), 2, [http://www.ncee.org/wp-content/uploads/2013/05/NCEE\\_MathReport\\_May20131.pdf](http://www.ncee.org/wp-content/uploads/2013/05/NCEE_MathReport_May20131.pdf).

15 Conley, *Understanding University Success*.

The Problem Solving and Data Analysis portion of the redesigned SAT contains multipart problems. These problems allow students to explore a richer situation at greater length than is possible in the current SAT. That, in turn, allows the redesigned SAT to better incorporate mathematical modeling and other mathematical practices. This feature of the redesigned SAT also reflects the structure of the PISA exam, which is administered in sets, each consisting of several items.

## CALCULATOR AND NO-CALCULATOR PORTIONS

The data are clear that postsecondary instructors expect students to be fluent in rational number arithmetic.<sup>16</sup> Having a no-calculator portion on the redesigned SAT will help assure postsecondary instructors that students who earn high scores on the SAT do not 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 is 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. It is, conversely, also possible to get bogged down in numerical and algebraic calculations that are best handled by technology.

Questions in the calculator portion of the exam 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.

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<sup>16</sup> The highest-rated skill in the *ACT National Curriculum Survey* in both 2005–2006 and 2009 was “Perform addition, subtraction, multiplication, and division on signed rational numbers.” See ACT, Inc., *ACT National Curriculum Survey 2005–2006* (Iowa City, IA: Author, 2007), 41, <http://www.act.org/research/policymakers/pdf/NationalCurriculumSurvey2006.pdf>, and ACT, *National Curriculum Survey 2009*, 54. Similar conclusions were reached in the *Standards for Success* study of instructors at Association of American Universities institutions. See Conley, *Understanding University Success*.

## Summary

All of the new tests that are part of the redesigned SAT are deeply informed by evidence about essential requirements for college and career readiness and success and are designed in such a way as to measure robustly students' attainment of those key requirements. Two themes unite much of the preceding discussion of the Evidence-Based Reading and Writing and Essay portions of the exam: 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. In the Math Test, the redesigned SAT calls for sustained attention on a core of concepts, skills, and understandings rather than a futile race through a vast array of math soon forgotten. The great beauty of mathematics is that knowing a few things very well gives students a wide-ranging readiness. The mathematics on the SAT is what students can expect to see and use throughout a range of college courses, workforce training programs, and career opportunities.

Across the Evidence-Based Reading and Writing, Essay, and Math portions, the College Board's commitment to focus can be summed up as follows: The redesigned SAT is not mysterious or tricky. It is profoundly transparent. It announces what is assessed and what is worthy of practice. It is designed to offer very clear signals to instruction and to resemble the best of classroom work and work outside of the classroom. The redesigned SAT is not random but reliable, measuring durably powerful knowledge and skills needed in all levels of postsecondary education, work, and life. Rather than covering a great number of topics and concepts that most examinees will never see again, students study a deep core that they can draw upon again and again in college and career.

## Executive Summary

SECTION I	Behind the Redesign
SECTION II	The Redesigned SAT: Evidentiary Foundation
<b>SECTION III</b>	<b>Test Specifications: SAT Evidence-Based Reading and Writing and SAT Essay</b>
SECTION IV	Test Specifications: SAT Math Test
SECTION V	Our Commitment
APPENDIX A	The Craft of Developing the SAT: How We Do It

These draft test specifications, sample questions and other materials are just that — drafts — and will systematically evolve over time. These sample questions are meant to illustrate the shifts in the redesigned SAT® and are not a full reflection of what will be tested. Actual questions used on the exam are going through extensive reviews and pretesting to help ensure that they are clear and fair and that they measure what is intended. The test specifications as well as the research foundation defining what is measured on the test will continue to be refined based on ongoing research.

## TEST SPECIFICATIONS: SAT EVIDENCE-BASED READING AND WRITING AND SAT ESSAY

### A Transparent Blueprint

In the preceding sections, we provided an overview of the redesign of the SAT and the evidentiary basis for key elements of that redesign. In this section, we present detailed descriptions of the content, skills, format, and distinctive features of the redesigned SAT's Reading Test, Writing and Language Test, and Essay (with a similar discussion of the Math Test to follow in the next section). We present a detailed description of each test as well as annotated sample materials that help illustrate central aspects of the test. (The full passages and additional sample materials can be found in Appendix B.)

### SAT Reading Test

#### OVERALL CLAIM FOR THE TEST

The redesigned SAT's Reading Test is intended to collect evidence in support of a broad claim about student performance:

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Students can demonstrate college and career readiness proficiency in reading and comprehending a broad range of high-quality, appropriately challenging literary and informational texts in the content areas of U.S. and world literature, history/social studies, and science.

#### TEST DESCRIPTION

The basic aim of the redesigned SAT's Reading Test is to determine whether students can demonstrate college and career readiness proficiency in comprehending a broad range of high-quality, appropriately challenging literary and informational texts in the content areas of U.S. and world literature, history/social studies, and science. The test comprises a series of passages and associated multiple-choice questions; to answer the

questions, students must refer to what the passages say explicitly and use careful reasoning to draw supportable inferences from the passages. In some cases, topically related passages in history/social studies and in science are paired and accompanied by questions assessing whether students can draw important connections between the passages as well as comprehend each passage individually. In other cases, history/social studies and science passages are accompanied by one or more relevant graphical representations of data — tables, graphs, charts, and the like — and certain questions require students to interpret the graphic(s) and/or to synthesize information and ideas presented graphically with those in the associated passage. (Mathematical computation is, however, not required to answer these questions.)

All passages are taken from high-quality, previously published sources; all graphics are either also taken from such sources or created for the test based on authentic, accurate data. Each prose passage is intended to represent some of the best writing and thinking in the field it represents. Literature selections come from classic and contemporary works by authors working in the United States and around the world. History/social studies selections include portions of U.S.-based founding documents and texts in the Great Global Conversation — engaging, often historically and culturally important works grappling with issues at the heart of civic and political life — and explorations of topics in the social sciences, including anthropology, communication studies, economics, education, human geography, law, linguistics, political science, psychology, and sociology (and their subfields). Science selections examine both foundational concepts and recent developments in the natural sciences, including Earth science, biology, chemistry, and physics (and their subfields).

The questions associated with the passages assess whether students understand information and ideas in these readings; are able to analyze texts rhetorically; and can synthesize across topically related passages as well as a passage and its accompanying graphic(s). Questions address substantive information and ideas in passages and graphics, and they are meant to reflect the kinds of questions one would encounter in a lively, rigorous, evidence-based discussion of the texts. The order in which questions are presented is also as natural as possible, with general questions about central ideas, themes, point of view, overall text structure, and the like coming early in the sequence (so that students can first build and demonstrate an understanding of the passage as a whole), followed by more localized questions about details, words in context, evidence, and the like (after students have had an opportunity to consider the whole passage and how its parts interrelate). Answers are derived from what is stated or implied in the passages and graphics rather than from prior knowledge of the topics.

Passages are selected with both quantitative and qualitative measures of text complexity in mind and represent a range of difficulties consistent with effectively measuring students' college and career readiness. Questions and their answer choices are rooted in the context of the passages (and any graphics) they accompany, and, in an effort to assess more directly students' command of evidence, certain questions explicitly require students to determine the best textual support for the answer to another question.

Numerous questions also address whether students are able to interpret the meaning of relevant words and phrases in context and/or analyze how word choice influences meaning, shapes mood and tone, reflects point of view, or lends precision or interest. In addition, certain questions require analysis and synthesis of information and ideas presented in multiple, related passages or in a passage and its associated graphic(s). Across the test, students are called on to analyze passages and graphics in ways consistent with how texts are read in the content areas they represent, so that questions about a science passage, for example, might focus on hypotheses, experimentation, and data, while questions about a literature passage might focus on theme, mood, and characterization (although, again, topic-specific prior knowledge is not assessed).

The Reading Test is, in short, a rigorous, carefully constructed assessment of comprehension and reasoning skill with an unmistakable focus on close reading of appropriately challenging passages and graphics in a wide array of subject areas.



## Test Summary

The following tables provide a synopsis of key content dimensions of the SAT Reading Test.

SAT READING TEST CONTENT SPECIFICATIONS		
	NUMBER	PERCENTAGE OF TEST
<b>Time Allotted</b>	65 minutes	
<b>Passage Word Count</b>	3,250 words total from 4 single passages and 1 pair; 500–750 words per passage or paired set	
<b>Total Questions</b>	52 questions	100%
Multiple Choice (4 options)		100%
Passage Based		100%
<b>Contribution of Items to Subscores and Scores</b> (Percentages do not add up to 100%.)		
Words in Context (Across Reading and Writing and Language Tests)	10 questions (2 questions per passage/pair)	19%
Command of Evidence (Across Reading and Writing and Language Tests)	10 questions (2 questions per passage/pair)	19%
Analysis in History/Social Studies (Across Math, Reading, and Writing and Language Tests)	21 questions (all history/social studies questions)	40%
Analysis in Science (Across Math, Reading, and Writing and Language Tests)	21 questions (all science questions)	40%
<b>Passage Contents</b>		
U.S. and World Literature	1 passage; 10 questions	20%
History/Social Studies	2 passages, or 1 passage and 1 pair; 10–11 questions each	40%
Science	2 passages, or 1 passage and 1 pair; 10–11 questions each	40%
<b>Graphics</b>		
	1–2 graphics in 1 History/Social Studies and in 1 Science passage	
<b>Text and Graphical Complexity</b>		
Text Complexity	A specified range from grades 9–10 to postsecondary entry across 4 passages and 1 pair	
Graphical Data Representations (tables, graphs, charts, etc.)	Somewhat challenging to challenging (moderate to moderately high data density, few to several variables, moderately challenging to moderately complex interactions)	

SAT READING DOMAIN	
Content Dimension	Description
<b>Text Complexity</b>	The passages/pair on the SAT Reading Test represent a specified range of text complexities from grades 9–10 to postsecondary entry.
<b>Information and Ideas</b>	These questions focus on the informational content of text.
<b>Reading closely</b>	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.
<b>Citing textual evidence</b>	The student will cite the textual evidence that best supports a given claim or point.
<b>Determining central ideas and themes</b>	The student will identify explicitly stated central ideas or themes in text and determine implicit central ideas or themes from text.
<b>Summarizing</b>	The student will identify a reasonable summary of a text or of key information and ideas in text.
<b>Understanding relationships</b>	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).
<b>Interpreting words and phrases in context</b>	The student will determine the meaning of words and phrases in context.
<b>Rhetoric</b>	These questions focus on the rhetorical analysis of text.
<b>Analyzing word choice</b>	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.
<b>Analyzing text structure</b>	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.
<b>Analyzing point of view</b>	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.
<b>Analyzing purpose</b>	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).
<b>Analyzing arguments</b>	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.
<b>Synthesis</b>	These questions focus on synthesizing multiple sources of information.
<b>Analyzing multiple texts</b>	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.)
<b>Analyzing quantitative information</b>	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.

## Key Features

Four distinctive features of the SAT Reading Test are described below:

- » Emphasis on words in context
- » Emphasis on command of evidence
- » Inclusion of informational graphics
- » Specified range of text complexity

Each feature is illustrated with sample material. Note that in most cases only the most relevant portion or portions of the passages are presented here; actual Reading Test passages are significantly longer. (A fuller set of sample Reading materials can be found in Appendix B.)

### WORDS IN CONTEXT

The SAT Reading Test measures students' understanding of the meaning and use of words and phrases in the context of extended prose passages. These words and phrases are neither highly obscure nor specific to any one domain. They are words and phrases whose specific meaning and rhetorical purpose are derived in large part through the context in which they are used. The following passage excerpt and sample question help illustrate this concept. (Note that the tested word has been highlighted for convenience but would not be highlighted in a normal testing situation, where a reference to one or more numbered lines of the passage would help guide students. See also the complete passage in Appendix B for the full context in which this skill is measured; additional sample questions associated with this passage can also be found in that appendix.)

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[. . .] The coming decades will likely see more **intense** clustering of jobs, innovation, and productivity in a smaller number of bigger cities and city-regions. Some regions could end up bloated beyond the capacity of their infrastructure, while others struggle, their promise stymied by inadequate human or other resources.

Adapted from Richard Florida, *The Great Reset*.  
©2010 by Richard Florida.

As used in line 55, “intense” most nearly means

- A) emotional.
- B) concentrated.
- C) brilliant.
- D) determined.

This question asks students to determine word meaning within a social science context. While students may frequently use the word “intense” to describe personalities or emotions, the context of this sentence requires students to recognize that “intense” can also mean “concentrated.” The best answer here is choice B because the context makes clear that the clustering of jobs, innovation, and productivity is expected to be denser, or more concentrated in a smaller number of bigger cities and city-regions, over the coming decades. The best answer can be determined from context clues, and none of the other answer choices makes sense in context although each is a legitimate synonym of the tested word; the tested word is also a high-utility word likely to appear in many types of reading. In these ways, the question draws students back to the text rather than rewarding only isolated vocabulary knowledge.

Questions on the redesigned SAT’s Reading Test might also explore how the same word shifts meaning between or even within contexts. To understand the latter, consider, for example, how Abraham Lincoln variously uses “dedicate” in the Gettysburg Address. The word is not notably obscure or difficult in its most common modern usage. Most students would understand what it means, say, to describe another person as a dedicated friend or employee. However, in the hands of an adept writer and orator such as Lincoln, even a relatively simple, common word such as “dedicate” can take on a range of nuanced, related meanings and implications.

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Four score and seven years ago our fathers brought forth on this continent, a new nation, conceived in Liberty, and **dedicated** to the proposition that all men are created equal.

Now we are engaged in a great civil war, testing whether that nation, or any nation so conceived and so **dedicated**, can long endure. We are met on a great battle-field of that war. We have come to **dedicate** a portion of that field, as a final resting place for those who here gave their lives that that nation might live. It is altogether fitting and proper that we should do this.

But, in a larger sense, we can not **dedicate** — we can not consecrate — we can not hallow — this ground. The brave men, living and dead, who struggled here, have consecrated it, far above our poor power to add or detract. The world will little note, nor long remember what we say here, but it can never forget what they did here.

It is for us the living, rather, to be **dedicated** here to the unfinished work which they who fought here have thus far so nobly advanced. It is rather for us to be here **dedicated** to the great task remaining before us — that from these honored dead we take increased devotion to that cause for which they gave the last full measure of devotion — that we here highly resolve that these dead shall not have died in vain — that this nation, under God, shall have a new birth of freedom — and that government of the people, by the people, for the people, shall not perish from the earth.

Abraham Lincoln, address delivered at the dedication of the National Cemetery at Gettysburg, November 19, 1863.

Early in the address, Lincoln describes the United States as “dedicated to the proposition that all men are created equal.” Here, “dedicated” means something close to “committed” in the modern, everyday sense, but a more precise synonym might be “devoted,” in the sense of the nation being “brought forth” by the “fathers” expressly to fulfill the promise of equality for all. When Lincoln refers later to “this nation, or any nation” being “so conceived and so dedicated,” he means “devoted” in a similar sense. However, when Lincoln writes that “we have come to dedicate a portion” of the Gettysburg field of battle “as a final resting place,” he uses “dedicate” mainly in the sense of setting aside for a memorial purpose. His meaning shifts slightly again when he contends that “in a larger

sense, we cannot dedicate . . . this ground.” Linked with “consecrate” and “hallow,” the word “dedicate” here takes on both a sense of literal memorial making and a sense of making sacred (hallowed, consecrated). Lincoln’s final uses of the word — “it is for us the living . . . to be dedicated here to the unfinished work” and “it is rather for us to be here dedicated to the great task remaining before us” — take on the weight of accumulated meanings: the living must be given over and personally devoted to carrying out a sacred cause.

Although, of course, no one SAT test question could get at all of these usages and levels of meaning, the redesigned test could, for instance, focus on how two different uses of a word such as “dedicate” vary in meaning, tone, and overall rhetorical effect.

## COMMAND OF EVIDENCE

The SAT Reading Test requires students not only to derive information and ideas from a text but also in some cases to identify the portion of the text that serves as the best evidence for the conclusions they reach. In this way, students both interpret text and back up their interpretation by citing the most relevant textual support. The following passage excerpt and related pair of sample questions help illustrate this concept. (Note that for convenience, the lines cited in the first question in the pair are highlighted in the passage excerpt, and the lines cited in the second question in the pair are reprinted below each answer choice; in an actual test, students would have to refer back to the passage, which has numbered lines. See also the complete passage in Appendix B for the full context in which these skills are measured; additional sample questions associated with this passage can be found in that appendix as well. The passage is also presented in the text complexity examples below.)

The pair of questions is based on a passage from a text in the Great Global Conversation.

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. . . The North Carolina ratification convention: “No one need be afraid that officers who commit oppression will pass with immunity.” “Prosecutions of impeachments will seldom fail to agitate the passions of the whole community,” said Hamilton in the *Federalist Papers*, number 65. “We divide into parties more or less friendly or inimical to the accused.”\* I do not mean political parties in that sense.

The drawing of political lines goes to the motivation behind impeachment; but impeachment must proceed within the confines of the constitutional term “high crime[s] and misdemeanors.” Of the impeachment process, it was Woodrow Wilson who said that “Nothing short of the grossest offenses against the plain law of the land will suffice to give them speed and effectiveness. Indignation so great as to overgrow party interest may secure a conviction; but nothing else can.” [ . . . ]

Adapted from a speech delivered by Congresswoman Barbara Jordan of Texas on July 25, 1974, as a member of the Judiciary Committee of the United States House of Representatives.

In lines 49-54 (“Prosecutions . . . sense”), what is the most likely reason Jordan draws a distinction between two types of “parties”?

- A) To counter the suggestion that impeachment is or should be about partisan politics
- B) To disagree with Hamilton’s claim that impeachment proceedings excite passions
- C) To contend that Hamilton was too timid in his support for the concept of impeachment
- D) To argue that impeachment cases are decided more on the basis of politics than on justice

Which choice provides the best evidence for the answer to the previous question?

A) Lines 13-17 (“It . . . office”)

*It is wrong, I suggest, it is a misreading of the Constitution for any member here to assert that for a member to vote for an article of impeachment means that that member must be convinced that the President should be removed from office.*

B) Lines 20-24 (“The division . . . astute”)

*The division between the two branches of the legislature, the House and the Senate, assigning to the one the right to accuse and to the other the right to judge—the framers of this Constitution were very astute.*

C) Lines 55-58 (“The drawing . . . misdemeanors”)

*The drawing of political lines goes to the motivation behind impeachment; but impeachment must proceed within the confines of the constitutional term “high crime[s] and misdemeanors.”*

D) Lines 65-68 (“Congress . . . transportation”)

*Congress has a lot to do: appropriations, tax reform, health insurance, campaign finance reform, housing, environmental protection, energy sufficiency, mass transportation.*

The first of the two questions asks students to analyze a distinction that Barbara Jordan draws in her speech between two types of “parties”: the informal associations to which Alexander Hamilton refers and formal, organized political parties such as the modern-day Republican and Democratic parties. The best answer to this question is choice A. Jordan anticipates that listeners to her speech might misinterpret her use of Hamilton’s quotation as suggesting that she thinks impeachment is essentially a tool of organized political parties to achieve partisan ends, with one party attacking and another defending the president. In the above excerpt of her speech and in the larger reading passage, Jordan makes clear that she thinks impeachment should be reserved only for the most serious of offenses — ones that should rankle people of any political affiliation.

The second question asks students to determine which of four portions of the passage provides the best textual evidence for the answer to the



previous question, thereby demonstrating their command of evidence. In this case, choice C provides the best support because the lines cited in choice C help emphasize Jordan's point that impeachment is so serious that its use must be reserved for high crimes and misdemeanors, not for merely political gains. In these sorts of questions, students make explicit their reasoning as they read and comprehend text.

## INFORMATIONAL GRAPHICS

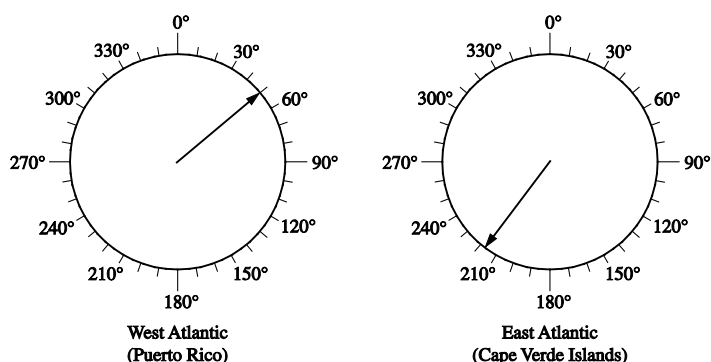
The SAT Reading Test has two passages that include one or two graphics (e.g., tables, graphs, and charts) that convey information related to the passage content. Students are asked to interpret the information conveyed in one or more graphics and/or to integrate that information with information in the text. The following passage excerpt and sample question help illustrate this concept. See also the complete passage in Appendix B for the full context in which this skill is measured; additional sample questions associated with this passage are also found in that appendix.)

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[. . .] Putman works in the lab of Ken Lohmann, who has been studying the magnetic abilities of loggerheads for over 20 years. In his lab at the University of North Carolina, Lohmann places hatchlings in a large water tank surrounded by a large grid of electromagnetic coils. In 1991, he found that the babies started swimming in the opposite direction if he used the coils to reverse the direction of the magnetic field around them. They could use the field as a compass to get their bearing. [. . .]

Adapted from Ed Yong, "Turtles Use the Earth's Magnetic Field as Global GPS."  
©2011 by Kalmbach Publishing Co.

**ORIENTATION OF HATCHLING LOGGERHEADS TESTED IN MAGNETIC FIELDS**



Adapted from Nathan Putman, Courtney Endres, Catherine Lohmann, and Kenneth Lohmann, "Longitude Perception and Bicoordinate Magnetic Maps in Sea Turtles." © 2011 by Elsevier Inc.

*Orientation of hatchling loggerheads tested in a magnetic field that simulates a position at the west side of the Atlantic near Puerto Rico (left) and a position at the east side of the Atlantic near the Cape Verde Islands (right). The arrow in each circle indicates the mean direction that the group of hatchlings swam. Data are plotted relative to geographic north ( $N = 0^\circ$ ).*

It can reasonably be inferred from the passage and graphic that if scientists adjusted the coils to reverse the magnetic field simulating that in the East Atlantic (Cape Verde Islands), the hatchlings would most likely swim in which direction?

- A) Northwest
- B) Northeast
- C) Southeast
- D) Southwest

This question asks students to reach a logical conclusion after connecting information in the graphic with information in the passage. Here, the best answer is choice B. The passage notes that Lohmann, who studied loggerhead turtle hatchlings "in a large water tank surrounded by a large grid of electromagnetic coils" capable of manipulating the magnetic field around the turtles, discovered that the hatchlings would start "swimming in the opposite direction" when he "reverse[d] the direction of the magnetic field around them." The graphic (whose caption establishes that geographic north is represented by 0 degrees) indicates that loggerhead hatchlings tested in a magnetic field that simulates a position on the east side of the Atlantic near the Cape Verde Islands would normally travel in a southwesterly direction (around 218 degrees). Given the above information, it is reasonable to infer that if the magnetic field were reversed, the turtles would travel in a northeasterly direction.

## TEXT COMPLEXITY

The SAT Reading Test includes passages that span a specified range of text complexity levels from grades 9–10 to postsecondary entry. As noted in Section II, test development staff make use of feedback from subject-matter experts at the K–12 and postsecondary levels, student performance data, and quantitative and qualitative measures of text complexity to make and refine decisions about the placement of passages within complexity bands. These steps help ensure that the range of text difficulties represented on test forms are comparable.

Following are two sample Reading passages. Each passage has been annotated to describe some of the features that make the passage relatively easier or more complex. The first passage is representative in many respects of passages at the lower (easier) end of the text complexity range included in the redesigned SAT, while the second passage (also sampled above) is representative in many respects of passages at the upper (harder) end. It should be noted that neither passage is uniformly “easy” or “hard”; as is true for most authentic texts, each passage contains elements that are easier to comprehend and elements that are more difficult. Overall, though, as the annotations suggest, the passages are reasonable exemplars of the two ends of the text complexity continuum reflected on the redesigned SAT’s Reading Test.

## Lower Text Complexity Example

This passage should offer a relatively low reading challenge for college- and career-ready high school juniors and seniors, although some aspects of the passage are more challenging than others (as is generally true of authentic texts).

(1) This passage is adapted from Richard Florida, *The Great Reset*. ©2010 by Richard Florida.

(2) In today’s idea-driven economy, the cost of time is what really matters. With the constant pressure to innovate, it makes little sense to waste countless collective hours commuting. So, the most efficient and productive regions are those in which people are thinking and working—not sitting in traffic.

(3) The auto-dependent transportation system has reached its limit in most major cities and megaregions. Commuting by car is among the least efficient of all our activities—not to mention among the least enjoyable, according to detailed research by the Nobel Prize–winning economist Daniel Kahneman and his colleagues. Though one might think that the economic crisis beginning in 2007 would have reduced traffic (high unemployment means fewer workers traveling to and from work), the opposite has been true. Average commutes have lengthened, and congestion has gotten worse, if anything. (4) The average commute rose in 2008 to 25.5 minutes, “erasing years of decreases to stand at the level of 2000, as people had to leave home earlier in the morning to pick up friends for their ride to work or to catch a bus or subway train,” according to the U.S. Census Bureau, which collects the figures. And those are average figures. Commutes are far longer in the big West Coast cities of Los Angeles and San Francisco and the East Coast cities of New York, Philadelphia, Baltimore, and Washington, D.C. In many of these cities, gridlock has become the norm, not just at rush hour but all day, every day.

(5) The costs are astounding. In Los Angeles, congestion eats up more than 485 million working hours a year; that’s seventy hours, or nearly two weeks, of full-time work per commuter. In D.C., the time cost of congestion is sixty-two hours per worker per year. In New York it’s forty-four hours. Average it out, and the time cost across America’s thirteen biggest city-regions is fifty-one hours per worker per year. Across the country, commuting wastes 4.2 billion hours of work time annually—nearly a full workweek for every commuter. The overall cost to the U.S. economy is nearly \$90 billion when lost productivity and wasted fuel are

**(1) Knowledge Demands: Content/Discipline Knowledge:** The passage assumes little to no prior familiarity with the topic, which reduces the reading challenge.

**(2) Language Conventuality and Clarity:** The passage generally uses familiar vocabulary and relatively simple sentence structures. The author’s fairly informal tone also helps make the passage more accessible, further reducing the reading challenge.

**(3) Purpose:** The purpose of the passage is straightforward: to describe the degree of and costs associated with the congestion of U.S. cities and city-regions. The passage consistently builds support to achieve this purpose, which also helps reduce the reading challenge.

**(4) Knowledge Demands: Content/Discipline Knowledge:** The passage’s references to other texts and sources of evidence are clearly signaled and easily grasped, making them fairly easy to digest.

**(5) Structure:** The structure of the passage is relatively simple. Paragraphs generally are introduced by topic sentences, focus on a single main idea, and use easily understood supporting details clearly related to the main idea. These factors contribute to the relatively low reading challenge of the text.

taken into account. At the Martin Prosperity Institute, we calculate that every minute shaved off America’s commuting time is worth \$19.5 billion in value added to the economy. The numbers add up fast: five minutes is worth \$97.7 billion; ten minutes, \$195 billion; fifteen minutes, \$292 billion.

It’s ironic that so many people still believe the main remedy for traffic congestion is to build more roads and highways, which of course only makes the problem worse.

New roads generate higher levels of (6) “induced traffic,” that is, new roads just invite drivers to drive more and lure people who take mass transit back to their cars. Eventually, we end up with more clogged roads rather than a long-term improvement in traffic flow.

The coming decades will likely see more intense clustering of jobs, innovation, and productivity in a smaller number of bigger cities and city-regions. Some regions could end up bloated beyond the capacity of their infrastructure, while others struggle, their promise stymied by inadequate human or other resources.

**(6) Language Conventionalty and Clarity:** The passage does introduce some abstract and potentially unfamiliar terms, but the author provides sufficient context for understanding them, which reduces the reading challenge.

## Higher Text Complexity Example

This passage should offer a relatively high reading challenge for college- and career-ready high school juniors and seniors, although some aspects of the passage are less challenging than others (as is generally true of authentic texts).

(1) This passage is adapted from a speech delivered by Congresswoman Barbara Jordan of Texas on July 25, 1974, as a member of the Judiciary Committee of the United States House of Representatives. In the passage, Jordan discusses how and when a United States president may be impeached, or charged with serious offenses, while in office. Jordan’s speech was delivered in the context of impeachment hearings against then president Richard M. Nixon.

(2) Today, I am an inquisitor. (3) An hyperbole would not be fictional and would not overstate the solemnness that I feel right now. My faith in the Constitution is whole; it is complete; it is total. And I am not going to sit here and be an idle spectator to the diminution, the subversion, the destruction, of the Constitution.

(4) “Who can so properly be the inquisitors for the nation as the representatives of the nation themselves?” “The subjects of its jurisdiction are those offenses which proceed from the misconduct of public men.”\* And that’s what we’re talking about. In other words, [the jurisdiction comes] from the abuse or violation of some public trust.

It is wrong, I suggest, it is a misreading of the Constitution for any member here to assert that for a member to vote for an article of impeachment means that that member must be convinced that the President should be removed from office. The Constitution doesn’t say that. The powers relating to impeachment are an essential check in the hands of the body of the legislature against and upon the encroachments of the executive. The division between the two branches of the legislature, the House and the Senate, assigning to the one the right to accuse and to the other the right to judge—the framers of this Constitution were very astute. They did not make the accusers and the judges . . . the same person.

We know the nature of impeachment. We’ve been talking about it a while now. It is chiefly designed for the President and his high ministers to somehow be called into account. It is designed to “bridle” the executive

**(1) Purpose:** The purpose of the passage is relatively straightforward (and clarified to some degree in the passage’s advance organizer): to offer Jordan’s view of the nature of the impeachment of a U.S. president.

**(2) Structure:** The passage is fairly loose in structure. This adds to the challenge of following the development of the argument.

**(3) Language Conventionality and Clarity:** Jordan uses elevated diction, uncommon sentence structures, and potentially unfamiliar vocabulary here and throughout the passage (although context clues are generally available), which adds to the challenge of the passage.

**(4) Knowledge Demands: Content/Discipline Knowledge:** Jordan makes numerous references to other texts, particularly to the U.S. Constitution and other U.S. founding documents, as she builds her case. This interspersing of quotations and historical references significantly increases the challenge of the passage.

if he engages in excesses. “It is designed as a method of national inquest into the conduct of public men.”\* The framers confided in the Congress the power, if need be, to remove the President in order to strike a delicate balance between a President swollen with power and grown tyrannical, and preservation of the independence of the executive.

(5) The nature of impeachment: a narrowly channeled exception to the separation of powers maxim. The Federal Convention of 1787 said that. It limited impeachment to high crimes and misdemeanors, and discounted and opposed the term “maladministration.” “It is to be used only for great misdemeanors,” so it was said in the North Carolina ratification convention. And in the Virginia ratification convention: “We do not trust our liberty to a particular branch. We need one branch to check the other.”

. . . The North Carolina ratification convention: “No one need be afraid that officers who commit oppression will pass with immunity.” “Prosecutions of impeachments will seldom fail to agitate the passions of the whole community,” said Hamilton in the *Federalist Papers*, number 65. “We divide into parties more or less friendly or inimical to the accused.”\* I do not mean political parties in that sense.

The drawing of political lines goes to the motivation behind impeachment; but impeachment must proceed within the confines of the constitutional term “high crime[s] and misdemeanors.” Of the impeachment process, it was Woodrow Wilson who said that “Nothing short of the grossest offenses against the plain law of the land will suffice to give them speed and effectiveness. Indignation so great as to overgrow party interest may secure a conviction; but nothing else can.”

Common sense would be revolted if we engaged upon this process for petty reasons. Congress has a lot to do: appropriations, tax reform, health insurance, campaign finance reform, housing, environmental protection, energy sufficiency, mass transportation. Pettiness cannot be allowed to stand in the face of such overwhelming problems. So today we’re not being petty. We’re trying to be big, because the task we have before us is a big one.

\*Jordan quotes from *Federalist No. 65*, an essay by Alexander Hamilton, published in 1788, on the powers of the United States Senate, including the power to decide cases of impeachment against a president of the United States.

(5) **Purpose:** Although the passage responds to concrete, real-world events, Jordan frequently moves beyond present-day circumstances to address principles and other abstract notions. This abstractness adds appreciably to the reading challenge.

## SAT Writing and Language Test

### OVERALL CLAIM FOR THE TEST

Like the other tests in the battery, the redesigned SAT's Writing and Language Test is intended to collect evidence in support of a broad claim about student performance:

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Students can demonstrate college and career readiness proficiency in revising and editing a range of texts in a variety of content areas, both academic and career related, for expression of ideas and for conformity to the conventions of standard written English grammar, usage, and punctuation.

### TEST DESCRIPTION

The basic aim of the redesigned SAT's Writing and Language Test is to determine whether students can demonstrate college and career readiness proficiency in revising and editing a range of texts in a variety of content areas, both academic and career related, for development, organization, and effective language use and for conformity to the conventions of standard written English grammar, usage, and punctuation. The test comprises a series of high-quality multiparagraph passages and associated multiple-choice questions. Some passages and/or questions are accompanied by one or more graphical representations of data — tables, charts, graphs, and the like — and certain questions require students to make revising and editing decisions about passages in light of information and ideas conveyed graphically. (Mathematical computation is, however, not required to answer these questions.)

All passages are written specifically for the test so that errors (a collective term for various rhetorical or mechanical problems) can be introduced that students must recognize and correct. The most common question format requires students to choose the best of three alternatives to an indicated part of the passage (often an underlined portion) or to determine that the version presented in the passage is the best option; other formats, however, are also used. All graphics are either taken from high-quality, previously published sources or created for the test based on authentic, accurate data. In their base, “correct” form, passages are well-written essayistic prose pieces on topics in careers, history/social studies, the humanities, and science, with the core writing modes of argument,



informative/explanatory text, and nonfiction narrative represented. Careers passages typically deal with trends, issues, and debates in major fields of work, such as information technology or health care. History/social studies passages discuss historical topics or topics in the social sciences, including anthropology, communication studies, economics, education, human geography, law, linguistics, political science, psychology, and sociology (and their subfields). Humanities passages delve into subjects in the arts and letters. Science passages explore concepts, research, and discoveries in the natural sciences, including Earth science, biology, chemistry, and physics (and their subfields).

The questions associated with the passages place students in the role of someone revising and editing the work of an unspecified writer. Students are, by turns, asked to improve the development, organization, and use of language in the passages and to ensure that the passages conform to conventions of standard written English grammar, usage, and punctuation. When passages and/or questions are accompanied by graphics, students are asked to draw connections between text and graphics — for example, to correct a passage’s inaccurate interpretation of data presented in a table. Answers to all questions are anchored in the context of the passages. Neither rote recall of language rules nor context-free applications of grammar, usage, and mechanics conventions are tested; moreover, low-level recognition and labeling of errors is downplayed in favor of asking students to make authentic, context-based revising and editing decisions.

In accord with best practices, the test requires students to answer questions based on extended-prose contexts rather than in isolation or in limited (e.g., single-sentence) contexts. Although some questions are answerable by referring to a single phrase, clause, or sentence, many others leverage the extended context the test’s format makes available and require students to have an understanding of multiple sentences, one or more paragraphs, or the passage as a whole.

The range of rhetorical and conventions issues assessed on the SAT Writing and Language Test has been carefully delineated by the test’s blueprint to ensure that the matters deemed most relevant to future postsecondary success are emphasized in test questions (see table below). Furthermore, the Writing and Language Test supports the redesigned SAT’s focus on command of evidence and on relevant words in context by allocating numerous questions to assessing whether students can develop ideas effectively (e.g., by adding relevant supporting details or by maintaining or improving focus and cohesion) and use words carefully and with purpose (e.g., to improve precision or concision).

The Writing and Language Test also exemplifies the redesigned SAT's emphasis on literacy across the curriculum by its inclusion of appropriately challenging passages in numerous content areas, including history/social studies and science. Moreover, the Writing and Language Test reinforces the commitment of the redesigned SAT to assessing quantitative literacy by including graphics and graphics-based questions. Much like the SAT Reading Test, the SAT Writing and Language Test presents students with a rigorous, carefully designed assessment of key literacy competencies needed for college and careers.

## Test Summary

The following tables provide a synopsis of key content dimensions of the Writing and Language Test.

SAT WRITING AND LANGUAGE TEST CONTENT SPECIFICATIONS		
	NUMBER	PERCENTAGE OF TEST
<b>Time Allotted</b>	35 minutes	
<b>Passage Word Count</b>	1700 words total from 4 passages; 400–450 words per passage	
<b>Total Questions</b>	44 questions	100%
Multiple Choice (4 options)		100%
Passage Based		100%
<b>Contribution of Items to Subscores and Scores</b> (Percentages do not add up to 100%.)		
Expression of Ideas	24 questions	55%
Standard English Conventions	20 questions	45%
Words in Context (Across Reading and Writing and Language Tests)	8 questions (2 questions per passage)	18%
Command of Evidence (Across Reading and Writing and Language Tests)	8 questions (2 questions per passage)	18%
Analysis in History/Social Studies (Across Math, Reading, and Writing and Language Tests)	6 questions (all Expression of Ideas questions in history/social studies)	14%
Analysis in Science (Across Math, Reading, and Writing and Language Tests)	6 questions (all Expression of Ideas questions in science)	14%
<b>Passage Contents</b>		
Careers	1 passage; 11 questions	25%
History/Social Studies	1 passage; 11 questions	25%
Humanities	1 passage; 11 questions	25%
Science	1 passage; 11 questions	25%
<b>Graphics</b>		
	1 or more graphics in 1 or more sets of questions	
<b>Text Types</b>		
Argument	1–2 passages	25%–50%
Informative/Explanatory Text	1–2 passages	25%–50%
Nonfiction Narrative	1 passage	25%
<b>Text and Graphical Complexity</b>		
Text Complexity	A specified range from grades 9–10 to postsecondary entry across 4 passages	
Graphical Data Representations (tables, charts, graphs, etc.)	Basic to somewhat challenging (low to moderate data density, few variables, simple to moderately challenging interactions)	

SAT WRITING AND LANGUAGE DOMAIN	
Content Dimension	Description
<b>Text Complexity</b>	The passages on the SAT Writing and Language Test represent a specified range of text complexities from grades 9–10 to postsecondary entry.
<b>Expression of Ideas</b>	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.
<b>Development</b>	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.
<b>Organization</b>	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 to ensure that transition words, phrases, or sentences are used effectively to connect information and ideas.
<b>Effective language use</b>	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.
<b>Standard English Conventions</b>	These questions focus on editing text to ensure conformity to the conventions of standard written English sentence structure, usage, and punctuation.
<b>Sentence structure</b>	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).

**SAT WRITING AND LANGUAGE DOMAIN**

Content Dimension	Description
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.
<b>Conventions of Usage</b>	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 ( <i>its, your, their</i> ), 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.
<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.
<b>Conventions of Punctuation</b>	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.

## Key Features

Three distinctive features of the SAT Writing and Language Test (shared with the SAT Reading Test) are described below:

- » Emphasis on words in context
- » Emphasis on command of evidence
- » Inclusion of informational graphics

Each feature is illustrated with sample material. Note that only the most relevant portions of the passages are presented here; actual Writing and Language Test passages are significantly longer and present passage and questions in side-by-side columns. (The full passages and additional sample materials can be found in Appendix B.)

### WORDS IN CONTEXT

The SAT 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 following passage excerpts and sample questions help illustrate this concept. (See also the complete passages in Appendix B for the full contexts in which these skills are measured; additional sample questions associated with these passages can also be found in that appendix.)

---

[. . .] The transportation planner's job might involve conducting a traffic count to determine the daily number of vehicles traveling on the road to the new factory. If analysis of the traffic count indicates that there is more traffic than the **3** current road as it is designed at this time can efficiently accommodate, the transportation planner might recommend widening the road to add another lane. [. . .]

3. A) NO CHANGE  
B) current design of the road right now  
C) road as it is now currently designed  
D) current design of the road

This question asks students to determine the most economical way to express an idea clearly. Students must recognize that only one choice (choice D, "current design of the road") expresses the idea clearly and concisely, whereas other choices introduce various redundancies ("current" and "at this time" in choice A, "current" and "right now" in

choice B, and “now” and “currently” in choice C) that serve only to weaken written expression here.

---

[. . .] As Kingman developed as a painter, his works were often compared to paintings by Chinese landscape artists dating back to CE 960, a time when a strong tradition of landscape painting emerged in Chinese art. Kingman, however, 4 vacated from that tradition in a number of ways, most notably in that he chose to focus not on natural landscapes, such as mountains and rivers, but on cities. [. . .]

4. A) NO CHANGE  
 B) evacuated  
 C) departed  
 D) retired

This question asks students to determine which word makes the most sense in the context of a sentence from a passage about painter Dong Kingman. The best answer here is choice C because “departed” is the most contextually appropriate way to indicate that Kingman had deviated from the tradition of Chinese landscape painting in a number of ways. Each of the other choices also conveys a sense of “leaving,” but none is as effective in the sentence, as it would be both awkward and unconventional to describe a person as vacating, evacuating, or retiring from a tradition in a number of ways. In this sort of question, students must demonstrate not only facility with language in general but also skill in using language in particular contexts to convey meaning clearly and precisely.

By including the sorts of words-in-context questions sampled above, the redesigned SAT supports and rewards students’ development of broad and deep word knowledge without resorting to obscurity.

---

[. . .] During his career, Kingman exhibited his work 7 internationally. He garnered much acclaim. [. . .]

7. Which choice most effectively combines the sentences at the underlined portion?
- A) internationally, and Kingman also garnered  
 B) internationally; from exhibiting, he garnered  
 C) internationally but garnered  
 D) internationally, garnering

This question asks students to demonstrate skill in combining sentences smoothly and logically. Students must demonstrate an appreciation of the subtleties of language by recognizing that while all of the choices create grammatical sentences, only one choice (choice D, “internationally, garnering”) preserves the writer’s intended meaning (unlike choice C, “internationally but garnered,” which illogically makes the two ideas in the sentence seem at odds with each other) and avoids clumsy repetition (unlike choice B, “internationally; from exhibiting, he garnered”) or a weak and unclear connection among ideas (unlike choice A, “internationally, and Kingman also garnered”).

## COMMAND OF EVIDENCE

The SAT Writing and Language Test measures students’ capacity to revise a text to improve its development of information and ideas. To answer these questions, students must have a solid grasp of the content of the passage in question (although it’s important to note that prior knowledge of the topic is not expected of students). The following passage excerpt and sample question help illustrate this concept. (See also the complete passage in Appendix B for the full context in which this skill is measured; additional sample questions associated with this passage can also be found in that appendix.)

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[. . .] **6** His fine brushwork conveys detailed street-level activity: a peanut vendor pushing his cart on the sidewalk, a pigeon pecking for crumbs around a fire hydrant, an old man tending to a baby outside a doorway. His broader brushstrokes and sponge-painted shapes create majestic city skylines, with skyscrapers towering in the background, bridges connecting neighborhoods on either side of a river, and enormous ships maneuvering out of a busy harbor. To art critics and fans alike, these city scenes represent the innovative spirit of twentieth-century urban Modernism. [. . .]

6. Which choice most effectively establishes the main topic of the paragraph?
- A) Kingman is considered a pioneer of the California Style school of painting.
  - B) Although cities were his main subject, Kingman did occasionally paint natural landscapes.
  - C) In his urban landscapes, Kingman captures the vibrancy of crowded cities.
  - D) In 1929 Kingman moved to Oakland, California, where he attended the Fox Art School.



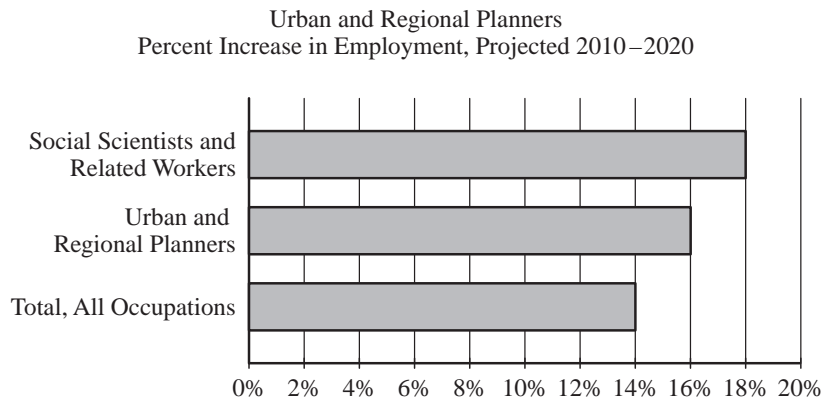
This question asks students to demonstrate an understanding of the central point that the writer is making in the paragraph by choosing the sentence that best signals the paragraph's main topic. Students must carefully analyze the information and ideas in the other sentences in the paragraph to recognize that urban landscapes (and not natural landscapes) are the primary focus (thereby making choice C the best answer and ruling out choice B) and that a detail about Kingman's place in the California Style school of painting (choice A) or about Kingman's background (choice D) would not effectively prepare the reader for the content that follows in the rest of the paragraph.

## INFORMATIONAL GRAPHICS

The SAT Writing and Language Test contains one or more passages and/or questions that include one or more graphics (e.g., tables, graphs, or charts) that convey information related to the passage content. Students are asked to consider the information in these graphics as they make decisions about how and whether to revise a passage. The following passage excerpt and sample question help illustrate this concept. (See also the complete passage in Appendix B for the full context in which this skill is measured; additional sample questions associated with this passage can also be found in that appendix.)

---

[. . .] Transportation planners perform critical work within the broader field of urban and regional planning. As of 2010, there were approximately 40,300 urban and regional planners employed in the United States. The United States Bureau of Labor Statistics forecasts steady job growth in this field, **6** projecting that 16 percent of new jobs in all occupations will be related to urban and regional planning. Population growth and concerns about environmental sustainability are expected to spur the need for transportation planning professionals.



Adapted from United States Bureau of Labor Statistics, Employment Projections Program.  
“All occupations” includes all occupations in the United States economy.

6. Which choice completes the sentence with accurate data based on the graph?
- A) NO CHANGE
  - B) warning, however, that job growth in urban and regional planning will slow to 14 percent by 2020.
  - C) predicting that employment of urban and regional planners will increase 16 percent between 2010 and 2020.
  - D) indicating that 14 to 18 percent of urban and regional planning positions will remain unfilled.

This question asks students to analyze data displayed graphically and to integrate that information with information presented in text — specifically, to determine which of four interpretations of the graph is accurate and to revise the passage’s wording as needed. The best answer here is choice C, as the graph establishes that the employment of urban and regional planning is expected to increase by 16 percent between 2010 and 2020. The other answer choices misstate the data in the graph in one way or another. The focus in a question such as this is not simply on understanding information in a data display, as important as that can be, but rather on demonstrating a broad command of evidence by synthesizing information and ideas expressed in two different mediums (graphics and words).

## SAT Essay (Optional Component)

### OVERALL CLAIM FOR THE TEST

As with the other tests in the battery, the redesigned SAT's Essay is intended to collect evidence in support of a broad claim about student performance:

Students can demonstrate college and career readiness proficiency in producing a cogent and clear written analysis using evidence drawn from an appropriately challenging source text written for a broad audience.

### TEST DESCRIPTION

The basic aim of the redesigned 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. While the source text will vary from administration to administration, the Essay prompt itself is highly consistent. Such transparent consistency allows students, in their preparation and during the actual test, to focus squarely on source analysis and use of evidence in the specific text they are to analyze.

All passages are taken from high-quality, previously published sources. While the specific style and content of the passages inevitably vary to some extent given the College Board's commitment to using authentic texts with this task, the passages take the general form of what might be called arguments written for a broad audience. That is, the passages examine ideas, debates, trends, and the like in the arts, the sciences, and civic, cultural, and political life that have wide interest, relevance, and accessibility to a general readership. Passages tend not to be simple pro/con debates on issues but instead strive to convey nuanced views on complex subjects. They are notable, too, for their use of evidence, logical reasoning, and/or stylistic and persuasive elements. Text complexity of the passages is carefully monitored to ensure that the reading challenge is appropriate and comparable across administrations but not an insuperable barrier to students responding to the source text under timed conditions. Prior knowledge of the passages' topics is not expected or required.

For the Essay, students are asked to explain how the author of the accompanying passage builds an argument to persuade an audience. Students are informed that they may analyze such aspects of the passage as the author's use of evidence, reasoning, and stylistic and persuasive elements but that they may also or instead choose other features to analyze; students are further advised that, in all cases, they should center their discussion on those aspects that are most salient to the passage in question. Responses are not to focus on whether students agree or disagree with the claims made in the passage but rather on how the author builds an argument to persuade an audience. In broad terms, responses are evaluated for demonstrated comprehension of the source text, the quality of analysis of that source text, and the quality of the writing in the response. Students' responses should demonstrate such dimensions as a careful understanding of the passage; effective, selective use of textual evidence to develop and support points; clear organization and expression of ideas; and a command of the conventions of standard written English. (A fuller list of criteria used to evaluate student responses is provided below.)

In a break from the past and present of much standardized direct-writing assessment, the Essay task is not designed to elicit students' subjective opinions but rather to assess whether students are able to comprehend an appropriately challenging source text and to craft an effective written analysis of that text. Rather than merely asking students to emulate the form of evidence use by drawing on, say, their own experiences or imaginations, the Essay requires students to make purposeful, substantive use of textual evidence in a way that can be evaluated objectively. The Essay also connects reading and writing in a manner that both embodies and reinforces the interdependency of these ELA/literacy skills. Considered together with the multiple-choice SAT Reading and SAT Writing and Language Tests, the Essay response gives rich, detailed insight into students' reading and writing achievement and their readiness for college and careers.

While the College Board remains steadfast in its commitment to the importance of analytic writing for all students, two factors have contributed to its decision to no longer make the Essay a required part of the SAT. First, while the writing work that students do in the Evidence-Based Reading and Writing area of the exam is strongly predictive of college and career readiness and success, one single essay historically has not contributed significantly to the overall predictive power of the exam. Second, feedback from hundreds of member admission officers was divided: some respondents found the essay useful, but many did not. Therefore, by making the Essay optional, colleges will have the flexibility to make their own decisions about requiring the Essay, and students applying to colleges that do not require the Essay will be saved the expense and time for test results that will not be considered.

## Test Summary

The following tables provide a synopsis of key content dimensions of the Essay. Note that these tables represent the current thinking of the College Board but may be refined as more Essay field tests are analyzed.

SAT ESSAY CONTENT SPECIFICATIONS		
<b>Total Items</b>		
<b>Time Allotted</b>	<b>50 minutes</b>	
	<b>NUMBER</b>	<b>PERCENTAGE OF TEST</b>
Prompts	1	100%
Passage Based (each passage 650–750 words)	1	100%
<b>Passage Content</b>		
Arguments Written for a Broad Audience	1	100%
<b>Text Complexity</b>		
High School Reading Level (grades 9–12)	1	100%
<b>Analytic Scoring (Provisional)*</b>		
Reading	1–4 scale	
Analysis	1–4 scale	
Writing	1–4 scale	

\*The College Board's current thinking is represented here. Scores of 2 to 8, the combined scores of two raters each scoring on a scale of 1 to 4, will be reported. The final nature of the scoring is dependent on further research.

## SAT ESSAY DOMAIN (PROVISIONAL)

CONTENT DIMENSION	DESCRIPTION
<b>Reading</b>	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
<b>Analysis</b>	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
<b>Writing</b>	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

## Key Features

Three distinctive features of the SAT Essay are described below:

- » Use of a common prompt
- » Emphasis on analysis of argument
- » Use of clear, powerful evaluation criteria

The first two features are illustrated with sample material. (An additional Essay sample is provided in Appendix B.)

## COMMON PROMPT

In the Essay, students are asked to write a cogent and clear response based on the comprehension and analysis of a source text, supporting their claims and points about the text with evidence drawn from the passage. While the source text will be different for each form of the

SAT, the prompt will be largely consistent in format and wording across administrations, as shown below.

---

As you read the passage below, consider how [the author] uses

- evidence, such as facts or examples, to support claims.
  - reasoning to develop ideas and to connect claims and evidence.
  - stylistic or persuasive elements, such as word choice or appeals to emotion, to add power to the ideas expressed.
- 

**[Source Text Will Appear Here]**

---

Write an essay in which you explain how [the author] builds an argument to persuade [his/her] audience that [author's claim]. In your essay, analyze how [the author] uses one or more of the features listed above (or features of your own choice) to strengthen the logic and persuasiveness of [his/her] argument. Be sure that your analysis focuses on the most relevant aspects of the passage.

Your essay should not explain whether you agree with [the author's] claims, but rather explain how the author builds an argument to persuade [his/her] audience.

---

Because the prompt is largely the same from test administration to test administration, students can prepare by developing the underlying reading, analysis, and writing skills measured on the exam rather than trying to anticipate the kind of question that will be asked. Moreover, because the Essay task is centered on a unique source text disclosed only on test day, students must engage with the passage rather than rely on canned, generic responses generated ahead of time. In these ways, the test encourages meaningful practice aligned with curriculum and instruction rather than narrow “prep” focused on mastery of an artificial test format.

## ANALYSIS OF ARGUMENTS

The Essay requires students to analyze how an author uses evidence, reasoning, and/or stylistic or persuasive elements (and/or other elements of the students' choosing) to build his or her argument. A sample Essay task is presented below, followed by an annotated version of the source to suggest some of the ways that students might analyze the text in response to the prompt.

---

As you read the passage below, consider how Dana Gioia uses

- evidence, such as facts or examples, to support claims.
  - reasoning to develop ideas and to connect claims and evidence.
  - stylistic or persuasive elements, such as word choice or appeals to emotion, to add power to the ideas expressed.
- 

**Adapted from “Why Literature Matters” by Dana Gioia. ©2005 by The New York Times Company. Originally published April 10, 2005.**

[A] strange thing has happened in the American arts during the past quarter century. While income rose to unforeseen levels, college attendance ballooned, and access to information increased enormously, the interest young Americans showed in the arts—and especially literature—actually diminished.

According to the 2002 Survey of Public Participation in the Arts, a population study designed and commissioned by the National Endowment for the Arts (and executed by the US Bureau of the Census), arts participation by Americans has declined for eight of the nine major forms that are measured. . . . The declines have been most severe among younger adults (ages 18–24). The most worrisome finding in the 2002 study, however, is the declining percentage of Americans, especially young adults, reading literature.

That individuals at a time of crucial intellectual and emotional development bypass the joys and challenges of literature is a troubling trend. If it were true that they substituted histories, biographies, or political works for literature, one might not worry. But book reading of any kind is falling as well.



That such a longstanding and fundamental cultural activity should slip so swiftly, especially among young adults, signifies deep transformations in contemporary life. To call attention to the trend, the Arts Endowment issued the reading portion of the Survey as a separate report, “Reading at Risk: A Survey of Literary Reading in America.”

The decline in reading has consequences that go beyond literature. The significance of reading has become a persistent theme in the business world. The February issue of *Wired* magazine, for example, sketches a new set of mental skills and habits proper to the 21st century, aptitudes decidedly literary in character: not “linear, logical, analytical talents,” author Daniel Pink states, but “the ability to create artistic and emotional beauty, to detect patterns and opportunities, to craft a satisfying narrative.” When asked what kind of talents they like to see in management positions, business leaders consistently set imagination, creativity, and higher-order thinking at the top.

Ironically, the value of reading and the intellectual faculties that it inculcates appear most clearly as active and engaged literacy declines. There is now a growing awareness of the consequences of nonreading to the workplace. In 2001 the National Association of Manufacturers polled its members on skill deficiencies among employees. Among hourly workers, poor reading skills ranked second, and 38 percent of employers complained that local schools inadequately taught reading comprehension.

The decline of reading is also taking its toll in the civic sphere. . . . A 2003 study of 15- to 26-year-olds’ civic knowledge by the National Conference of State Legislatures concluded, “Young people do not understand the ideals of citizenship . . . and their appreciation and support of American democracy is limited.”

It is probably no surprise that declining rates of literary reading coincide with declining levels of historical and political awareness among young people. One of the surprising findings of “Reading at Risk” was that literary readers are markedly more civically engaged than nonreaders, scoring two to four times more likely to perform charity work, visit a museum, or attend a sporting event. One reason for their higher social and cultural interactions may lie in the kind of civic and historical knowledge that comes with literary reading. . . .

The evidence of literature’s importance to civic, personal, and economic health is too strong to ignore. The decline of literary reading foreshadows serious long-term social and economic

problems, and it is time to bring literature and the other arts into discussions of public policy. Libraries, schools, and public agencies do noble work, but addressing the reading issue will require the leadership of politicians and the business community as well . . . .

Reading is not a timeless, universal capability. Advanced literacy is a specific intellectual skill and social habit that depends on a great many educational, cultural, and economic factors. As more Americans lose this capability, our nation becomes less informed, active, and independent-minded. These are not the qualities that a free, innovative, or productive society can afford to lose.

---

Write an essay in which you explain how Dana Gioia builds an argument to persuade his audience that the decline of reading in America will have a negative effect on society. In your essay, analyze how Gioia uses one or more of the features listed in the box above (or features of your own choice) to strengthen the logic and persuasiveness of his argument. Be sure that your analysis focuses on the most relevant features of the passage.

Your essay should not explain whether you agree with Gioia's claims, but rather explain how Gioia builds an argument to persuade his audience.

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## ANNOTATED VERSION OF PASSAGE

*Adapted from “Why Literature Matters” by Dana Gioia. ©2005  
by The New York Times Company. Originally published April 10, 2005.*

[A] strange thing has happened in the American arts during the past quarter century. (1) While income rose to unforeseen levels, college attendance ballooned, and access to information increased enormously, the interest young Americans showed in the arts—and especially literature—actually diminished.

(2) According to the 2002 Survey of Public Participation in the Arts, a population study designed and commissioned by the National Endowment for the Arts (and executed by the US Bureau of the Census), arts participation by Americans has declined for eight of the nine major forms that are measured.... The declines have been most severe among younger adults (ages 18–24). The most worrisome finding in the 2002 study, however, is the declining percentage of Americans, especially young adults, reading literature.

That individuals at a time of crucial intellectual and emotional development bypass the joys and challenges of literature is a troubling trend. If it were true that they substituted histories, biographies, or political works for literature, one might not worry. But book reading of any kind is falling as well.

That such a (3) longstanding and fundamental cultural activity should slip so swiftly, especially among young adults, signifies deep transformations in contemporary life. To call attention to the trend, the Arts Endowment issued the reading portion of the Survey as a separate report, “Reading at Risk: A Survey of Literary Reading in America.”

(4) The decline in reading has consequences that go beyond literature. The significance of reading has become a persistent theme in the business world. The February issue of *Wired* magazine, for example, sketches a new set of mental skills and habits proper to the 21st century, aptitudes decidedly literary in character: not “linear, logical, analytical talents,” author Daniel Pink states, but “the ability to create artistic and emotional beauty, to detect patterns and opportunities, to craft a satisfying narrative.” When asked what kind of talents they like to see in management positions, business leaders consistently set imagination, creativity, and higher-order thinking at the top.

(1) To highlight the irony and gravity of a dwindling percentage of readers, the writer juxtaposes the rise in income, college attendance, and access to college education to the decline in young Americans’ interest in the arts and in literature.

(2) The writer cites data commissioned by an authoritative source (the National Endowment for the Arts) to lend credibility to his subsequent point that there is a “troubling trend” of “individuals in a time of crucial intellectual and emotional development bypass[ing] the joys and challenges of literature.”

(3) The writer uses precisely chosen, powerful words to characterize reading as a “longstanding” and “fundamental cultural” activity that is “slip[ping] . . . swiftly” among young adults. This juxtaposition of words underscores the writer’s claim that this development signifies “deep transformations in contemporary life” and thereby creates a compelling appeal to readers’ emotions.

(4) The writer synthesizes multiple sources of evidence (e.g., the previously mentioned arts endowment survey, *Wired* magazine) as part of reasoning that concludes that the decrease in reading has implications outside of literature. The writer then connects this point to his subsequent claim that the skills necessary for life in the 21st century are “decidedly literary in character.” He goes on to cite another authoritative source as further evidence of the continuing need for literary achievement.

Ironically, the value of reading and the intellectual faculties that it inculcates appear most clearly as active and engaged literacy declines. There is now a growing awareness of the consequences of nonreading to the workplace. (5) In 2001 the National Association of Manufacturers polled its members on skill deficiencies among employees. Among hourly workers, poor reading skills ranked second, and 38 percent of employers complained that local schools inadequately taught reading comprehension.

(6) The decline of reading is also taking its toll in the civic sphere. . . . A 2003 study of 15- to 26-year-olds' civic knowledge by the National Conference of State Legislatures concluded, "Young people do not understand the ideals of citizenship. . . and their appreciation and support of American democracy is limited."

It is probably no surprise that declining rates of literary reading coincide with declining levels of historical and political awareness among young people. (7) One of the surprising findings of "Reading at Risk" was that literary readers are markedly more civically engaged than nonreaders, scoring two to four times more likely to perform charity work, visit a museum, or attend a sporting event. One reason for their higher social and cultural interactions may lie in the kind of civic and historical knowledge that comes with literary reading. . . .

The evidence of literature's importance to (8) civic, personal, and economic health is too strong to ignore. The decline of literary reading foreshadows serious long-term social and economic problems, and it is time to bring literature and the other arts into discussions of public policy. Libraries, schools, and public agencies do noble work, but addressing the reading issue will require the leadership of politicians and the business community as well. . . .

Reading is not a timeless, universal capability. Advanced literacy is a specific intellectual skill and social habit that depends on a great many educational, cultural, and economic factors. (9) As more Americans lose this capability, our nation becomes less informed, active, and independent-minded. These are not the qualities that a free, innovative, or productive society can afford to lose.

(5) The writer provides survey data as evidence to support his point in the previous paragraph that "the significance of reading has become a persistent theme in the business world." This point and supporting evidence contribute to the writer's central claim that the decline in reading skills among young adults has negative long-term consequences.

(6) The writer again uses data, this time from a 2003 study, as further evidence to support his earlier claim that the decline in reading has far-reaching consequences. Here, his evidence links the decline in reading to deterioration in the civic sphere and waning "appreciation and support of American democracy."

(7) By referring to this report again, this time in the context of discussing a decline in civic engagement, the writer further supports the point he has just made.

(8) The writer contrasts "civic, personal and economic health" with "serious long-term social and economic problems," which is intended to frame a critical choice between potentially poor outcomes and a vital future.

(9) The writer uses the final sentence of the passage as an appeal to fear and national pride by warning that unless more emphasis is placed on reading, the United States will become "less informed, active, and independent-minded." These lines serve as an emotional call to action and raise the stakes of the argument the writer is making.

## EVALUATION CRITERIA

The criteria by which students’ written responses will be evaluated are notable for their clarity and robustness. As plans currently stand, each response will be assessed using three analytic traits — Reading, Analysis, and Writing — each of which will be scored on a scale of 1 to 4. (As elsewhere noted, additional ongoing research may confirm or modify that plan.)

While it is too early yet in the development of the Essay scoring model to publish a final rubric, the following serves as a likely indication of the bases on which students’ responses will be evaluated.

READING	ANALYSIS	WRITING
<p>The Reading domain encompasses students’ comprehension of a source text, including the text’s central ideas and important details and how they interrelate. Students demonstrate their skill in comprehension in part by making effective use of evidence (quotations, paraphrases, or both) from the source text.</p>	<p>The Analysis domain encompasses students’ evaluation of an author’s use of evidence, reasoning, and/or stylistic and persuasive elements, and/or features of the text of the students’ own choosing. Students demonstrate their skill in analysis in part by using relevant, sufficient, and strategically chosen support for the claims or points they make and by focusing consistently on those features of the text that are most relevant to addressing the task.</p>	<p>The Writing domain encompasses the cohesiveness of students’ written response to the task as well as students’ use of language. Students demonstrate their skill in writing in part by providing a precise central claim; creating an effective organization and progression of ideas; successfully employing a variety of sentence structures; using precise word choice; maintaining an appropriate style and tone; and showing command of the conventions of standard written English.</p>

As should be readily apparent from the table and from the discussion in Section II of the Essay’s evidentiary foundation, these criteria are both aligned with and supportive of important priorities in rigorous high school instruction. The clarity and richness of the criteria will also yield important information about student performance that should be easily understood and translated into further classroom-based work and support.

## Summary

The preceding discussion has presented an overview of the redesigned SAT's Reading, Writing and Language, and Essay Tests along with some of the features that make these tests distinctive — a break from both the current-generation SAT and many other assessments. We at the College Board will continue to be guided by research and evidence as we develop the redesigned SAT. In the months leading up to its release, for example, we may find through research that we need to adjust such elements described in this document as time limits, number of questions or tasks, or scores that we will report. When and if we make these or other changes, we will do so with the sole aim of making a better test, and we will communicate these changes as widely as possible and in a timely manner.

## Appendix B: Sample Test Materials: Reading, Writing and Language, and Essay

The sample questions/tasks in this appendix are provided to show a number of the key features of the redesigned SAT's Reading, Writing and Language, and Essay Tests, but do not constitute a full form in terms of total number of questions/tasks, the range of question difficulty across each test, or examples of all question types and formats.

### Sample Reading Set 1

#### PASSAGE

**CONTENT:** History/Social Studies / Founding Documents and the Great Global Conversation

**FOCUS:** Students must read and understand a passage from a text in the Great Global Conversation.

**Questions 1–5 are based on the following passage.**

*This passage is adapted from a speech delivered by Congresswoman Barbara Jordan of Texas on July 25, 1974, as a member of the Judiciary Committee of the United States House of Representatives. In the passage, Jordan discusses how and when a United States president may be impeached, or charged with serious offenses, while in office. Jordan’s speech was delivered in the context of impeachment hearings against then president Richard M. Nixon.*

Today, I am an inquisitor. An hyperbole would not be fictional and would not overstate the solemnness that I feel right now. My faith in the Constitution is whole; it is complete; it is total. And I am not going to sit here and be an idle spectator to the diminution, the subversion, the destruction, of the Constitution.

“Who can so properly be the inquisitors for the nation as the representatives of the nation themselves?” “The subjects of its jurisdiction are those offenses which proceed from the misconduct of public men.”\* And that’s what we’re talking about. In other words, [the jurisdiction comes] from the abuse or violation of some public trust.

It is wrong, I suggest, it is a misreading of the Constitution for any member here to assert that for a member to vote for an article of impeachment means that that member must be convinced that the President should be removed from office. The Constitution doesn’t say that. The powers relating to impeachment are an essential check in the hands of the body of the legislature against and upon the encroachments of the executive. The division between the two branches of the legislature, the House and the Senate, assigning to the one the right to accuse and to the other the right to judge—the framers of this Constitution were very astute. They did not make the accusers and the judges . . . the same person.

We know the nature of impeachment. We’ve been talking about it a while now. It is chiefly designed for the President and his high ministers to somehow be called into account. It is designed to “bridle” the executive if he engages in excesses. “It is designed as a method of national inquest into the conduct of public men.”\* The framers confided in the Congress the power, if need be, to

remove the President in order to strike a delicate balance between a President swollen with power and grown tyrannical, and preservation of the independence of the executive.

The nature of impeachment: a narrowly channeled exception to the separation of powers maxim. The Federal Convention of 1787 said that. It limited impeachment to high crimes and misdemeanors, and discounted and opposed the term “maladministration.” “It is to be used only for great misdemeanors,” so it was said in the North Carolina ratification convention. And in the Virginia ratification convention: “We do not trust our liberty to a particular branch. We need one branch to check the other.”

. . . The North Carolina ratification convention: “No one need be afraid that officers who commit oppression will pass with immunity.” “Prosecutions of impeachments will seldom fail to agitate the passions of the whole community,” said Hamilton in the Federalist Papers, number 65. “We divide into parties more or less friendly or inimical to the accused.”\* I do not mean political parties in that sense.

The drawing of political lines goes to the motivation behind impeachment; but impeachment must proceed within the confines of the constitutional term “high crime[s] and misdemeanors.” Of the impeachment process, it was Woodrow Wilson who said that “Nothing short of the grossest offenses against the plain law of the land will suffice to give them speed and effectiveness. Indignation so great as to overgrow party interest may secure a conviction; but nothing else can.”

Common sense would be revolted if we engaged upon this process for petty reasons. Congress has a lot to do: appropriations, tax reform, health insurance, campaign finance reform, housing, environmental protection, energy sufficiency, mass transportation. Pettiness cannot be allowed to stand in the face of such overwhelming problems. So today we’re not being petty. We’re trying to be big, because the task we have before us is a big one.

\*Jordan quotes from *Federalist* No. 65, an essay by Alexander Hamilton, published in 1788, on the powers of the United States Senate, including the power to decide cases of impeachment against a president of the United States.



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1. The stance Jordan takes in the passage is best described as that of
- A) an idealist setting forth principles.
  - B) an advocate seeking a compromise position.
  - C) an observer striving for neutrality.
  - D) a scholar researching a historical controversy.

CONTENT: Rhetoric / Analyzing point of view

FOCUS: Students must use information and ideas in the passage to determine the speaker's perspective.

KEY: A

Choice A is the best answer. Jordan helps establish her idealism by declaring that she is an “inquisitor” (line 1) and that her “faith in the Constitution is whole; it is complete; it is total” (lines 3–4). At numerous points in the passage, Jordan sets forth principles (e.g., “The powers relating to impeachment are an essential check in the hands of the body of the legislature against and upon the encroachments of the executive,” in lines 18–20) and makes reference to important documents that do the same, including the U.S. Constitution and *Federalist* No. 65.

Choice B is not the best answer because although Jordan is advocating a position, there is no evidence in the passage that she is seeking a compromise position. Indeed, she notes that she is “not going to sit here and be an idle spectator to the diminution, the subversion, the destruction, of the Constitution” (lines 4–6), indicating that she is not seeking compromise.

Choice C is not the best answer because Jordan is a participant (“an inquisitor,” line 1) in the proceedings, not a mere observer. Indeed, she notes that she is “not going to sit here and be an idle spectator to the diminution, the subversion, the destruction, of the Constitution” (lines 4–6).

Choice D is not the best answer because Jordan is identified as a congresswoman and an “inquisitor” (line 1), not a scholar, and because she is primarily discussing events happening at the moment, not researching an unidentified historical controversy. While she refers to historical documents and individuals, her main emphasis is on the (then) present impeachment hearings.

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2. The main rhetorical effect of the series of three phrases in lines 5–6 (“the diminution, the subversion, the destruction”) is to
- A) convey with increasing intensity the seriousness of the threat Jordan sees to the Constitution.
  - B) clarify that Jordan believes the Constitution was first weakened, then sabotaged, then broken.
  - C) indicate that Jordan thinks the Constitution is prone to failure in three distinct ways.
  - D) propose a three-part agenda for rescuing the Constitution from the current crisis.

CONTENT: Rhetoric / Analyzing word choice

FOCUS: Students must determine the main rhetorical effect of the speaker’s choice of words.

KEY: A

Choice A is the best answer because the quoted phrases — building from “diminution” to “subversion” to “destruction” — suggest the increasing seriousness of the threat Jordan sees to the Constitution.

Choice B is not the best answer because the passage offers no evidence that the quoted phrases refer to three different events that happened in a strict sequence. It is more reasonable to infer from the passage that Jordan sees “diminution,” “subversion,” and “destruction” as differing degrees to which the Constitution could be undermined. Moreover, the passage suggests that Jordan sees these three things as products of the same action or series of actions, not as three distinct stages in a process.

Choice C is not the best answer because the passage offers no evidence that the quoted phrases refer to three distinct ways in which the Constitution is prone to failure. It is more reasonable to infer from the passage that Jordan sees “diminution,” “subversion,” and “destruction” as differing degrees to which the Constitution could be undermined. Moreover, the passage suggests that Jordan sees these three things as products of the same action or series of actions, not as three distinct “ways.”

Choice D is not the best answer because the passage offers no evidence that the quoted phrases refer to three unique elements of a proposal to resolve a crisis. It is more reasonable to infer from the passage that Jordan sees “diminution,” “subversion,” and “destruction” as differing degrees to which the Constitution could be undermined. Moreover, the

passage suggests that Jordan sees these three things as products of the same action or series of actions, not as three distinct “parts.”

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3. As used in line 37, “channeled” most nearly means

- A) worn.
- B) sent.
- C) constrained.
- D) siphoned.

**CONTENT:** Information and Ideas / Interpreting words and phrases in context

**FOCUS:** Students must determine the meaning of a word in the context in which it appears.

**KEY:** C

Choice C is the best answer because the context makes clear that the kind of “exception” (line 38) Jordan describes should be narrowly constrained, or limited. As lines 38–41 indicate, the Federal Convention of 1787 “limited impeachment to high crimes and misdemeanors, and discounted and opposed the term ‘maladministration,’” presumably because the term implied too broad a scope for the exception.

Choice A is not the best answer because while “channeled” sometimes means “worn,” it would make no sense in context to say that the kind of “exception” (line 38) Jordan describes should be narrowly worn.

Choice B is not the best answer because while “channeled” sometimes means “sent,” it would make no sense in context to say that the kind of “exception” (line 38) Jordan describes should be narrowly sent.

Choice D is not the best answer because while “channeled” sometimes means “siphoned,” it would make no sense in context to say that the kind of “exception” (line 38) Jordan describes should be narrowly siphoned.

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4. In lines 49–54 (“Prosecutions . . . sense”), what is the most likely reason Jordan draws a distinction between two types of “parties”?
- A) To counter the suggestion that impeachment is or should be about partisan politics
  - B) To disagree with Hamilton’s claim that impeachment proceedings excite passions
  - C) To contend that Hamilton was too timid in his support for the concept of impeachment
  - D) To argue that impeachment cases are decided more on the basis of politics than on justice

CONTENT: Rhetoric / Analyzing arguments /  
Assessing reasoning

FOCUS: Students must interpret the speaker’s line of reasoning.

KEY: A

Choice A is the best answer. Jordan is making a distinction between two types of “parties”: the informal associations to which Alexander Hamilton refers and formal, organized political parties such as the modern-day Republican and Democratic parties. Jordan anticipates that listeners to her speech might misinterpret her use of Hamilton’s quotation as suggesting that she thinks impeachment is essentially a tool of organized political parties to achieve partisan ends, with one party attacking and another defending the president. Throughout the passage and notably in the seventh paragraph (lines 55–63), Jordan makes clear that she thinks impeachment should be reserved only for the most serious of offenses — ones that should rankle people of any political affiliation.

Choice B is not the best answer because Jordan offers no objection to Hamilton’s notion that impeachment proceedings excite passions. Indeed, she quotes Hamilton extensively in a way that indicates that she fundamentally agrees with his view on impeachment. Moreover, she acknowledges that her own speech is impassioned — that she feels a “solemnness” (line 2) and a willingness to indulge in “hyperbole” (line 1).

Choice C is not the best answer because Jordan offers no objection to Hamilton’s level of support for the concept of impeachment. Indeed, she quotes Hamilton extensively in a way that indicates that she fundamentally agrees with his view on impeachment.

Choice D is not the best answer because Jordan suggests that she and her fellow members of Congress are “trying to be big” (line 71), or high-minded, rather than decide the present case on the basis of politics. Indeed, throughout the last four paragraphs of the passage (lines 37–72), she elaborates on the principled, just basis on which impeachment should proceed. Moreover, throughout the passage Jordan is focused on the present impeachment hearings, not on the justice or injustice of impeachments generally.

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5. Which choice provides the best evidence for the answer to the previous question?
- A) Lines 13–17 (“It . . . office”)
  - B) Lines 20–24 (“The division . . . astute”)
  - C) Lines 55–58 (“The drawing . . . misdemeanors”)
  - D) Lines 65–68 (“Congress . . . transportation”)

CONTENT: Information and Ideas / Citing textual evidence

FOCUS: Students must determine which portion of the passage provides the best evidence for the answer to question 4.

KEY: C

Choice C is the best answer because in lines 55–58, Jordan draws a contrast between political motivations and “high crime[s] and misdemeanors” as the basis for impeachment and argues that impeachment “must proceed within the confines” of the latter concept. These lines thus serve as the best evidence for the answer to the previous question.

Choice A is not the best answer because lines 13–17 only address a misconception that Jordan contends some people have about what a vote for impeachment means. These lines thus do not serve as the best evidence for the answer to the previous question.

Choice B is not the best answer because lines 20–24 only speak to a division of responsibility between the two houses of the U.S. Congress. These lines thus do not serve as the best evidence for the answer to the previous question.

Choice D is not the best answer because lines 65–68 serve mainly to indicate that the U.S. Congress has an extensive and important agenda. These lines thus do not serve as the best evidence for the answer to the previous question.

## Sample Reading Set 2

### PASSAGE

CONTENT: Science

FOCUS: Students must read and understand a passage and accompanying graphic on a natural science topic.

**Questions 1–6 are based on the following passage and supplementary material.**

*This passage is adapted from Ed Yong, “Turtles Use the Earth’s Magnetic Field as Global GPS.” ©2011 by Kalmbach Publishing Co.*

In 1996, a loggerhead turtle called Adelita swam across 9,000 miles from Mexico to Japan, crossing the entire Pacific on her way. Wallace J. Nichols tracked this epic journey with a satellite tag. But Adelita herself had no such technology at her disposal. How did she steer a route across two oceans to find her destination?

Nathan Putman has the answer. By testing hatchling turtles in a special tank, he has found that they can use the Earth’s magnetic field as their own Global Positioning System (GPS). By sensing the field, they can work out both their latitude and longitude and head in the right direction.

Putman works in the lab of Ken Lohmann, who has been studying the magnetic abilities of loggerheads for over 20 years. In his lab at the University of North Carolina, Lohmann places hatchlings in a large water tank surrounded by a large grid of electromagnetic coils. In 1991, he found that the babies started swimming in the opposite direction if he used the coils to reverse the direction of the magnetic field around them. They could use the field as a compass to get their bearing.

Later, Lohmann showed that they can also use the magnetic field to work out their position. For them, this is literally a matter of life or death. Hatchlings born off the coast of Florida spend their early lives in the North

Atlantic gyre, a warm current that circles between North America and Africa. If they’re swept towards the cold waters outside the gyre, they die. Their magnetic sense keeps them safe.

Using his coil-surrounded tank, Lohmann could mimic the magnetic field at different parts of the Earth’s surface. If he simulated the field at the northern edge of the gyre, the hatchlings swam southwards. If he simulated the field at the gyre’s southern edge, the turtles swam west-northwest. These experiments showed that the turtles can use their magnetic sense to work out their latitude—their position on a north-south axis. Now, Putman has shown that they can also determine their longitude—their position on an east-west axis.

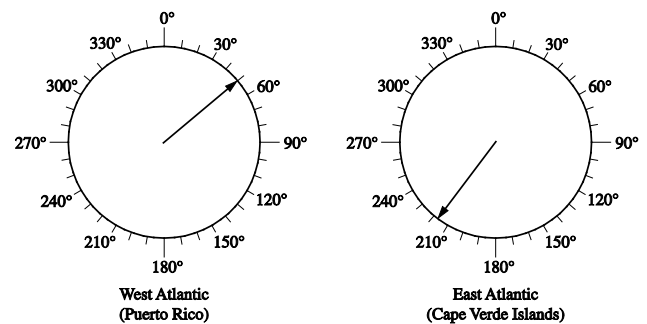
He tweaked his magnetic tanks to simulate the fields in two positions with the same latitude at opposite ends of the Atlantic. If the field simulated the west Atlantic near Puerto Rico, the turtles swam northeast. If the field matched that on the east Atlantic near the Cape Verde Islands, the turtles swam southwest. In the wild, both headings would keep them within the safe, warm embrace of the North Atlantic gyre.

Before now, we knew that several animal migrants, from loggerheads to reed warblers to sparrows, had some way of working out longitude, but no one knew how. By keeping the turtles in the same conditions, with only the magnetic fields around them changing, Putman clearly showed that they can use these fields to find their way. In the wild, they might well also use other landmarks like the position of the sea, sun and stars.

Putman thinks that the turtles work out their position using two features of the Earth’s magnetic field that

change over its surface. They can sense the field's inclination, or the angle at which it dips towards the surface. At the poles, this angle is roughly 90 degrees and at the equator, it's roughly zero degrees. They can also sense its intensity, which is strongest near the poles and weakest near the equator. Different parts of the world have unique combinations of these two variables. Neither corresponds directly to either latitude or longitude, but together, they provide a "magnetic signature" that tells the turtle where it is.

**ORIENTATION OF HATCHLING LOGGERHEADS TESTED IN MAGNETIC FIELDS**



Adapted from Nathan Putman, Courtney Endres, Catherine Lohmann, and Kenneth Lohmann, "Longitude Perception and Bicoordinate Magnetic Maps in Sea Turtles." ©2011 by Elsevier Inc.

*Orientation of hatchling loggerheads tested in a magnetic field that simulates a position at the west side of the Atlantic near Puerto Rico (left) and a position at the east side of the Atlantic near the Cape Verde Islands (right). The arrow in each circle indicates the mean direction that the group of hatchlings swam. Data are plotted relative to geographic north ( $N = 0^\circ$ ).*

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1. The passage most strongly suggests that Adelita used which of the following to navigate her 9,000-mile journey?
- A) The current of the North Atlantic gyre
  - B) Cues from electromagnetic coils designed by Putman and Lohmann
  - C) The inclination and intensity of Earth’s magnetic field
  - D) A simulated “magnetic signature” configured by Lohmann

**CONTENT:** Information and Ideas / Reading closely / Determining implicit meanings

**FOCUS:** Students must draw a reasonable inference from the text.

**KEY:** C

Choice C is the best answer. The first paragraph describes the 9,000-mile journey that Adelita made and raises the question, which the rest of the passage tries to answer, of how this loggerhead turtle was able to “steer a route across two oceans to find her destination” (lines 5–6). The answer comes most directly in the last paragraph, which presents Putman’s belief that loggerhead turtles “work out their position using two features of the Earth’s magnetic field that change over its surface” (lines 56–58): its inclination and its intensity. It is reasonable, therefore, to infer from the passage that this was the method that Adelita used.

Choice A is not the best answer because there is no evidence in the passage that Adelita used the current of the North Atlantic gyre to navigate her 9,000-mile journey. The passage does discuss the North Atlantic gyre but only as the place where loggerhead turtle hatchlings “born off the coast of Florida spend their early lives” (lines 24–25).

Choice B is not the best answer because there is no evidence in the passage that Adelita navigated her 9,000-mile journey with the aid of cues from electromagnetic coils designed by Putman and Lohmann. The passage does say that Putman and Lohmann use electromagnetic coils as part of their research on loggerhead turtles, but the coils are part of tanks used in a laboratory to study loggerhead hatchlings (see lines 13–17).

Choice D is not the best answer because there is no evidence in the passage that Adelita navigated her 9,000-mile journey with the aid of a simulated “magnetic signature” configured by Lohmann. The passage does describe how Lohmann and Putman manipulate magnetic fields as part of their research on loggerhead turtle hatchlings (see, for example, lines 15–20), but there is no indication that the two scientists used (or



even could use) the kind of equipment necessary for this project outside of laboratory tanks or with Adelita in the wild.

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2. Which choice provides the best evidence for the answer to the previous question?

- A) Lines 1–3 (“In 1996 . . . way”)
- B) Lines 30–32 (“Using . . . surface”)
- C) Lines 53–55 (“In the wild . . . stars”)
- D) Lines 64–67 (“Neither . . . it is”)

CONTENT: Information and Ideas / Citing textual evidence

FOCUS: Students must determine which portion of the passage provides the best support for the answer to question 1.

KEY: D

Choice D is the best answer because in lines 64–67, the author indicates that “together, [inclination and intensity] provide a ‘magnetic signature’ that tells the turtle where it is.” These lines thus serve as the best evidence for the answer to the previous question.

Choice A is not the best answer because in lines 1–3, the author establishes that Adelita made a 9,000-mile journey but does not explain how she navigated it. These lines thus do not serve as the best evidence for the answer to the previous question.

Choice B is not the best answer because in lines 30–32, the author indicates that Lohmann is able to “mimic the magnetic field at different parts of the Earth’s surface” in his laboratory but does not explain how Adelita navigated her 9,000-mile journey or suggest that Lohmann had any influence over Adelita’s trip. These lines thus do not serve as the best evidence for the answer to the previous question.

Choice C is not the best answer because in lines 53–55, the author notes that loggerhead turtles “in the wild” may make use of “landmarks like the position of the sea, sun and stars” but does not indicate that Adelita used such landmarks to navigate her 9,000-mile journey. These lines thus do not serve as the best evidence for the answer to the previous question.

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3. As used in line 3, “tracked” most nearly means

- A) searched for.
- B) traveled over.
- C) followed.
- D) hunted.

CONTENT: Information and Ideas / Interpreting words and phrases in context

FOCUS: Students must determine the meaning of a word in the context in which it appears.

KEY: C

Choice C is the best answer because the context makes clear that Nichols followed Adelita’s “epic journey with a satellite tag” (line 4).

Choice A is not the best answer because while “tracked” sometimes means “searched for,” it would make little sense in context to say that Nichols searched for Adelita’s “epic journey with a satellite tag” (line 4). It is more reasonable to conclude from the passage that Nichols knew about Adelita and her journey and used a satellite tag to help follow it.

Choice B is not the best answer because while “tracked” sometimes means “traveled over,” it would make no sense in context to say that Nichols traveled over Adelita’s “epic journey with a satellite tag” (line 4).

Choice D is not the best answer because while “tracked” sometimes means “hunted,” it would make no sense in context to say that Nichols hunted Adelita’s “epic journey with a satellite tag” (line 4).

4. Based on the passage, which choice best describes the relationship between Putman’s and Lohmann’s research?
- A) Putman’s research contradicts Lohmann’s.
  - B) Putman’s research builds on Lohmann’s.
  - C) Lohmann’s research confirms Putman’s.
  - D) Lohmann’s research corrects Putman’s.

CONTENT: Information and Ideas / Understanding relationships

FOCUS: Students must characterize the relationship between two individuals described in the passage.

KEY: B

Choice B is the best answer. Putman “works in the lab of Ken Lohmann, who has been studying the magnetic abilities of loggerheads for over 20 years” (lines 13–15). Lohmann had earlier demonstrated that loggerhead turtles “could use the [magnetic] field as a compass to get their bearing” (lines 20–21) and “use their magnetic sense to work out their latitude—their position on a north-south axis” (lines 36–37). Putman has since (“now,” line 37) built on Lohmann’s work by demonstrating that the turtles “can also determine their longitude—their position on an east-west axis” (lines 38–39).

Choice A is not the best answer because the passage does not indicate that Putman’s research contradicts Lohmann’s. In fact, Putman’s work complements Lohmann’s. Lohmann had demonstrated that loggerhead turtles “could use the [magnetic] field as a compass to get their bearing” (lines 20–21) and “use their magnetic sense to work out their latitude—their position on a north-south axis” (lines 36–37). Putman has, in turn, demonstrated that the turtles “can also determine their longitude—their position on an east-west axis” (lines 38–39).

Choice C is not the best answer because the research of Lohmann that the passage describes came before that of Putman. Putman “works in the lab of Ken Lohmann, who has been studying the magnetic abilities of loggerheads for over 20 years” (lines 13–15). Lohmann had earlier demonstrated that loggerhead turtles “could use the [magnetic] field as a compass to get their bearing” (lines 20–21) and “use their magnetic sense to work out their latitude—their position on a north-south axis” (lines 36–37). Putman has since (“now,” line 37) built on Lohmann’s work by demonstrating that the turtles “can also determine their longitude—their position on an east-west axis” (lines 38–39).

Choice D is not the best answer because the passage does not indicate that Lohmann’s research corrects Putman’s. First, the research of Lohmann that the passage describes came before that of Putman (see explanation for choice C) and thus could not “correct” Putman’s later research. Second, the passage does not indicate that Putman’s research contradicts Lohmann’s (see explanation for choice A), meaning that there is nothing for Lohmann to “correct” with his own research.

5. The author refers to reed warblers and sparrows (line 49) primarily to
- A) contrast the loggerhead turtle’s migration patterns with those of other species.
  - B) provide examples of species that share one of the loggerhead turtle’s abilities.
  - C) suggest that most animal species possess some ability to navigate long distances.
  - D) illustrate some ways in which the ability to navigate long distances can help a species.

**CONTENT:** Rhetoric / Analyzing text structure / Analyzing part-whole relationships

**FOCUS:** Students must determine the main rhetorical effect a part of the passage has on the passage as a whole.

**KEY:** B

Choice B is the best answer because the author indicates that reed warblers and sparrows, like loggerhead turtles, had previously been known to have “some way of working out longitude” (lines 49–50).

Choice A is not the best answer because although the author notes that loggerhead turtles, reed warblers, and sparrows are all “animal migrants” (line 48), he offers no specifics about reed warblers’ and sparrows’ migration patterns, and the only connection he draws among the three animals is their recognized ability of somehow “working out longitude” (line 50).

Choice C is not the best answer because the author only mentions three “animal migrants” by name (loggerhead turtles, reed warblers, and sparrows) and indicates that “several” such migrants had previously been known to have “some way of working out longitude” (lines 48–50).

He makes no claim in the passage that most animal species have some long-distance navigation ability.

Choice D is not the best answer because although the author indicates that reed warblers and sparrows, like loggerhead turtles, are “animal migrants” (line 48), he offers no specifics about how the ability to navigate long distances might help reed warblers and sparrows (nor, for that matter, much information about how this ability might help loggerhead turtles).

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6. It can reasonably be inferred from the passage and graphic that if scientists adjusted the coils to reverse the magnetic field simulating that in the East Atlantic (Cape Verde Islands), the hatchlings would most likely swim in which direction?

- A) Northwest
- B) Northeast
- C) Southeast
- D) Southwest

CONTENT: Synthesis / Analyzing quantitative information

FOCUS: Students must interpret a graphic and synthesize information from both the text and the graphic.

KEY: B

Choice B is the best answer. The passage notes that Lohmann, who studied loggerhead turtle hatchlings “in a large water tank surrounded by a large grid of electromagnetic coils” (lines 16–17) capable of manipulating the magnetic field around the turtles, discovered that the hatchlings would start “swimming in the opposite direction” when he “reverse[d] the direction of the magnetic field around them” (lines 18–20). The graphic (whose caption establishes that geographic north is represented by 0 degrees) indicates that loggerhead hatchlings tested in a magnetic field that simulates a position at the east side of the Atlantic near the Cape Verde Islands would normally travel in a southwesterly direction (around 218 degrees). Given the above information, it is reasonable to infer that if the magnetic field were reversed, the turtles would travel in a northeasterly direction.

Choice A is not the best answer because information in the passage and graphic suggests that the loggerhead turtle hatchlings would travel in a

northeasterly, and not a northwesterly, direction if scientists reversed the magnetic field simulating a position at the east side of the Atlantic near the Cape Verde Islands.

Choice C is not the best answer because information in the passage and graphic suggests that the loggerhead turtle hatchlings would travel in a northeasterly, and not a southeasterly, direction if scientists reversed the magnetic field simulating a position at the east side of the Atlantic near the Cape Verde Islands.

Choice D is not the best answer because information in the passage and graphic suggests that the loggerhead turtle hatchlings would travel in a northeasterly, and not a southwesterly, direction if scientists reversed the magnetic field simulating a position at the east side of the Atlantic near the Cape Verde Islands. The graphic indicates that the hatchlings travel southwesterly under the normal (nonreversed) simulated conditions.

## Sample Reading Set 3

### PASSAGE

CONTENT: History/Social Studies / Social science

FOCUS: Students must read and understand a passage and accompanying graphic on a social science topic.

**Questions 1-3 are based on the following passage and supplementary material.**

*This passage is adapted from Richard Florida, The Great Reset. ©2010 by Richard Florida.*

In today's idea-driven economy, the cost of time is what really matters. With the constant pressure to innovate, it makes little sense to waste countless collective hours commuting. So, the most efficient and productive regions are those in which people are thinking and working—not sitting in traffic.

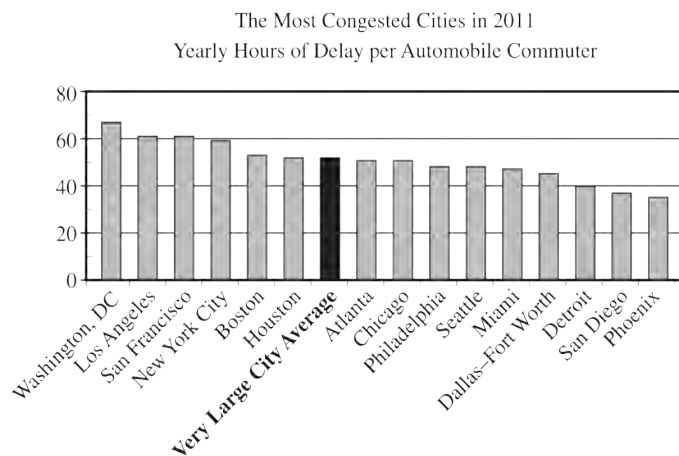
The auto-dependent transportation system has reached its limit in most major cities and megaregions. Commuting by car is among the least efficient of all our activities—not to mention among the least enjoyable, according to detailed research by the Nobel Prize-winning economist Daniel Kahneman and his colleagues. Though one might think that the economic crisis beginning in 2007 would have reduced traffic (high unemployment means fewer workers traveling to and from work), the opposite has been true. Average commutes have lengthened, and congestion has gotten worse, if anything. The average commute rose in 2008 to 25.5 minutes, “erasing years of decreases to stand at the level of 2000, as people had to leave home earlier in the morning to pick up friends for their ride to work or to catch a bus or subway train,” according to the U.S. Census Bureau, which collects the figures. And those are average figures. Commutes are far longer in the big West Coast cities of Los Angeles and San Francisco and the East Coast cities of New York, Philadelphia, Baltimore, and Washington, D.C. In many of these cities, gridlock

has become the norm, not just at rush hour but all day, every day.

The costs are astounding. In Los Angeles, congestion eats up more than 485 million working hours a year; that's seventy hours, or nearly two weeks, of full-time work per commuter. In D.C., the time cost of congestion is sixty-two hours per worker per year. In New York it's forty-four hours. Average it out, and the time cost across America's thirteen biggest city-regions is fifty-one hours per worker per year. Across the country, commuting wastes 4.2 billion hours of work time annually—nearly a full workweek for every commuter. The overall cost to the U.S. economy is nearly \$90 billion when lost productivity and wasted fuel are taken into account. At the Martin Prosperity Institute, we calculate that every minute shaved off America's commuting time is worth \$19.5 billion in value added to the economy. The numbers add up fast: five minutes is worth \$97.7 billion; ten minutes, \$195 billion; fifteen minutes, \$292 billion.

It's ironic that so many people still believe the main remedy for traffic congestion is to build more roads and highways, which of course only makes the problem worse. New roads generate higher levels of “induced traffic,” that is, new roads just invite drivers to drive more and lure people who take mass transit back to their cars. Eventually, we end up with more clogged roads rather than a long-term improvement in traffic flow.

The coming decades will likely see more intense clustering of jobs, innovation, and productivity in a smaller number of bigger cities and city-regions. Some regions could end up bloated beyond the capacity of their infrastructure, while others struggle, their promise stymied by inadequate human or other resources.



Adapted from Adam Werbach, "The American Commuter Spends 38 Hours a Year Stuck in Traffic." ©2013 by The Atlantic.

1. The passage most strongly suggests that researchers at the Martin Prosperity Institute share which assumption?
  - A) Employees who work from home are more valuable to their employers than employees who commute.
  - B) Employees whose commutes are shortened will use the time saved to do additional productive work for their employers.
  - C) Employees can conduct business activities, such as composing memos or joining conference calls, while commuting.
  - D) Employees who have lengthy commutes tend to make more money than employees who have shorter commutes.

CONTENT: Rhetoric / Analyzing arguments / Assessing reasoning

FOCUS: Students must reasonably infer an assumption that is implied in the passage.

KEY: B

Choice B is the best answer because details in the third paragraph (lines 30–46) strongly suggest that researchers (“we”) at the Martin Prosperity Institute assume that shorter commutes will lead to more productive time for workers. The author notes that “across the country, commuting wastes 4.2 billion hours of work time annually” and that “the overall cost to the U.S. economy is nearly \$90 billion when lost productivity and wasted fuel are taken into account” (lines 37–41). Given also that those at the institute “calculate that every minute shaved off America’s



commuting time is worth \$19.5 billion in value added to the economy” (lines 42–44), it can reasonably be concluded that some of that added value is from heightened worker productivity.

Choice A is not the best answer because there is no evidence in the passage that researchers at the Martin Prosperity Institute assume that employees who work from home are more valuable to their employers than employees who commute. Although the passage does criticize long commutes, it does not propose working from home as a solution.

Choice C is not the best answer because there is no evidence in the passage that researchers at the Martin Prosperity Institute assume that employees can conduct business activities, such as composing memos or joining conference calls, while commuting. The passage does discuss commuting in some detail, but it does not mention activities that commuters can or should be undertaking while commuting, and it generally portrays commuting time as lost or wasted time.

Choice D is not the best answer because there is no evidence in the passage that researchers at the Martin Prosperity Institute assume that employees who have lengthy commutes tend to make more money than employees who have shorter commutes. The passage does not draw any clear links between the amount of money employees make and the commutes they have.

---

2. As used in line 55, “intense” most nearly means

- A) emotional.
- B) concentrated.
- C) brilliant.
- D) determined.

**CONTENT:** Information and Ideas / Interpreting words and phrases in context

**FOCUS:** Students must determine the meaning of a word in the context in which it appears.

**KEY:** B

Choice B is the best answer because the context makes clear that the clustering of jobs, innovation, and productivity will be more

concentrated in, or more densely packed into, “a smaller number of bigger cities and city-regions” (lines 56–57).

Choice A is not the best answer because although “intense” sometimes means “emotional,” it would make no sense in context to say that the clustering of jobs, innovation, and productivity will be more emotional in “a smaller number of bigger cities and city-regions” (lines 56–57).

Choice C is not the best answer because although “intense” sometimes means “brilliant,” it would make no sense in context to say that the clustering of jobs, innovation, and productivity will be more brilliant in “a smaller number of bigger cities and city-regions” (lines 56–57).

Choice D is not the best answer because although “intense” sometimes means “determined,” it would make no sense in context to say that the clustering of jobs, innovation, and productivity will be more determined in “a smaller number of bigger cities and city-regions” (lines 56–57).

- 
3. Which claim about traffic congestion is supported by the graph?
- A) New York City commuters spend less time annually delayed by traffic congestion than the average for very large cities.
  - B) Los Angeles commuters are delayed more hours annually by traffic congestion than are commuters in Washington, D.C.
  - C) Commuters in Washington, D.C., face greater delays annually due to traffic congestion than do commuters in New York City.
  - D) Commuters in Detroit spend more time delayed annually by traffic congestion than do commuters in Houston, Atlanta, and Chicago.

CONTENT: Synthesis / Analyzing quantitative information

FOCUS: Students must interpret data presented graphically.

KEY: C

Choice C is the best answer. Higher bars on the graph represent longer annual commute delays than do lower bars; moreover, the number of hours of annual commute delay generally decreases as one moves from left to right on the graph. The bar for Washington, D.C. is higher than and to the left of that for New York City, meaning that D.C. automobile commuters experience greater amounts of delay each year.

Choice A is not the best answer because the graph's bar for New York City is higher than and to the left of that for the average for very large cities, meaning that New York City automobile commuters experience greater, not lesser, amounts of delay each year.

Choice B is not the best answer because the graph's bar for Los Angeles is lower than and to the right of that for Washington, D.C., meaning that Los Angeles automobile commuters experience lesser, not greater, amounts of delay each year.

Choice D is not the best answer because the graph's bar for Detroit is lower than and to the right of those for Houston, Atlanta, and Chicago, meaning that Detroit automobile commuters experience lesser, not greater, amounts of delay each year.

## Lower Text Complexity Example

This passage should offer a relatively low reading challenge for college- and career-ready high school juniors and seniors, although some aspects of the passage are more challenging than others (as is generally true of authentic texts).

(1) This passage is adapted from Richard Florida, *The Great Reset*. ©2010 by Richard Florida.

(2) In today’s idea-driven economy, the cost of time is what really matters. With the constant pressure to innovate, it makes little sense to waste countless collective hours commuting. So, the most efficient and productive regions are those in which people are thinking and working—not sitting in traffic.

(3) The auto-dependent transportation system has reached its limit in most major cities and megaregions. Commuting by car is among the least efficient of all our activities—not to mention among the least enjoyable, according to detailed research by the Nobel Prize–winning economist Daniel Kahneman and his colleagues. Though one might think that the economic crisis beginning in 2007 would have reduced traffic (high unemployment means fewer workers traveling to and from work), the opposite has been true. Average commutes have lengthened, and congestion has gotten worse, if anything. (4) The average commute rose in 2008 to 25.5 minutes, “erasing years of decreases to stand at the level of 2000, as people had to leave home earlier in the morning to pick up friends for their ride to work or to catch a bus or subway train,” according to the U.S. Census Bureau, which collects the figures. And those are average figures. Commutes are far longer in the big West Coast cities of Los Angeles and San Francisco and the East Coast cities of New York, Philadelphia, Baltimore, and Washington, D.C. In many of these cities, gridlock has become the norm, not just at rush hour but all day, every day.

(5) The costs are astounding. In Los Angeles, congestion eats up more than 485 million working hours a year; that’s seventy hours, or nearly two weeks, of full-time work per commuter. In D.C., the time cost of congestion is sixty-two hours per worker per year. In New York it’s forty-four hours. Average it out, and the time cost across America’s thirteen biggest city-regions is fifty-one hours per worker per year. Across the country, commuting wastes 4.2 billion hours of work time annually—nearly a full workweek for every commuter. The overall cost to the U.S. economy is nearly \$90 billion when lost productivity and wasted fuel are

**(1) Knowledge Demands: Content/Discipline Knowledge:** The passage assumes little to no prior familiarity with the topic, which reduces the reading challenge.

**(2) Language Conventuality and Clarity:** The passage generally uses familiar vocabulary and relatively simple sentence structures. The author’s fairly informal tone also helps make the passage more accessible, further reducing the reading challenge.

**(3) Purpose:** The purpose of the passage is straightforward: to describe the degree of and costs associated with the congestion of U.S. cities and city-regions. The passage consistently builds support to achieve this purpose, which also helps reduce the reading challenge.

**(4) Knowledge Demands: Content/Discipline Knowledge:** The passage’s references to other texts and sources of evidence are clearly signaled and easily grasped, making them fairly easy to digest.

**(5) Structure:** The structure of the passage is relatively simple. Paragraphs generally are introduced by topic sentences, focus on a single main idea, and use easily understood supporting details clearly related to the main idea. These factors contribute to the relatively low reading challenge of the text.

taken into account. At the Martin Prosperity Institute, we calculate that every minute shaved off America’s commuting time is worth \$19.5 billion in value added to the economy. The numbers add up fast: five minutes is worth \$97.7 billion; ten minutes, \$195 billion; fifteen minutes, \$292 billion.

It’s ironic that so many people still believe the main remedy for traffic congestion is to build more roads and highways, which of course only makes the problem worse. New roads generate higher levels of (6) “induced traffic,” that is, new roads just invite drivers to drive more and lure people who take mass transit back to their cars. Eventually, we end up with more clogged roads rather than a long-term improvement in traffic flow.

The coming decades will likely see more intense clustering of jobs, innovation, and productivity in a smaller number of bigger cities and city-regions. Some regions could end up bloated beyond the capacity of their infrastructure, while others struggle, their promise stymied by inadequate human or other resources.

**(6) Language Conventionality and Clarity:** The passage does introduce some abstract and potentially unfamiliar terms, but the author provides sufficient context for understanding them, which reduces the reading challenge.

## Higher Text Complexity Example

This passage should offer a relatively high reading challenge for college- and career-ready high school juniors and seniors, although some aspects of the passage are less challenging than others (as is generally true of authentic texts).

(1) This passage is adapted from a speech delivered by Congresswoman Barbara Jordan of Texas on July 25, 1974, as a member of the Judiciary Committee of the United States House of Representatives. In the passage, Jordan discusses how and when a United States president may be impeached, or charged with serious offenses, while in office. Jordan’s speech was delivered in the context of impeachment hearings against then president Richard M. Nixon.

(2) Today, I am an inquisitor. (3) An hyperbole would not be fictional and would not overstate the solemnness that I feel right now. My faith in the Constitution is whole; it is complete; it is total. And I am not going to sit here and be an idle spectator to the diminution, the subversion, the destruction, of the Constitution.

(4) “Who can so properly be the inquisitors for the nation as the representatives of the nation themselves?” “The subjects of its jurisdiction are those offenses which proceed from the misconduct of public men.”\* And that’s what we’re talking about. In other words, [the jurisdiction comes] from the abuse or violation of some public trust.

It is wrong, I suggest, it is a misreading of the Constitution for any member here to assert that for a member to vote for an article of impeachment means that that member must be convinced that the President should be removed from office. The Constitution doesn’t say that. The powers relating to impeachment are an essential check in the hands of the body of the legislature against and upon the encroachments of the executive. The division between the two branches of the legislature, the House and the Senate, assigning to the one the right to accuse and to the other the right to judge—the framers of this Constitution were very astute. They did not make the accusers and the judges . . . the same person.

We know the nature of impeachment. We’ve been talking about it a while now. It is chiefly designed for the President and his high ministers to somehow be called into account. It is designed to “bridle” the executive

**(1) Purpose:** The purpose of the passage is relatively straightforward (and clarified to some degree in the passage’s advance organizer): to offer Jordan’s view of the nature of the impeachment of a U.S. president.

**(2) Structure:** The passage is fairly loose in structure. This adds to the challenge of following the development of the argument.

**(3) Language Conventionalty and Clarity:** Jordan uses elevated diction, uncommon sentence structures, and potentially unfamiliar vocabulary here and throughout the passage (although context clues are generally available), which adds to the challenge of the passage.

**(4) Knowledge Demands: Content/ Discipline Knowledge:** Jordan makes numerous references to other texts, particularly to the U.S. Constitution and other U.S. founding documents, as she builds her case. This interspersing of quotations and historical references significantly increases the challenge of the passage.

if he engages in excesses. “It is designed as a method of national inquest into the conduct of public men.”\* The framers confided in the Congress the power, if need be, to remove the President in order to strike a delicate balance between a President swollen with power and grown tyrannical, and preservation of the independence of the executive.

(5) The nature of impeachment: a narrowly channeled exception to the separation of powers maxim. The Federal Convention of 1787 said that. It limited impeachment to high crimes and misdemeanors, and discounted and opposed the term “maladministration.” “It is to be used only for great misdemeanors,” so it was said in the North Carolina ratification convention. And in the Virginia ratification convention: “We do not trust our liberty to a particular branch. We need one branch to check the other.”

. . . The North Carolina ratification convention: “No one need be afraid that officers who commit oppression will pass with immunity.” “Prosecutions of impeachments will seldom fail to agitate the passions of the whole community,” said Hamilton in the *Federalist Papers*, number 65. “We divide into parties more or less friendly or inimical to the accused.”\* I do not mean political parties in that sense.

The drawing of political lines goes to the motivation behind impeachment; but impeachment must proceed within the confines of the constitutional term “high crime[s] and misdemeanors.” Of the impeachment process, it was Woodrow Wilson who said that “Nothing short of the grossest offenses against the plain law of the land will suffice to give them speed and effectiveness. Indignation so great as to overgrow party interest may secure a conviction; but nothing else can.”

Common sense would be revolted if we engaged upon this process for petty reasons. Congress has a lot to do: appropriations, tax reform, health insurance, campaign finance reform, housing, environmental protection, energy sufficiency, mass transportation. Pettiness cannot be allowed to stand in the face of such overwhelming problems. So today we’re not being petty. We’re trying to be big, because the task we have before us is a big one.

\*Jordan quotes from *Federalist No. 65*, an essay by Alexander Hamilton, published in 1788, on the powers of the United States Senate, including the power to decide cases of impeachment against a president of the United States.

(5) **Purpose:** Although the passage responds to concrete, real-world events, Jordan frequently moves beyond present-day circumstances to address principles and other abstract notions. This abstractness adds appreciably to the reading challenge.

## Sample Writing and Language Set 1

### PASSAGE

CONTENT: Humanities

FOCUS: Students must make revising and editing decisions in the context of a passage on a topic in the humanities.

Questions 1–7 are based on the following passage.

#### Dong Kingman: Painter of Cities

A 1954 documentary about renowned watercolor painter Dong Kingman shows the artist sitting on a stool on Mott Street in New York City’s Chinatown. A crowd of admiring spectators watches as Kingman squeezes dollops of paint from several tubes into a tin watercolor **1** box, from just a few primary colors, Kingman creates dozens of beautiful hues as he layers the translucent paint onto the paper on his easel. Each stroke of the brush and dab of the sponge transforms thinly sketched outlines into buildings, shop signs, and streetlamps. The street scene Kingman begins composing in this short film is very much in keeping with the urban landscapes for which he is best known.

[1] Kingman was keenly interested in landscape painting from an early age. [2] In Hong Kong, where Kingman completed his schooling, teachers at that time customarily assigned students a formal “school name.” [3] His interest was so keen, in fact, that he was named after it. [4] The young boy who had been called Dong Moy Shu became Dong Kingman. [5] The name Kingman was selected for its two **2** parts, “king” and “man”; Cantonese for “scenery” and “composition.” [6] As Kingman developed as a painter, his works were often compared to **3** paintings by Chinese landscape artists dating back to CE 960, a time when a strong tradition of landscape painting emerged in Chinese art. [7] Kingman, however, **4** vacated from that tradition in a number of ways, most notably in that he chose to focus not on natural landscapes, such as mountains and rivers, but on cities. **5**

1. A) NO CHANGE  
B) box. From just a few primary colors,  
C) box from just a few primary colors,  
D) box, from just a few primary colors
2. A) NO CHANGE  
B) parts: “king” and “man,”  
C) parts “king” and “man”;  
D) parts; “king” and “man”
3. A) NO CHANGE  
B) Chinese landscape artists  
C) painters of Chinese landscapes  
D) artists
4. A) NO CHANGE  
B) evacuated  
C) departed  
D) retired
5. For the sake of the cohesion of this paragraph, sentence 3 should be placed  
A) where it is now.  
B) before sentence 1.  
C) after sentence 1.  
D) after sentence 4.



6 His fine brushwork conveys detailed street-level activity: a peanut vendor pushing his cart on the sidewalk, a pigeon pecking for crumbs around a fire hydrant, an old man tending to a baby outside a doorway. His broader brushstrokes and sponge-painted shapes create majestic city skylines, with skyscrapers towering in the background, bridges connecting neighborhoods on either side of a river, and enormous ships maneuvering out of a busy harbor. To art critics and fans alike, these city scenes represent the innovative spirit of twentieth-century urban Modernism.

During his career, Kingman exhibited his work 7 internationally. He garnered much acclaim. In 1936, a critic described one of Kingman's solo exhibits as "twenty of the freshest, most satisfying watercolors that have been seen hereabouts in many a day." Since Kingman's death in 2000, museums across the United States and in China have continued to ensure that his now-iconic landscapes remain available for the public to enjoy.

6. Which choice most effectively establishes the main topic of the paragraph?
- A) Kingman is considered a pioneer of the California Style school of painting.
  - B) Although cities were his main subject, Kingman did occasionally paint natural landscapes.
  - C) In his urban landscapes, Kingman captures the vibrancy of crowded cities.
  - D) In 1929 Kingman moved to Oakland, California, where he attended the Fox Art School.
7. Which choice most effectively combines the sentences at the underlined portion?
- A) internationally, and Kingman also garnered
  - B) internationally; from exhibiting, he garnered
  - C) internationally but garnered
  - D) internationally, garnering

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**Question 1**

**CONTENT:** Sentence Structure / Sentence formation / Sentence boundaries

**FOCUS:** Students must create two grammatically complete and standard sentences.

**KEY:** B

Choice B is the best answer because it provides punctuation that creates two grammatically complete and standard sentences.

Choice A is not the best answer because it results in a comma splice as well as some confusion about what the prepositional phrase “from just a few primary colors” modifies.

Choice C is not the best answer because it results in a run-on sentence as well as some confusion about what the prepositional phrase “from just a few primary colors” modifies.

Choice D is not the best answer because it results in a comma splice.

---

**Question 2**

**CONTENT:** Conventions of Punctuation / Within-sentence punctuation, Nonrestrictive and parenthetical elements

**FOCUS:** Students must both signal a strong within-sentence break and set off nonessential elements of the sentence.

**KEY:** B

Choice B is the best answer because the colon after “parts” effectively signals that what follows in the sentence further defines what the “two parts” of Kingman’s name are and because the comma after “man” properly indicates that “‘king’ and ‘man’” and “Cantonese for ‘scenery’ and ‘composition’” are nonrestrictive appositives.

Choice A is not the best answer because the semicolon after “man” incorrectly joins an independent clause and a phrase. Moreover, the comma after “parts” is arguably a weak form of punctuation to be signaling the strong break in the sentence indicated here.

Choice C is not the best answer because the semicolon after “man” incorrectly joins an independent clause and a phrase and because the absence of a comma after “parts” fails to indicate that “two parts” and “‘king’ and ‘man’” are nonrestrictive appositives.

Choice D is not the best answer because the semicolon after “parts” incorrectly joins an independent clause and phrases and because the absence of a comma after “man” fails to indicate that “‘king’ and ‘man’” and “Cantonese for ‘scenery’ and ‘composition’” are nonrestrictive appositives.

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### Question 3

CONTENT: Conventions of Usage / Logical comparison

FOCUS: Students must ensure that like terms are being compared.

KEY: A

Choice A is the best answer because it creates a comparison between like terms: “works” by Kingman and “paintings by Chinese landscape artists.”

Choice B is not the best answer because it creates a comparison between unlike terms: “works” by Kingman and “Chinese landscape artists.”

Choice C is not the best answer because it creates a comparison between unlike terms: “works” by Kingman and “painters of Chinese landscapes.”

Choice D is not the best answer because it creates a comparison between unlike terms: “works” by Kingman and “artists.”

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### Question 4

CONTENT: Effective Language Use / Precision

FOCUS: Students must determine the most contextually appropriate word.

KEY: C

Choice C is the best answer because “departed” is the most contextually appropriate way to indicate that Kingman had deviated from the tradition of Chinese landscape painting in a number of ways.

Choice A is not the best answer because while “vacated” does offer some sense of “leaving,” it would be awkward and unconventional to say that a person was vacating from a tradition in a number of ways.

Choice B is not the best answer because while “evacuated” does offer some sense of “leaving,” it would be awkward and unconventional to say that a person was evacuating from a tradition in a number of ways.

Choice D is not the best answer because while “retired” does offer some sense of “leaving,” it would be awkward and unconventional to say that a person was retiring from a tradition in a number of ways.

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### Question 5

CONTENT: Organization / Logical sequence

FOCUS: Students must improve the cohesion of a paragraph.

KEY: C

Choice C is the best answer because placing sentence 3 after sentence 1 makes the paragraph most cohesive. Sentence 3 refers to Kingman’s “interest” being “so keen,” a callback to sentence 1, which says that “Kingman was keenly interested in landscape painting from an early age.”

Choice A is not the best answer because leaving sentence 3 where it is now creates a sequence of sentences that lacks sufficient cohesion. Keeping sentence 3 in its current location disrupts the link between sentence 2 (which describes the concept of “school names” in Hong Kong) and sentence 4 (which reveals that Dong Kingman was the school name of Dong Moy Shu).

Choice B is not the best answer because placing sentence 3 before sentence 1 creates a sequence of sentences that lacks sufficient cohesion. Putting sentence 3 at the beginning of the paragraph would offer a poor introduction to the paragraph, in large part because sentence 3 builds directly on a point made in sentence 1.

Choice D is not the best answer because placing sentence 3 after sentence 4 creates a sequence of sentences that lacks sufficient cohesion. Putting sentence 3 after sentence 4 would disrupt the link between sentence 4 (which mentions that Dong Moy Shu was given the school

name Dong Kingman) and sentence 5 (which explains what the two parts comprising the name Kingman mean in Cantonese).

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### Question 6

CONTENT: Development / Proposition

FOCUS: Students must determine which sentence best signals the main topic of a paragraph.

KEY: C

Choice C is the best answer because it clearly establishes the main topic of the paragraph: Kingman’s urban landscapes.

Choice A is not the best answer because it would begin the paragraph with a loosely related detail about Kingman’s painting style and would not clearly establish the main topic of the paragraph.

Choice B is not the best answer because it would suggest that the main topic of the paragraph is the natural landscapes Kingman occasionally painted, which is incorrect given the focus of the rest of the sentences in the paragraph.

Choice D is not the best answer because it would begin the paragraph with a loosely related detail about Kingman’s life and would not clearly establish the main topic of the paragraph.

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### Question 7

CONTENT: Effective Language Use / Syntax

FOCUS: Students must combine sentences effectively.

KEY: D

Choice D is the best answer because it combines the sentences logically and efficiently, with the original second sentence becoming a participial phrase describing Kingman.

Choice A is not the best answer because it creates a wordy and awkward construction and because it fails to link the acclaim Kingman received with the exhibition of his work.

Choice B is not the best answer because it creates a repetitive and awkward construction.

Choice C is not the best answer because “but” suggests contrast or exception, neither of which makes sense in the context of the sentence.

## Sample Writing and Language Set 2

### PASSAGE

CONTENT: Careers

FOCUS: Students must make revising and editing decisions in the context of a passage on a careers-related topic.

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Questions 1–6 are based on the following passage and supplementary material.

#### A Life in Traffic

A subway system is expanded to provide service to a growing suburb. A bike-sharing program is adopted to encourage nonmotorized transportation. Stoplight timing is coordinated to alleviate rush hour traffic jams in a congested downtown area. When any one of these changes ❶ occur, it is likely the result of careful analysis conducted by transportation planners.

The work of transportation planners generally includes evaluating current transportation needs, assessing the effectiveness of existing facilities, and improving those facilities or ❷ they design new ones. Most transportation planners work in or near cities, but some are employed in rural areas. Say, for example, a large factory is built on the outskirts of a small town. Traffic to and from that location would increase at the beginning and end of work shifts. The transportation planner’s job might involve conducting a traffic count to determine the daily number of vehicles traveling on the road to the new factory. If analysis of the traffic count indicates that there is more traffic than the ❸ current road as it is designed at this time can efficiently accommodate, the transportation planner might recommend widening the road to add another lane.

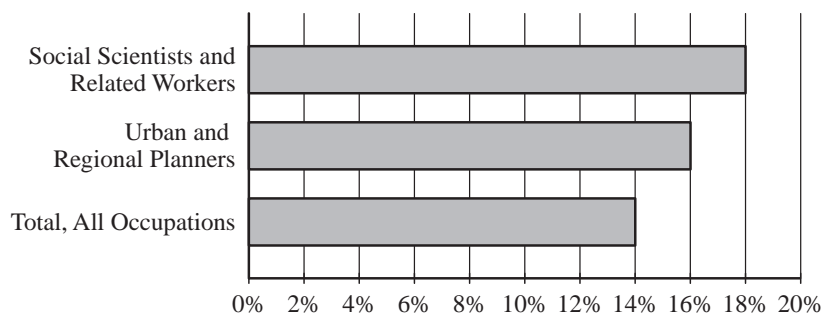
1. A) NO CHANGE  
B) occur, they are  
C) occurs, they are  
D) occurs, it is
2. A) NO CHANGE  
B) to design  
C) designing  
D) design
3. A) NO CHANGE  
B) current design of the road right now  
C) road as it is now currently designed  
D) current design of the road

Transportation planners work closely with a number of community stakeholders, such as government officials and other interested organizations and individuals. 4 Next, representatives from the local public health department might provide input in designing a network of trails and sidewalks to encourage people to walk more. Members of the Chamber of Commerce might share suggestions about designing transportation and parking facilities to support local businesses.

5 People who pursue careers in transportation planning have a wide variety of educational backgrounds. A two-year degree in transportation technology may be sufficient for some entry-level jobs in the field. Most jobs, however, require at least a bachelor's degree; majors of transportation planners are varied, including fields such as urban studies, civil engineering, geography, or transportation and logistics management. For many positions in the field, a master's degree is required.

Transportation planners perform critical work within the broader field of urban and regional planning. As of 2010, there were approximately 40,300 urban and regional planners employed in the United States. The United States Bureau of Labor Statistics forecasts steady job growth in this field, 6 projecting that 16 percent of new jobs in all occupations will be related to urban and regional planning. Population growth and concerns about environmental sustainability are expected to spur the need for transportation planning professionals.

Urban and Regional Planners  
Percent Increase in Employment, Projected 2010–2020



Adapted from United States Bureau of Labor Statistics, Employment Projections Program.  
“All occupations” includes all occupations in the United States economy.

4. A) NO CHANGE  
B) For instance,  
C) Furthermore,  
D) Similarly,
5. A) NO CHANGE  
B) People, who pursue careers in transportation planning,  
C) People who pursue careers, in transportation planning,  
D) People who pursue careers in transportation planning,
6. Which choice completes the sentence with accurate data based on the graph?  
  
A) NO CHANGE  
B) warning, however, that job growth in urban and regional planning will slow to 14 percent by 2020.  
C) predicting that employment of urban and regional planners will increase 16 percent between 2010 and 2020.  
D) indicating that 14 to 18 percent of urban and regional planning positions will remain unfilled.



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**Question 1**

**CONTENT:** Conventions of Usage / Agreement / Pronoun-antecedent agreement, Subject-verb agreement

**FOCUS:** Students must maintain grammatical agreement between pronoun and antecedent and between subject and verb.

**KEY:** D

Choice D is the best answer because it maintains agreement between pronoun (“it”) and antecedent (“any one”) and between subject (“any one”) and verb (“occurs”).

Choice A is not the best answer because the plural verb “occur” does not agree with the singular subject “any one.”

Choice B is not the best answer because the plural verb “occur” does not agree with the singular subject “any one” and because the plural pronoun “they” does not agree with the singular antecedent “any one.”

Choice C is not the best answer because the plural pronoun “they” does not agree with the singular antecedent “any one.”

---

**Question 2**

**CONTENT:** Sentence Structure / Sentence formation / Parallel structure

**FOCUS:** Students must maintain parallel structure.

**KEY:** C

Choice C is the best answer because “designing” maintains parallelism with “evaluating,” “assessing,” and “improving.”

Choice A is not the best answer because “they design” does not maintain parallelism with “evaluating,” “assessing,” and “improving.”

Choice B is not the best answer because “to design” does not maintain parallelism with “evaluating,” “assessing,” and “improving.”

Choice D is not the best answer because “design” does not maintain parallelism with “evaluating,” “assessing,” and “improving.”

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**Question 3**

CONTENT: Effective Language Use / Concision

FOCUS: Students must improve the economy of expression.

KEY: D

Choice D is the best answer because it offers a clear and concise wording without redundancy.

Choice A is not the best answer because “current” is redundant with “at this time.”

Choice B is not the best answer because “current” is redundant with “right now.”

Choice C is not the best answer because “now” is redundant with “currently.”

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**Question 4**

CONTENT: Organization / Introductions, conclusions, and transitions

FOCUS: Students must determine the most logical transitional word or phrase.

KEY: B

Choice B is the best answer because the transitional phrase “For instance” logically indicates that what follows provides an example related to the previous sentence. “Representatives from the local public health department” is an example of the kinds of people with whom transportation planners work.

Choice A is not the best answer because the transitional word “Next” indicates sequence, which is not logical given that what follows provides an example related to the previous sentence.

Choice C is not the best answer because the transitional word “Furthermore” indicates addition, which is not logical given that what follows provides an example related to the previous sentence.

Choice D is not the best answer because the transitional word “Similarly” indicates comparison or likeness, which is not logical given that what follows provides an example related to the previous sentence.

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### Question 5

**CONTENT:** Conventions of Punctuation / Nonrestrictive and parenthetical elements, Unnecessary punctuation

**FOCUS:** Students must distinguish between restrictive/essential and nonrestrictive/nonessential sentence elements and avoid unneeded punctuation.

**KEY:** A

Choice A is the best answer because “who pursue careers in transportation planning” is, in context, a restrictive clause that should not be set off with punctuation. “Who pursue careers in transportation planning” is essential information defining who the “people” are.

Choice B is not the best answer because it incorrectly sets off the restrictive clause “who pursue careers in transportation planning” with commas as though the clause were nonrestrictive, or not essential to defining who the “people” are.

Choice C is not the best answer because it incorrectly sets off the essential sentence element “in transportation planning” with commas as though the phrase were not essential to the meaning of the sentence. “In transportation planning” is essential information defining what the “careers” are.

Choice D is not the best answer because it introduces an unnecessary comma after the word “planning,” incorrectly setting off the subject of the sentence (“people who pursue careers in transportation planning”) from the predicate (“have a wide variety of educational backgrounds”).

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**Question 6**

CONTENT: Development / Quantitative information

FOCUS: Students must evaluate text based on data presented graphically.

KEY: C

Choice C is the best answer because it completes the sentence with an accurate interpretation of data in the graph. The graph displays projections of how much growth in employment there is expected to be between 2010 and 2020 for “social scientists and related workers,” for “urban and regional planners,” and in “all occupations” in the U.S. economy. According to the graph, the employment of urban and regional planners is expected to increase 16 percent between 2010 and 2020.

Choice A is not the best answer because the data in the graph do not support the claim that 16 percent of new jobs in all occupations will be related to urban and regional planning.

Choice B is not the best answer because the data in the graph do not support the claim that job growth in urban and regional planning will slow to 14 percent by 2020.

Choice D is not the best answer because the data in the graph do not support the claim that 14 to 18 percent of urban and regional planning positions will remain unfilled.

## Sample Essay Prompt 1

The following sample Essay prompt is followed by an annotated version of the source text that suggests some of the ways that students might analyze the text in response to the prompt. The annotations are only examples of elements of the passage students may choose to write about.

---

As you read the passage below, consider how Paul Bogard uses

- evidence, such as facts or examples, to support claims.
  - reasoning to develop ideas and to connect claims and evidence.
  - stylistic or persuasive elements, such as word choice or appeals to emotion, to add power to the ideas expressed.
- 

*Adapted from Paul Bogard, “Let There be Dark.” ©2012 by the Los Angeles Times. Originally published December 21, 2012.*

At my family’s cabin on a Minnesota lake, I knew woods so dark that my hands disappeared before my eyes. I knew night skies in which meteors left smoky trails across sugary spreads of stars. But now, when 8 of 10 children born in the United States will never know a sky dark enough for the Milky Way, I worry we are rapidly losing night’s natural darkness before realizing its worth. This winter solstice, as we cheer the days’ gradual movement back toward light, let us also remember the irreplaceable value of darkness.

All life evolved to the steady rhythm of bright days and dark nights. Today, though, when we feel the closeness of nightfall, we reach quickly for a light switch. And too little darkness, meaning too much artificial light at night, spells trouble for all.

Already the World Health Organization classifies working the night shift as a probable human carcinogen, and the American Medical Association has voiced its unanimous support for “light pollution reduction efforts and glare reduction efforts at both the national and state levels.” Our bodies need darkness to produce the hormone melatonin, which keeps certain cancers from developing, and our bodies need darkness for sleep.

Sleep disorders have been linked to diabetes, obesity, cardiovascular disease and depression, and recent research suggests one main cause of “short sleep” is “long light.” Whether we work at night or simply take our tablets, notebooks and smartphones to bed, there isn’t a place for this much artificial light in our lives.

The rest of the world depends on darkness as well, including nocturnal and crepuscular species of birds, insects, mammals, fish and reptiles. Some examples are well known—the 400 species of birds that migrate at night in North America, the sea turtles that come ashore to lay their eggs—and some are not, such as the bats that save American farmers billions in pest control and the moths that pollinate 80% of the world’s flora. Ecological light pollution is like the bulldozer of the night, wrecking habitat and disrupting ecosystems several billion years in the making. Simply put, without darkness, Earth’s ecology would collapse. . . .

In today’s crowded, louder, more fast-paced world, night’s darkness can provide solitude, quiet and stillness, qualities increasingly in short supply. Every religious tradition has considered darkness invaluable for a soulful life, and the chance to witness the universe has inspired artists, philosophers and everyday stargazers since time began. In a world awash with electric light . . . how would Van Gogh have given the world his “Starry Night”? Who knows what this vision of the night sky might inspire in each of us, in our children or grandchildren?

Yet all over the world, our nights are growing brighter. In the United States and Western Europe, the amount of light in the sky increases an average of about 6% every year. Computer images of the United States at night, based on NASA photographs, show that what was a very dark country as recently as the 1950s is now nearly covered with a blanket of light. Much of this light is wasted energy, which means wasted dollars. Those of us over 35 are perhaps among the last generation to have known truly dark nights. Even the northern lake where I was lucky to spend my summers has seen its darkness diminish.

It doesn’t have to be this way. Light pollution is readily within our ability to solve, using new lighting technologies and shielding existing lights. Already, many cities and towns across North America and Europe are changing to LED streetlights, which offer dramatic possibilities for controlling wasted light. Other communities are finding success with simply turning off portions of their public lighting after midnight. Even Paris, the famed “city of light,” which already turns off its monument lighting after 1 a.m., will this summer start to require its shops, offices and public buildings to turn off lights after 2 a.m. Though primarily

designed to save energy, such reductions in light will also go far in addressing light pollution. But we will never truly address the problem of light pollution until we become aware of the irreplaceable value and beauty of the darkness we are losing.

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Write an essay in which you explain how Paul Bogard builds an argument to persuade his audience that natural darkness should be preserved. In your essay, analyze how Bogard uses one or more of the features listed in the box above (or features of your own choice) to strengthen the logic and persuasiveness of his argument. Be sure that your analysis focuses on the most relevant features of the passage.

Your essay should not explain whether you agree with Bogard's claims, but rather explain how Bogard builds an argument to persuade his audience.

## Annotated Version of Prompt 1's Passage

*Adapted from Paul Bogard, "Let There be Dark." ©2012 by the Los Angeles Times. Originally published December 21, 2012.*

At my family's cabin on a Minnesota lake, I knew woods so dark that my hands disappeared before my eyes. I knew night skies in (1) which meteors left smoky trails across sugary spreads of stars. But now, when (2) 8 of 10 children born in the United States will never know a sky dark enough for the Milky Way, I worry we are rapidly losing night's natural darkness before realizing its worth. This winter solstice, as we cheer the days' gradual movement back toward light, let us also remember the irreplaceable value of darkness.

All life evolved to the steady rhythm of bright days and dark nights. Today, though, when we feel the closeness of nightfall, we reach quickly for a light switch. And too little darkness, meaning too much artificial light at night, spells trouble for all.

(3) Already the World Health Organization classifies working the night shift as a probable human carcinogen, and the American Medical Association has voiced its unanimous support for "light pollution reduction efforts and glare reduction efforts at both the national and state levels." (4) Our bodies need darkness to produce the hormone melatonin, which keeps certain cancers from developing, and our bodies need darkness for sleep. Sleep disorders have been linked to diabetes, obesity, cardiovascular disease and depression, and recent research suggests one main cause of "short sleep" is "long light." Whether we work at night or simply take our tablets, notebooks and smartphones to bed, there isn't a place for this much artificial light in our lives.

The rest of the world depends on darkness as well, (5) including nocturnal and crepuscular species of birds, insects, mammals, fish and reptiles. Some examples are well known—the 400 species of birds that migrate at night in North America, the sea turtles that come ashore to lay their eggs—and some are not, such as the bats that save American farmers billions in pest control and the moths that pollinate 80% of the world's flora. Ecological light pollution is like the (6) bulldozer of the night, wrecking habitat and disrupting ecosystems several billion years in the making. Simply put, without darkness, Earth's ecology would collapse. . . . (7)

(1) The descriptive words used in this sentence add visual intensity, evoking the wonder of the night sky.

(2) The writer uses this statistic as evidence to inform his subsequent claim that we "are rapidly losing night's natural darkness."

(3) Providing evidence from authoritative sources (the World Health Organization and the American Medical Association) adds legitimacy to the writer's claim in the paragraph above that "too little darkness . . . spells trouble for all."

(4) The writer continues to draw on evidence from the authorities cited above. He uses this evidence to inform his subsequent point that "whether we work at night or simply take our . . . smartphones to bed, there isn't a place for this much artificial light in our lives."

(5) The presentation of facts and evidence supports the claim that follows at the end of the paragraph that "without darkness, Earth's ecology would collapse."

(6) The writer compares light pollution to the effects of a "bulldozer," a machine that can be used to ravage land. This imagery dramatizes the destructive potential of light pollution.

(7) By first discussing the human need for darkness and then moving into a discussion of the need for darkness among animals, the writer is able to build his argument about the "irreplaceable value of darkness."



In today's (8) crowded, louder, more fast-paced world, night's darkness can provide solitude, quiet and stillness, qualities increasingly in short supply. Every religious tradition has considered darkness invaluable for a soulful life, and the chance to witness the universe has inspired artists, philosophers and everyday stargazers since time began. (9) In a world awash with electric light . . . how would Van Gogh have given the world his "Starry Night"? Who knows what this vision of the night sky might inspire in each of us, in our children or grandchildren?

Yet all over the world, our nights are growing brighter. (10) In the United States and Western Europe, the amount of light in the sky increases an average of about 6% every year. Computer images of the United States at night, based on NASA photographs, show that what was a very dark country as recently as the 1950s is now nearly covered with a blanket of light. Much of this light is wasted energy, which means wasted dollars. (11) Those of us over 35 are perhaps among the last generation to have known truly dark nights. Even the northern lake where I was lucky to spend my summers has seen its darkness diminish.

(12) It doesn't have to be this way. Light pollution is readily within our ability to solve, using new lighting technologies and shielding existing lights. Already, many cities and towns across North America and Europe are changing to LED streetlights, (13) which offer dramatic possibilities for controlling wasted light. Other communities are finding success with simply turning off portions of their public lighting after midnight. (14) Even Paris, the famed "city of light," which already turns off its monument lighting after 1 a.m., will this summer start to require its shops, offices and public buildings to turn off lights after 2 a.m. Though primarily designed to save energy, such reductions in light will also go far in addressing light pollution. (15) But we will never truly address the problem of light pollution until we become aware of the irreplaceable value and beauty of the darkness we are losing.

(8) The writer makes a stylistic choice here, contrasting a "crowded, louder, more fast-paced world" with darkness that "can provide solitude, quiet and stillness." These words allow the writer to characterize a well-lit world as undesirable and to depict darkness as peaceful and pleasing.

(9) The use of rhetorical questions encourages the reader to consider a world without Van Gogh's beloved painting and what Van Gogh's vision inspires in us all. The suggestion of a world without such artistry and the notion that darkness is "invaluable for a soulful life" are also designed to evoke an emotional reaction in the reader.

(10) This statistic is used as evidence to support the claim that "our nights are growing brighter," which leads into the writer's point that this "blanket of light" is largely "wasted energy, which means wasted dollars."

(11) By returning to the introduction's description of a youth spent admiring dark nights, the writer creates another emotional appeal — this one to fear, especially in readers under thirty-five years old, who may now realize that their opportunities to witness true darkness are "diminishing."

(12) The writer moves from evoking fear to reassuring readers that there is a solution to the problem of light pollution.

(13) The writer chooses his words carefully in this paragraph in order to shape readers' perceptions and bolster his claims. For example, he argues that we are using too much light when less is needed by referring to light being "wasted." He also suggests how easily the problem of light pollution might be addressed, using "simply" to describe what "other communities" are doing.

(14) The writer reasons that if even a city known for its light can enact sensible restrictions, it ought to be comparatively easy for cities not famous for their use of light to do so as well. Paris is also used as evidence to support the writer's previous claim that "communities are finding success."

(15) The argument concludes by recalling the "irreplaceable value and beauty" of darkness. That this darkness is being lost, as evidenced over the course of the writer's argument, serves as a final appeal to readers' emotions.

## Sample Essay Prompt 2

The following sample Essay prompt is followed by an annotated version of the source text that suggests some of the ways that students might analyze the text in response to the prompt. The annotations are only examples of elements of the passage students may choose to write about.

---

As you read the passage below, consider how Dana Gioia uses

- evidence, such as facts or examples, to support claims.
  - reasoning to develop ideas and to connect claims and evidence.
  - stylistic or persuasive elements, such as word choice or appeals to emotion, to add power to the ideas expressed.
- 

*Adapted from “Why Literature Matters” by Dana Gioia. ©2005 by The New York Times Company. Originally published April 10, 2005.*

[A] strange thing has happened in the American arts during the past quarter century. While income rose to unforeseen levels, college attendance ballooned, and access to information increased enormously, the interest young Americans showed in the arts—and especially literature—actually diminished.

According to the 2002 Survey of Public Participation in the Arts, a population study designed and commissioned by the National Endowment for the Arts (and executed by the US Bureau of the Census), arts participation by Americans has declined for eight of the nine major forms that are measured. . . . The declines have been most severe among younger adults (ages 18–24). The most worrisome finding in the 2002 study, however, is the declining percentage of Americans, especially young adults, reading literature.

That individuals at a time of crucial intellectual and emotional development bypass the joys and challenges of literature is a troubling trend. If it were true that they substituted histories, biographies, or political works for literature, one might not worry. But book reading of any kind is falling as well.

That such a longstanding and fundamental cultural activity should slip so swiftly, especially among young adults, signifies deep transformations in contemporary life. To call attention to the trend, the Arts Endowment issued the reading portion of the Survey as a separate report, “Reading at Risk: A Survey of Literary Reading in America.”

The decline in reading has consequences that go beyond literature. The significance of reading has become a persistent theme in the business world. The February issue of *Wired* magazine, for example, sketches a new set of mental skills and habits proper to the 21st century, aptitudes decidedly literary in character: not “linear, logical, analytical talents,” author Daniel Pink states, but “the ability to create artistic and emotional beauty, to detect patterns and opportunities, to craft a satisfying narrative.” When asked what kind of talents they like to see in management positions, business leaders consistently set imagination, creativity, and higher-order thinking at the top.

Ironically, the value of reading and the intellectual faculties that it inculcates appear most clearly as active and engaged literacy declines. There is now a growing awareness of the consequences of nonreading to the workplace. In 2001 the National Association of Manufacturers polled its members on skill deficiencies among employees. Among hourly workers, poor reading skills ranked second, and 38 percent of employers complained that local schools inadequately taught reading comprehension.

The decline of reading is also taking its toll in the civic sphere. . . . A 2003 study of 15- to 26-year-olds’ civic knowledge by the National Conference of State Legislatures concluded, “Young people do not understand the ideals of citizenship . . . and their appreciation and support of American democracy is limited.”

It is probably no surprise that declining rates of literary reading coincide with declining levels of historical and political awareness among young people. One of the surprising findings of “Reading at Risk” was that literary readers are markedly more civically engaged than nonreaders, scoring two to four times more likely to perform charity work, visit a museum, or attend a sporting event. One reason for their higher social and cultural interactions may lie in the kind of civic and historical knowledge that comes with literary reading. . . .

The evidence of literature’s importance to civic, personal, and economic health is too strong to ignore. The decline of literary reading foreshadows serious long-term social and economic problems, and it

is time to bring literature and the other arts into discussions of public policy. Libraries, schools, and public agencies do noble work, but addressing the reading issue will require the leadership of politicians and the business community as well. . . .

Reading is not a timeless, universal capability. Advanced literacy is a specific intellectual skill and social habit that depends on a great many educational, cultural, and economic factors. As more Americans lose this capability, our nation becomes less informed, active, and independent-minded. These are not the qualities that a free, innovative, or productive society can afford to lose.

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Write an essay in which you explain how Dana Gioia builds an argument to persuade his audience that the decline of reading in America will have a negative effect on society. In your essay, analyze how Gioia uses one or more of the features listed in the box above (or features of your own choice) to strengthen the logic and persuasiveness of his argument. Be sure that your analysis focuses on the most relevant features of the passage.

Your essay should not explain whether you agree with Gioia's claims, but rather explain how Gioia builds an argument to persuade his audience.

## Annotated Version of Prompt 2's Passage

*Adapted from "Why Literature Matters" by Dana Gioia. ©2005 by The New York Times Company. Originally published April 10, 2005.*

[A] strange thing has happened in the American arts during the past quarter century. (1) While income rose to unforeseen levels, college attendance ballooned, and access to information increased enormously, the interest young Americans showed in the arts—and especially literature—actually diminished.

(2) According to the 2002 Survey of Public Participation in the Arts, a population study designed and commissioned by the National Endowment for the Arts (and executed by the US Bureau of the Census), arts participation by Americans has declined for eight of the nine major forms that are measured. . . . The declines have been most severe among younger adults (ages 18–24). The most worrisome finding in the 2002 study, however, is the declining percentage of Americans, especially young adults, reading literature.

That individuals at a time of crucial intellectual and emotional development bypass the joys and challenges of literature is a troubling trend. If it were true that they substituted histories, biographies, or political works for literature, one might not worry. But book reading of any kind is falling as well.

That such a (3) longstanding and fundamental cultural activity should slip so swiftly, especially among young adults, signifies deep transformations in contemporary life. To call attention to the trend, the Arts Endowment issued the reading portion of the Survey as a separate report, "Reading at Risk: A Survey of Literary Reading in America."

(4) The decline in reading has consequences that go beyond literature. The significance of reading has become a persistent theme in the business world. The February issue of *Wired* magazine, for example, sketches a new set of mental skills and habits proper to the 21st century, aptitudes decidedly literary in character: not "linear, logical, analytical talents," author Daniel Pink states, but "the ability to create artistic and emotional beauty, to detect patterns and opportunities, to craft a satisfying narrative." When asked what kind of talents they like to see in management positions, business leaders consistently set imagination, creativity, and higher-order thinking at the top.

(1) To highlight the irony and gravity of a dwindling percentage of readers, the writer juxtaposes the rise in income, college attendance, and access to college education to the decline in young Americans' interest in the arts and in literature.

(2) The writer cites data commissioned by an authoritative source (the National Endowment for the Arts) to lend credibility to his subsequent point that there is a "troubling trend" of "individuals in a time of crucial intellectual and emotional development bypass[ing] the joys and challenges of literature."

(3) The writer uses precisely chosen, powerful words to characterize reading as a "longstanding" and "fundamental cultural" activity that is "slip[ping] . . . swiftly" among young adults. This juxtaposition of words underscores the writer's claim that this development signifies "deep transformations in contemporary life" and thereby creates a compelling appeal to readers' emotions.

(4) The writer synthesizes multiple sources of evidence (e.g., the previously mentioned arts endowment survey, *Wired* magazine) as part of reasoning that concludes that the decrease in reading has implications outside of literature. The writer then connects this point to his subsequent claim that the skills necessary for life in the twenty-first century are "decidedly literary in character." He goes on to cite another authoritative source as further evidence of the continuing need for literary achievement.

Ironically, the value of reading and the intellectual faculties that it inculcates appear most clearly as active and engaged literacy declines. There is now a growing awareness of the consequences of nonreading to the workplace. (5) In 2001 the National Association of Manufacturers polled its members on skill deficiencies among employees. Among hourly workers, poor reading skills ranked second, and 38 percent of employers complained that local schools inadequately taught reading comprehension.

(6) The decline of reading is also taking its toll in the civic sphere. . . . A 2003 study of 15- to 26-year-olds' civic knowledge by the National Conference of State Legislatures concluded, "Young people do not understand the ideals of citizenship. . . and their appreciation and support of American democracy is limited."

It is probably no surprise that declining rates of literary reading coincide with declining levels of historical and political awareness among young people. (7) One of the surprising findings of "Reading at Risk" was that literary readers are markedly more civically engaged than nonreaders, scoring two to four times more likely to perform charity work, visit a museum, or attend a sporting event. One reason for their higher social and cultural interactions may lie in the kind of civic and historical knowledge that comes with literary reading. . . .

The evidence of literature's importance to (8) civic, personal, and economic health is too strong to ignore. The decline of literary reading foreshadows serious long-term social and economic problems, and it is time to bring literature and the other arts into discussions of public policy. Libraries, schools, and public agencies do noble work, but addressing the reading issue will require the leadership of politicians and the business community as well. . . .

Reading is not a timeless, universal capability. Advanced literacy is a specific intellectual skill and social habit that depends on a great many educational, cultural, and economic factors. (9) As more Americans lose this capability, our nation becomes less informed, active, and independent-minded. These are not the qualities that a free, innovative, or productive society can afford to lose.

(5) The writer provides survey data as evidence to support his point in the previous paragraph that "the significance of reading has become a persistent theme in the business world." This point and supporting evidence contribute to the writer's central claim that the decline in reading skills among young adults has negative long-term consequences.

(6) The writer again uses data, this time from a 2003 study, as further evidence to support his earlier claim that the decline in reading has far-reaching consequences. Here, his evidence links the decline in reading to deterioration in the civic sphere and waning "appreciation and support of American democracy."

(7) By referring to this report again, this time in the context of discussing a decline in civic engagement, the writer further supports the point he has just made.

(8) The writer contrasts "civic, personal, and economic health" with "serious long-term social and economic problems," which is intended to frame a critical choice between potentially poor outcomes and a vital future.

(9) The writer uses the final sentences of the passage as an appeal to fear and national pride by warning that unless more emphasis is placed on reading, the United States will become "less informed, active, and independent-minded." These lines serve as an emotional call to action and raise the stakes of the argument the writer is making.

## Executive Summary

SECTION I	Behind the Redesign
SECTION II	The Redesigned SAT: Evidentiary Foundation
<b>SECTION III</b>	Test Specific tions: SAT Evidence-Based Reading and Writing and SAT Essay
<b>SECTION IV</b>	Test Specific tions: SAT Math Test
SECTION V	Our Commitment
APPENDIX A	The Craft of Developing the SAT: How We Do It

These draft test specific tions, sample questions and other materials are just that — drafts — and will systematically evolve over time. These sample questions are meant to illustrate the shifts in the redesigned SAT® and are not a full reflection of what will be tested. Actual questions used on the exam are going through extensive reviews and pretesting to help ensure that they are clear and fair and that they measure what is intended. The test specific tions as well as the research foundation defining what is measured on the test will continue to be refined based on ongoing research.



## TEST SPECIFICATIONS: SAT MATH TEST

# A Transparent Blueprint

This section describes the content, format, and distinctive new features of the Math Test in the redesigned SAT, as well as the skills it measures. This section also includes annotated sample questions that help illustrate central aspects of the test.

### OVERALL CLAIM FOR THE TEST

The redesigned SAT's Math Test is intended to collect evidence in support of the following claim about student performance:

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Students have fluency with, understanding of, and the ability to apply the mathematical concepts, skills, and practices that are most strongly prerequisite and central to their ability to progress through a range of college courses, career training, and career opportunities.

### TEST DESCRIPTION

In keeping with the evidence about essential requirements for college and career readiness described in Section II, the redesigned SAT will require a stronger command of fewer, more important topics. To succeed on the redesigned SAT, students will need to exhibit mathematical practices, such as problem solving and using appropriate tools strategically. The SAT will also provide opportunities for richer applied problems.

The redesigned SAT's Math Test has four content areas:

- » Heart of Algebra
- » Problem Solving and Data Analysis
- » Passport to Advanced Math

## » Additional Topics in Math

Questions in each content area span the full range of difficulty and address relevant practices, fluency, and conceptual understanding.

## Test Summary

The following table summarizes the key content dimensions of the redesigned SAT's Math Test.

SAT MATH TEST CONTENT SPECIFICATIONS		
<b>Time Allotted</b>	80 minutes	
Calculator Portion (38 questions)	55 minutes	
No-Calculator Portion (20 questions)	25 minutes	
	<b>NUMBER</b>	<b>PERCENTAGE OF TEST</b>
<b>Total Items</b>	58 questions	100%
Multiple Choice (MC, 4 options)	45 questions	78%
Student-Produced Response (SPR — grid-in)	13 questions	22%
<b>Contribution of Items to Subscores</b>		
<b>Heart of Algebra</b>	19 questions	33%
Analyzing and fluently solving equations and systems of equations		
Creating expressions, equations, and inequalities to represent relationships between quantities and to solve problems		
Rearranging and interpreting formulas		
<b>Problem Solving and Data Analysis</b>	17 questions	29%
Creating and analyzing relationships using ratios, proportions, percentages, and units		
Describing relationships shown graphically		
Summarizing qualitative and quantitative data		
<b>Passport to Advanced Math</b>	16 questions	28%
Rewriting expressions using their structure		
Creating, analyzing, and fluently solving quadratic and higher-order equations		

### SAT MATH TEST CONTENT SPECIFICATIONS

Manipulating polynomials purposefully to solve problems

<b>Additional Topics in Math*</b>	6 questions	10%
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Making area and volume calculations in context

Investigating lines, angles, triangles, and circles using theorems

Working with trigonometric functions

#### Contribution of Items to Cross-Test Scores

Analysis in Science	8 questions	14%
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Analysis in History/Social Studies	8 questions	14%
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\*Questions under Additional Topics in Math contribute to the total Math Test score but do not contribute to a subscore within the Math Test.

The test covers all mathematical practices, with an emphasis on problem solving, modeling, using appropriate tools strategically, and looking for and making use of structure to do algebra. The practices emphasized in the redesigned SAT are central to the demands of postsecondary work. Problem solving requires students to make sense of problems and persevere to solve them, a skill highly rated by postsecondary instructors (Conley et al., *Reaching the Goal*, 2011). Modeling stresses applications characteristic of the entire postsecondary curriculum. Students will be asked throughout high school, college, and careers to make choices about which tools to use in solving problems. Finally, structure is fundamental to algebra and to other more advanced mathematics.

As indicated in the test specifications above, the Math Test has two portions. One is a 55-minute portion comprising 38 questions for which students are allowed to use calculators to solve the problems. The other is a 25-minute portion comprising 20 questions for which students are not allowed to use calculators to solve the problems. The blueprint for each of these portions is shown below.

**CALCULATOR PORTION**

	Number of Questions	% of Test
<b>Total Questions</b>	<b>38</b>	<b>100%</b>
Multiple Choice (MC)	30	79%
Student-Produced Response (SPR — grid-in)	8	21%
<b>Content Categories</b>	<b>38</b>	<b>100%</b>
Heart of Algebra	11	29%
Problem Solving and Data Analysis	17	45%
Passport to Advanced Math	7	18%
Additional Topics in Math	3	8%
<b>Time Allocated</b>	55 minutes	

**NO-CALCULATOR PORTION**

	Number of Questions	% of Test
<b>Total Questions</b>	<b>20</b>	<b>100%</b>
Multiple Choice (MC)	15	75%
Student-Produced Response (SPR — grid-in)	5	25%
<b>Content Categories</b>	<b>20</b>	<b>100%</b>
Heart of Algebra	8	40%
Passport to Advanced Math	9	45%
Additional Topics in Math	3	15%
<b>Time Allocated</b>	25 minutes	

## Detailed Description of the Content and Skills Measured by the SAT Math Test

The SAT has been redesigned to better align to what research shows students need to know and be able to do in order to be prepared for college and careers. This goal has led to a more focused SAT with a balance across fluency, conceptual understanding, and application. In these and other ways, such as embedding mathematical practices, the redesigned SAT is also a good reflection of college- and career-ready standards.

We will continue to be guided by research and evidence as we develop the redesigned SAT. In the months leading up to its release, for example, we may find through research that we need to adjust elements described in this document, such as time limits, number of questions or tasks, or scores reported. When and if we make these or other changes, we will do so solely to enhance the validity evidence supporting the test for its intended purposes, and we will communicate those changes as widely as possible and in a timely manner.

## HEART OF ALGEBRA: LINEAR EQUATIONS AND FUNCTIONS

SAT HEART OF ALGEBRA DOMAIN	
Content Dimension	Description
<b>Application</b>	
1. Create, solve, or interpret linear equations in one variable.	The student will create, solve, or interpret a linear expression or equation in one variable that represents a context. The expression or equation will have rational coefficients, and multiple steps may be required to simplify the expression, simplify the equation, or solve for the variable in the equation.
2. Create, solve, or interpret linear inequalities in one variable.	The student will create, solve, or interpret a linear inequality in one variable that represents a context. The inequality will have rational coefficients, and multiple steps may be required to simplify or solve for the variable.
3. Build a linear function that models a linear relationship between two quantities.	The student will describe a linear relationship that models a context using either an equation in two variables or function notation. The equation or function will have rational coefficients, and multiple steps may be required to build and simplify the equation or function.
4. Create, solve, and interpret systems of linear inequalities in two variables.	The student will analyze one or more constraints that exist between two variables by creating, solving, or interpreting an inequality in two variables or a system of inequalities in two variables to represent a context. Multiple steps may be required to create the inequality or system of inequalities or to determine whether a given point is in the solution set.
5. Create, solve, and interpret systems of two linear equations in two variables.	The student will analyze one or more constraints that exist between two variables by creating, solving, or analyzing a system of linear equations to represent a context. The equations will have rational coefficients, and multiple steps may be required to simplify or solve the system.
<b>Fluency</b>	
6. Solve linear equations in one variable.	The student will algebraically solve an equation (or inequality) in one variable. The equation (or inequality) will have rational coefficients and may require multiple steps to solve for the variable; the equation may yield no solution, one solution, or infinitely many solutions. The student may also be asked to determine the value of a constant or coefficient for an equation with no solution or infinitely many solutions.
7. Solve systems of two linear equations in two variables.	The student will algebraically solve a system of two linear equations in two variables. The equations will have rational coefficients, and the system may yield no solution, one solution, or infinitely many solutions. The student may also be asked to determine the value of a constant or coefficient of an equation in which the system has no solution, one solution, or infinitely many solutions.
<b>Conceptual Understanding</b>	
8. Interpret the variables and constants in expressions for linear functions within the context presented.	The student will make connections between a context and the linear equation that models the context and will identify or describe the real-life meaning of a constant term, a variable, or a feature of the given equation.

### SAT HEART OF ALGEBRA DOMAIN

Content Dimension	Description
9. Understand connections between algebraic and graphical representations.	The student will select a graph described by a given linear equation, select a linear equation that describes a given graph, determine the equation of a line given a verbal description of its graph, determine key features of the graph of a linear function from its equation, or determine how a graph may be impacted by a change in its equation.

Algebra is the language of much of high school mathematics, and it is also an important prerequisite for advanced mathematics and postsecondary education in many subjects. The redesigned SAT focuses strongly on algebra and recognizes in particular the essentials of the subject that are most essential for success in college and careers. Heart of Algebra will assess students' ability to analyze, fluently solve, and create linear equations and inequalities. Students will also be expected to analyze and fluently solve equations and systems of equations using multiple techniques.

To assess full command of the material, these problems will vary significantly in form and appearance. Problems may be straightforward fluency exercises or may pose challenges of strategy or understanding, such as interpreting the interplay between graphical and algebraic representations or solving as a process of reasoning. Students will be required to demonstrate both procedural skill and a deeper understanding of the concepts that undergird linear equations and functions to successfully exhibit a command of the Heart of Algebra.

Mastering linear equations and functions has clear benefits to students. The ability to use linear equations to model scenarios and to represent unknown quantities is powerful across the curriculum in the postsecondary classroom as well as in the workplace. Further, linear equations and functions remain the bedrock upon which much of advanced mathematics is built. Consider, for example, that derivatives in calculus are used to approximate curves by straight lines and to approximate nonlinear functions by linear ones. Without a strong foundation in the core of algebra, much of this advanced work remains inaccessible.

## PROBLEM SOLVING AND DATA ANALYSIS: PROPORTIONAL RELATIONSHIPS, PERCENTAGES, COMPLEX MEASUREMENTS, AND DATA INTERPRETATION AND SYNTHESIS

SAT PROBLEM SOLVING AND DATA ANALYSIS DOMAIN	
Content Dimension	Description
<b>Application</b>	
1. Use ratios, rates, proportional relationships, and scale drawings to solve single- and multistep problems.	The student will use a proportional relationship between two variables to solve a multistep problem to determine a ratio or rate; calculate a ratio or rate and then solve a multistep problem; take a given ratio or rate and solve a multistep problem.
2. Solve single- and multistep problems involving percentages.	The student will solve a multistep problem to determine a percentage; calculate a percentage and then solve a multistep problem; take a given percentage and solve a multistep problem.
3. Solve single- and multistep problems involving measurement quantities, units, and unit conversion.	The student will solve a multistep problem to determine a unit rate; calculate a unit rate and then solve a multistep problem; solve a multistep problem to complete a unit conversion; solve a multistep problem to calculate density; use the concept of density to solve a multistep problem.
4. Given a scatterplot, use linear, quadratic, or exponential models to describe how the variables are related.	The student will, given a scatterplot, select the equation of a line or curve of best fit; interpret the line in the context of the situation; use the line or curve of best fit to make a prediction.
5. Use the relationship between two variables to investigate key features of the graph.	The student will make connections between the graphical representation of a relationship and properties of the graph by selecting the graph that represents the properties described; using the graph to identify a value or set of values.
6. Compare linear growth with exponential growth.	The student will infer the connection between two variables given a context in order to determine what type of model fits best.
7. Use two-way tables to summarize categorical data and relative frequencies, and calculate conditional probability.	The student will summarize categorical data or use categorical data to calculate conditional frequencies; conditional probabilities; association of variables; independence of events.
8. Make inferences about population parameters based on sample data.	The student will estimate a population parameter given the results from a random sample of the population. The sample statistics may mention confidence intervals and measurement error that the student should understand and make use of, but need not calculate.
9. Use statistics to investigate measures of center of data and analyze shape, center, and spread.	The student will calculate measures of center and/or spread for a given set of data or use given statistics to compare two separate sets of data. The measures of center that may be calculated include mean, median, and mode, and the measures of spread that may be calculated include range. When comparing two data sets, the student may investigate mean, median, mode, range, and/or standard deviation.
10. Evaluate reports to make inferences, justify conclusions, and determine appropriateness of data collection methods.	The student will evaluate reports to make inferences, justify conclusions, and determine appropriateness of data collection methods. The reports may consist of tables, graphs, and text summaries.



The redesigned SAT's Math Test has responded to the research evidence identifying what is essential for college readiness and success by focusing significantly on 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. Problems in this category will require significant quantitative reasoning about ratios, rates, and proportional relationships and will place a premium on understanding and applying unit rate.

Interpreting and synthesizing data are widely applicable skills in postsecondary education and careers. In the redesigned SAT's Math Test, students will be expected to identify quantitative measures of center, the overall pattern, and any striking deviations from the overall pattern and spread in one or two different data sets. This includes recognizing the effects of outliers on the measures of center of a data set. In keeping with the need to stress widely applicable prerequisites, the redesigned SAT emphasizes applying core concepts and methods of statistics, rather than covering broadly a vast range of statistical techniques.

Finally, the redesigned SAT's Math Test emphasizes students' ability to apply math to solve problems in rich and varied contexts and features problems that require the application of problem solving and data analysis to solve problems in science, social studies, and career-related contexts.

## PASSPORT TO ADVANCED MATH: ANALYZING ADVANCED EXPRESSIONS

SAT PASSPORT TO ADVANCED MATH DOMAIN	
Content Dimension	Description
<b>Application</b>	
1. Create quadratic or exponential functions.	The student will create a quadratic or exponential function or equation that models a context. The equation will have rational coefficients and may require multiple steps to simplify or solve the equation.
2. Choose and produce equivalent forms of expressions to reveal and explain properties of a quantity.	The student will, given a context, determine the most suitable form of an expression or equation to reveal a particular trait.
<b>Procedural Skill and Fluency</b>	
3. Create equivalent expressions involving radicals and rational exponents.	The student will create equivalent expressions involving rational exponents and radicals, including simplifying or rewriting in other forms.
4. Create equivalent forms of expressions by using structure.	The student will create an equivalent form of an algebraic expression by using structure and fluency with operations.
5. Solve quadratic equations.	The student will solve a quadratic equation having rational coefficients. The equation can be presented in a wide range of forms to reward attending to algebraic structure and can require manipulation in order to solve.
6. Perform arithmetic operations on polynomials.	The student will add, subtract, and multiply polynomial expressions and simplify the result. The expressions will have rational coefficients.
7. Solve radical and rational equations in one variable, including examples where there are extraneous solutions.	The student will solve an equation in one variable that contains radicals or contains the variable in the denominator of a fraction. The equation will have rational coefficients, and the student may be required to identify when a resulting solution is extraneous.
8. Solve a system of equations consisting of one linear and one quadratic equation in two variables.	The student will solve a system of one linear equation and one quadratic equation. The equations will have rational coefficients.
9. Rewrite simple rational expressions.	The student will add, subtract, multiply, or divide two rational expressions or divide two polynomial expressions and simplify the result. The expressions will have rational coefficients.
<b>Conceptual Understanding</b>	
10. Interpret parts of nonlinear expressions in terms of their context.	The student will make connections between a context and the nonlinear equation that models the context to identify or describe the real-life meaning of a constant term, a variable, or a feature of the given equation.
11. Understand the relationship between zeros and factors of polynomials; use it to sketch graphs.	The student will use properties of factorable polynomials to solve conceptual problems relating to zeros, such as determining whether an expression is a factor of a polynomial based on other information provided.

### SAT PASSPORT TO ADVANCED MATH DOMAIN

Content Dimension	Description
12. Understand a nonlinear relationship between two variables by making connections between their algebraic and graphical representations.	The student will select a graph corresponding to a given nonlinear equation, interpret graphs in the context of solving systems of equations, select a nonlinear equation corresponding to a given graph, determine the equation of a curve given a verbal description of a graph, determine key features of the graph of a linear function from its equation, or determine the impact to a graph of a change in the defining equation.
13. Use function notation, and interpret statements using function notation.	The student will use function notation to solve conceptual problems related to transformations and compositions of functions.
14. Use structure to isolate or identify a quantity of interest in an expression or isolate a quantity of interest in an equation.	The student will rearrange an equation or formula to isolate a single variable or a quantity of interest.

As a test that provides an entry point to postsecondary education and careers, the redesigned SAT's Math Test will include topics that are central to the ability of students to progress to later, more advanced mathematics. Problems in Passport to Advanced Math will cover topics that have great relevance and utility for college and career work.

Chief among these topics is the understanding of the structure of expressions and the ability to analyze, manipulate, and rewrite these expressions. This includes an understanding of the key parts of expressions, such as terms, factors, and coefficients, and the ability to interpret complicated expressions made up of these components. Students will be able to show their skill in rewriting expressions, identifying equivalent forms of expressions, and understanding the purpose of different forms.

This category also includes reasoning with more complex equations, including solving quadratic and higher-order equations in one variable and understanding the graphs of quadratic and higher-order functions. Finally, this category includes the ability to interpret and build functions, another skill crucial for success in later mathematics and scientific fields.

## ADDITIONAL TOPICS IN MATH

SAT ADDITIONAL TOPICS IN MATH DOMAIN	
Content Dimension	Description
<b>Application</b>	
1. Solve problems using volume formulas.	The student will use given information about figures, such as length of a side, area of a face, or volume of a solid, to calculate missing information. Any required volume formulas will be provided to students either on the formula sheet or within the question.
2. Use trigonometric ratios and the Pythagorean Theorem to solve applied problems involving right triangles.	The student will use information about triangle side lengths or angles presented in a context to calculate missing information using the Pythagorean theorem and/or trigonometric ratios.
<b>Procedural Skill and Fluency</b>	
3. Perform arithmetic operations on complex numbers.	The student will add, subtract, multiply, divide, and simplify complex numbers.
4. Convert between degrees and radians and use radians to determine arc lengths; use trigonometric functions of radian measure.	The student will convert between angle measures in degrees and radians in order to calculate arc lengths by recognizing the relationship between an angle measured in radians and an arc length, evaluating trigonometric functions of angles in radians.
5. Apply theorems about circles to find arc lengths, angle measures, chord lengths, and areas of sectors.	The student will use given information about circles and lines to calculate missing values for radius, diameter, chord length, angle, arc, and sector area.
<b>Conceptual Understanding</b>	
6. Use concepts and theorems about congruence and similarity to solve problems about lines, angles, and triangles.	The student will use theorems about triangles and intersecting lines to determine missing lengths and angle measures of triangles. The student may also be asked to provide a missing length or angle to satisfy a given theorem.
7. Use the relationship between similarity, right triangles, and trigonometric ratios; use the relationship between sine and cosine of complementary angles.	The student will use trigonometry and theorems about triangles and intersecting lines to determine missing lengths and angle measures of right triangles. The student may also be asked to provide a missing length or angle that would satisfy a given theorem.
8. Create or use an equation in two variables to solve a problem about a circle in the coordinate plane.	The student will create an equation or use properties of an equation of a circle to demonstrate or determine a property of the circle's graph.

While the overwhelming majority of problems on the redesigned SAT's Math Test fall into the first three domains, the test also addresses additional topics in high school math. In keeping with the approach described in Section II, patterns of selection for these are governed by evidence about their relevance to postsecondary education and work. The additional topics include essential geometric and trigonometric concepts and the Pythagorean Theorem, which become powerful methods of analysis and problem solving when connected to other math domains.

## SAMPLE QUESTIONS ILLUSTRATING DISTINCTIVE FEATURES OF THE REDESIGNED SAT'S MATH TEST

The following distinctive features of the redesigned SAT's Math Test are illustrated by sample questions that reflect the following:

- » An emphasis on mathematical reasoning over reasoning questions disconnected from the mathematics curriculum
- » A strong emphasis on both fluency and understanding
- » Richer applications, emphasizing career, science, and social studies applications
- » Item sets that allow for more than one question about a given scenario
- » A no-calculator portion

**REASONING ON THE REDESIGNED SAT'S MATH TEST WILL CONNECT MORE DIRECTLY TO ESSENTIAL SKILLS FOR COLLEGE READINESS THAT ARE PART OF A RIGOROUS HIGH SCHOOL CURRICULUM.**

To see what this shift means, consider the following question from the current SAT:<sup>1</sup>

Family	Number of Consecutive Nights
Jackson	10
Callan	5
Epstein	8
Liu	6
Benton	8

The table above shows the number of consecutive nights that each of five families stayed at a certain hotel during a 14-night period. If the Liu family's stay did not overlap with the Benton family's stay, which of the 14 nights could be a night on which only one of the five families stayed at the hotel?

- A) The 3rd
- B) The 5th
- C) The 6th
- D) The 8th
- E) The 10th

This question presents the student with a reasoning puzzle unrelated to the school mathematics curriculum. Being able to solve unfamiliar problems is valuable, but a test based entirely on this idea does not provide as much assurance that students have learned essential math skills and practices — nor does it reward students for their hard work in doing so.

The redesigned SAT's Math Test focuses on applied reasoning skills that are both essential for college readiness and taught in challenging high school math classrooms. This means that the questions will require reasoning and insight as they relate to important curricular skills such as looking for and making use of algebraic structure. In contrast to the question on the left, consider the following sample from the Heart of Algebra category:

EXAMPLE 1: Sample item from the redesigned SAT

If  $\frac{1}{2}x + \frac{1}{3}y = 4$ , what is the value of  $3x + 2y$ ?

A student may find the solution to this Heart of Algebra problem by noticing the structure of the given equation and seeing that multiplying both sides of the equation  $\frac{1}{2}x + \frac{1}{3}y = 4$  by 6 to clear fractions from the equation yields  $3x + 2y = 24$ .

<sup>1</sup> College Board, *Official SAT Practice Test 2013–14* (New York: Author, 2013).

## A STRONG EMPHASIS ON BOTH FLUENCY AND UNDERSTANDING

In *Adding It Up: Helping Children Learn Mathematics*, the National Research Council (NRC) identified procedural fluency and conceptual understanding as two of the five components of mathematical proficiency. The NRC calls for their inclusion in curricula, instructional materials, and assessments as they define what it means to learn math successfully.<sup>2</sup> As students cannot be ready for college and career without being mathematically proficient, the redesigned SAT assesses fluency with mathematical procedures and conceptual understanding with equal intensity.

The following two sample questions show some of the ways in which fluency and understanding are important on the redesigned SAT.

---

### EXAMPLE 2

$$4x - y = 3y + 7$$

$$x + 8y = 4$$

Based on the system of equations above, what is the value of the product  $xy$ ?

- A)  $\frac{3}{2}$
- B)  $\frac{1}{4}$
- C)  $\frac{1}{2}$
- D)  $\frac{11}{9}$

Example 2, again from Heart of Algebra, rewards fluency in solving pairs of simultaneous linear equations. Rather than looking for a clever way of back solving the value of the product  $xy$  from the system, students can solve the system for the values of  $x$  and  $y$ , then simply multiply them to get choice C,  $\frac{1}{2}$ . Note that because the system is not given in standard form, this requires doing some additional algebra, further reinforcing the need for fluency.

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<sup>2</sup> National Research Council, *Adding It Up: Helping Children Learn Mathematics* (Washington, DC: The National Academies Press, 2001).

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**EXAMPLE 3**

The function  $f$  is defined by  $f(x) = 2x^3 + 3x^2 + cx + 8$ , where  $c$  is a constant. In the  $xy$ -plane, the graph of  $f$  intersects the  $x$ -axis at the three points  $(-4, 0)$ ,  $(\frac{1}{2}, 0)$ , and  $(p, 0)$ . What is the value of  $c$ ?

- A)  $-18$
- B)  $-2$
- C)  $2$
- D)  $10$

Example 3, from Passport to Advanced Math, assesses conceptual understanding of polynomials and their graphs. If a student understands these concepts and requires, for example, the point  $(-4, 0)$  to lie on the graph, this results in  $0 = 2(-4)^3 + 3(-4)^2 + c(-4) + 8$ . A student who looks for and makes use of structure will monitor the calculation at this point and recognize an equation that determines the desired value of  $c$ ,  $-18$ . Seeing that he or she is on the right track, the student will then perform the calculations required to solve for  $c$ .



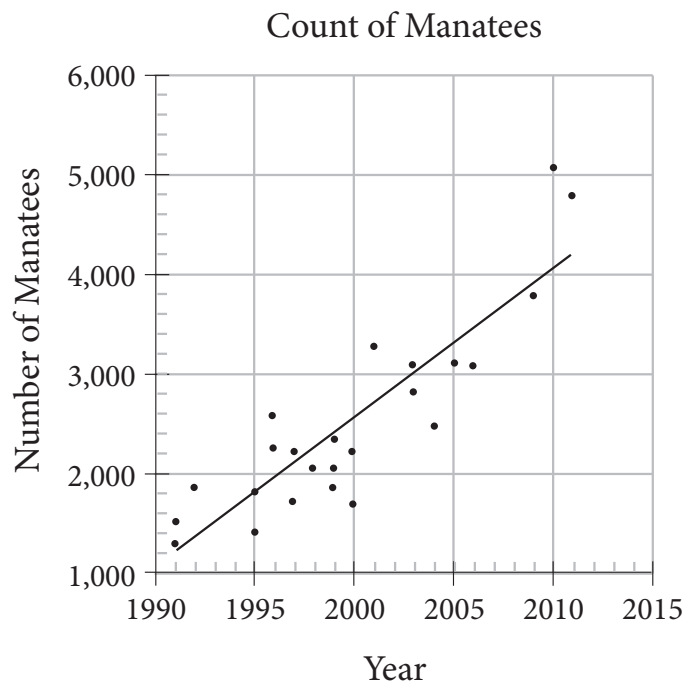
## **RICHER APPLICATIONS, EMPHASIZING CAREER, SCIENCE, AND SOCIAL STUDIES APPLICATIONS**

In response to evidence about essential prerequisites for college and career readiness and success, the redesigned SAT's Math Test requires students to apply their mathematics knowledge, skills, and understandings in challenging, authentic contexts. Students taking the Math Test will encounter a range of disciplines and will be asked to address real-world problems drawn from science, social studies, and careers and demonstrate a capacity for sustained reasoning over the multiple steps required to answer many of the questions on the exam. In these ways, the Math Test also rewards and incentivizes valuable work in the classroom.

Applications on the redesigned SAT's Math Test require students to demonstrate the ability to analyze a situation, determine the essential elements required to solve the problem, represent the problem mathematically, and carry out a solution. These applications often also require linking topics within the mathematics domain (e.g., functions and statistics) and across disciplines (e.g., math and science). Learning to model and problem solve is enhanced when students use the same mathematics (e.g., linear equations) to solve problems in different contexts (e.g., science, social studies, or careers).

Example 4 below is based on real-world methods (aerial observations of wintering spots, or synoptic counts) used by the U.S. Fish and Wildlife Service to count manatees, a type of sea mammal. This type of item is an excellent way of connecting linear functions to statistics. In this item, students are not required to model the line of best fit completely, but they are required to decontextualize the item to understand that they must compute the slope of the line of best fit to get the correct answer, 150.

## EXAMPLE 4

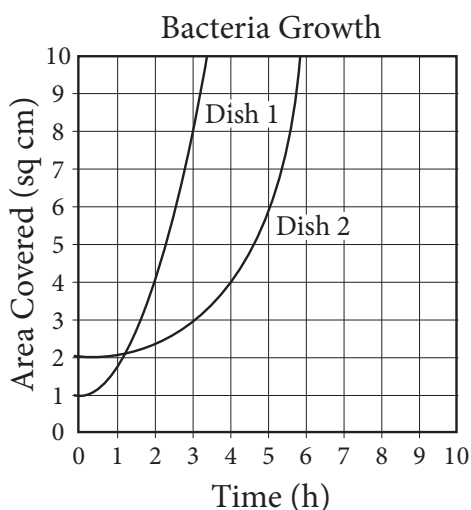


The scatterplot above shows counts of Florida manatees, a type of sea mammal, from 1991 to 2011. Based on the line of best fit to the data shown, which of the following values is closest to the average yearly increase in the number of manatees?

- A) 0.75
- B) 75
- C) 150
- D) 750

Example 5 below is another rich application item that uses a science context to make a connection across math domains (functions and statistics) and across subjects (math and science). In this item, students need to synthesize the information given in the graph and the prompt and determine which pieces of information in the graph will help provide them with a correct statement about the data.

## EXAMPLE 5



A researcher places two colonies of bacteria into two petri dishes that each have area 10 square centimeters. After the initial placement of the bacteria ( $t = 0$ ), the researcher measures and records the area covered by the bacteria in each dish every ten minutes. The data for each dish were fit by a smooth curve, as shown above, where each curve represents the area of a dish covered by bacteria as a function of time, in hours. Which of the following is a correct statement about the data above?

- A) At time  $t = 0$ , both dishes are 100% covered by bacteria.
- B) At time  $t = 0$ , bacteria covers 10% of Dish 1 and 20% of Dish 2.
- C) At time  $t = 0$ , Dish 2 is covered with 50% more bacteria than Dish 1.
- D) For the first hour, the area covered in Dish 2 is increasing at a higher average rate than the area covered in Dish 1.

## ITEM SETS THAT ALLOW FOR MORE THAN ONE QUESTION ABOUT A GIVEN SCENARIO

Asking more than one question about a given scenario allows students taking the redesigned SAT to do more sustained thinking and explore situations in greater depth. Students will encounter longer problems like these in their postsecondary work. By including item sets, the redesigned SAT rewards and incentivizes aligned, productive work in classrooms.

Item sets can be used to dig deeper into a student's understanding of a construct or to make connections to other domains. For example, one question from a set may ask about statistics and probability and the next may ask about the function that models the data. In the classroom, item sets manifest the connections between domains and provide opportunities for students to practice and extend their skills of abstraction, analysis, and communication.

Within this subset of questions, students will encounter:

- » career-related contexts, which could include scale drawings, estimation, unit rates, percentages, and proportional relationships;
- » problem sets that make use of these contexts, allowing multiple questions about a single stimulus;
- » real-life scenarios that will likely yield more complex solutions; and
- » real-life scenarios that might not be proportional; for instance, students may be asked to demonstrate their proficiency with scaling quantities that aren't proportional or with situations of diminishing returns and accelerated growth.

### ITEM SET:

In the classroom, item sets manifest the connections between different domains and provide opportunities for students to practice and extend their skills of abstraction, analysis, and communication. In the redesigned SAT, item sets allow the effective measurement of these skills and inspire productive practice in the classrooms.

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**EXAMPLE 6**

*(This is a student-produced response item set. Students grid in their answers, which are machine scored.)*

An international bank issues its Traveler credit cards worldwide. When a customer makes a purchase using a Traveler card in a currency different from the customer's home currency, the bank converts the purchase price at the daily foreign exchange rate and then charges a 4% fee on the converted cost.

Sara lives in the United States, but is on vacation in India. She used her Traveler card for a purchase that cost 602 rupees (Indian currency). The bank posted a charge of \$9.88 to her account that included the 4% fee.

**PART 1**

What foreign exchange rate, in Indian rupees per one U.S. dollar, did the bank use for Sara's charge? Round your answer to the nearest whole number.

**PART 2**

A bank in India sells a prepaid credit card worth 7,500 rupees. Sara can buy the prepaid card using dollars at the daily exchange rate with no fee, but she will lose any money left unspent on the prepaid card. What is the least number of the 7,500 rupees on the prepaid card Sara must spend for the prepaid card to be cheaper than charging all her purchases on the Traveler card? Round your answer to the nearest whole number of rupees.

**SOLUTION****PART 1**

\$9.88 represents the conversion of 602 rupees plus a 4% fee on the converted cost.

To calculate the original cost of the item in dollars,  $x$ :

$$\begin{aligned} 1.04x &= 9.88 \\ x &= 9.5 \end{aligned}$$

Since the original cost is \$9.50, to calculate the exchange rate  $r$ , in Indian rupees per one U.S. dollar:

$$\begin{aligned} 9.50 \text{ dollars} \times \frac{r \text{ rupees}}{1 \text{ dollar}} &= 602 \text{ rupees} \\ r &= \frac{602}{9.50} \\ &\approx 63 \text{ rupees} \end{aligned}$$

**PART 2**

Let  $d$  dollars be the cost of the 7,500-rupee prepaid card. This implies that the exchange rate on this particular day is  $\frac{d}{7,500}$  dollars per rupee. Suppose Sara's total purchases on the prepaid card were  $r$  rupees. The value of the  $r$  rupees in dollars is  $\left(\frac{d}{7,500}\right)r$  dollars. If Sara spent the  $r$  rupees on the Traveler card instead, she would be charged  $(1.04)\left(\frac{d}{7,500}\right)r$  dollars. To answer the question about how many rupees Sara must spend in order to make the Traveler card a cheaper option (in dollars) for spending the  $r$  rupees, we set up the inequality  $1.04\left(\frac{d}{7,500}\right)r \geq d$ . Rewriting both sides reveals  $1.04\left(\frac{r}{7,500}\right)d \geq (1)d$ , from which we can infer  $1.04\left(\frac{r}{7,500}\right) \geq 1$ . Dividing on both sides by 1.04 and multiplying on both sides by 7,500 finally yields  $r \geq 7,212$ . Hence the least number of rupees Sara must spend for the prepaid card to be cheaper than the Traveler card is 7,212.

Note that Example 6 is not a multiple-choice item. Responses are gridded in by students, which often allows for multiple correct responses and solution processes. Such items allow students to freely apply their critical thinking skills when planning and implementing a solution.

Example 6 is also an item set that includes two student-produced response questions. Student-produced response item set questions on the redesigned SAT measure the complex knowledge and skills that require students to deeply think through the solutions to problems. Set within a range of real-world contexts, these questions require students to make sense of problems and persevere in solving them; make connections between and among the different parts of a stimulus; plan a solution approach, as no scaffolding is provided to suggest a solution strategy; abstract, analyze, and refine an approach as needed; and produce and validate a response. These types of questions require the application of complex cognitive skills.

## A NO-CALCULATOR PORTION

The redesigned SAT's Math Test will contain two portions: one in which the student may use a calculator and another in which the student may not. The no-calculator portion allows the redesigned SAT to assess fluencies valued by postsecondary instructors and includes conceptual questions for which a calculator will not be helpful. Meanwhile, the calculator portion gives insight into students' capacity to use appropriate tools strategically. The calculator is a tool that students must use (or not use) judiciously.

The calculator portion of the test will include more complex modeling and reasoning questions to allow students to make computations more efficiently. However, this portion will also include questions in which the calculator could be a deterrent to expedience, thus assessing appropriate use of tools. For these types of questions, students who make use of structure or their ability to reason will reach the solution more rapidly than students who get bogged down using a calculator.

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**EXAMPLE 7**

What is one possible solution to the equation  $\frac{24}{x+1} - \frac{12}{x-1} = 1$ ?

Example 7, from the no-calculator portion of the test, requires students to look at the structure of the expression and find a way to rewrite it, again showing the link between fluency and mathematical practices. The student must transform the expression without a calculator, for example by multiplying both sides of the equation by a common denominator as a first step to find the solution. This leads to  $x = 5$  and  $x = 7$ , both of which should be checked in the original equation to ensure that they are not extraneous.

Additional example items showing the distinctive features of the redesigned SAT's Math Test within the four content categories can be found in Appendix B.



## Summary

The preceding discussion has presented an overview of the redesigned SAT's Math Test along with a discussion of some of the key features that make the Math Test distinctive both compared to the current SAT's math section and compared to other assessments within the field. As with the Evidence-Based Reading and Writing area of the redesigned SAT, we at the College Board are continuing our research and development of the redesigned SAT's Math Test. In doing so, we may find that we will need to make adjustments to our specifications as presented in this section (e.g., number of items, time limits, and scores). Any adjustments made, however, would be made only to more effectively serve the evidence-based features that are the focus of our development work on the Math Test. Our commitment, as we relate in Section V, includes communicating any and all changes widely and in a timely manner.

## Appendix B: Math Sample Questions

The sample questions/tasks in this section are provided to show a number of the key features of the redesigned SAT's Math Test, but do not constitute a full form of the test in terms of the total number of questions/tasks, the range of question difficulty, or examples of all question types and formats.

### Sample Questions: Heart of Algebra

#### SAMPLE 1

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Aaron is staying at a hotel that charges \$99.95 per night plus tax for a room. A tax of 8% is applied to the room rate, and an additional one-time untaxed fee of \$5.00 is charged by the hotel. Which of the following represents Aaron's total charge, in dollars, for staying  $x$  nights?

- A)  $(99.95 + 0.08x) + 5$
- B)  $1.08(99.95x) + 5$
- C)  $1.08(99.95x + 5)$
- D)  $1.08(99.95 + 5)x$

CONTENT: Heart of Algebra

KEY: B

CALCULATOR USAGE: Calculator

This problem asks students to interpret a situation and formulate a linear expression that represents the situation mathematically. The construction of mathematical models that represent real-world scenarios is a critical skill.

Choice B is correct. The total charge that Aaron will pay is the room rate, the 8% tax on the room rate, and a fixed fee. If Aaron stayed  $x$  nights, then the total charge is  $(99.95x + 0.08 \times 99.95x) + 5$ , which can be rewritten as  $1.08(99.95x) + 5$ .

Choice A is not the correct answer. The expression includes only a one-night stay in the room and does not accurately account for tax on the room.

Choice C is not the correct answer. The expression includes tax on the fee, and the hotel does not charge tax on the \$5.00 fee.

Choice D is not the correct answer. The expression includes tax on the fee and a fee charge for each night.

## SAMPLE 2

---

The gas mileage for Peter's car is 21 miles per gallon when the car travels at an average speed of 50 miles per hour. The car's gas tank has 17 gallons of gas at the beginning of a trip. If Peter's car travels at an average speed of 50 miles per hour, which of the following functions  $f$  models the number of gallons of gas remaining in the tank  $t$  hours after the trip begins?

A)  $f(t) = 17 - \frac{21}{50t}$

B)  $f(t) = 17 - \frac{50t}{21}$

C)  $f(t) = \frac{17 - 21t}{50}$

D)  $f(t) = \frac{17 - 50t}{21}$

CONTENT: Heart of Algebra

KEY: B

CALCULATOR USAGE: Calculator

In this question, students must understand that the number of gallons of gas in the tank is a function of time. The core skill assessed here is the ability to translate from a real-world situation into a mathematical model.

Choice B is correct. Since Peter's car is traveling at an average speed of 50 miles per hour and the car's gas mileage is 21 miles per gallon, the number of gallons of gas used each hour can be found by

$\frac{50 \text{ miles}}{1 \text{ hour}} \times \frac{1 \text{ gallon}}{21 \text{ miles}} = \frac{50}{21}$ . The car uses  $\frac{50}{21}$  gallons of gas per hour, so it uses  $\frac{50}{21}t$  gallons of gas in  $t$  hours. The car's gas tank has 17 gallons of gas

at the beginning of the trip. Therefore, the function that models the number of gallons of gas remaining in the tank  $t$  hours after the trip begins is  $f(t) = 17 - \frac{50t}{21}$ .

Choice A is not the correct answer. The number of gallons of gas used each hour is determined by dividing the average speed by the car's gas mileage.

Choice C is not the correct answer. The number of gallons of gas used each hour is misrepresented as  $\frac{21}{50}$ . Also, the number of gallons used each hour must be multiplied by time  $t$  before it is subtracted from the number of gallons of gas in the tank at the beginning of the trip.

Choice D is not the correct answer. The number of gallons of gas used each hour must be multiplied by time  $t$  before it is subtracted from the number of gallons of gas in the tank at the beginning of the trip.

### SAMPLE 3

---

If  $-\frac{9}{5} < -3t + 1 < -\frac{7}{4}$ , what is one possible value of  $9t - 3$ ?

CONTENT: Heart of Algebra

KEY: Any value greater than  $\frac{21}{4}$  and less than  $\frac{27}{5}$

CALCULATOR USAGE: Calculator

Recognizing the structure of this inequality provides one solution strategy. With this strategy, a student will look at the relationship between  $-3t + 1$  and  $9t - 3$  and recognize that the latter is  $-3$  multiplied by the former.

Multiplying all parts of the inequality by  $-3$  reverses the inequality signs, resulting in  $\frac{27}{5} > 9t - 3 > \frac{21}{4}$ , or rather  $\frac{21}{4} < 9t - 3 < \frac{27}{5}$  when written with increasing values from left to right. Any value greater than  $\frac{21}{4}$  and less than  $\frac{27}{5}$  is correct.

**SAMPLE 4**

---

$$\frac{5(k+2)-7}{6} = \frac{13-(4-k)}{9}$$

In the equation above, what is the value of  $k$ ?

- A)  $\frac{9}{17}$
- B)  $\frac{9}{13}$
- C)  $\frac{33}{17}$
- D)  $\frac{33}{13}$

CONTENT: Heart of Algebra

KEY: B

CALCULATOR USAGE: No calculator

In this problem, students will demonstrate their fluency in solving equations in one variable.

Choice B is correct. Simplifying the numerators yields  $\frac{5k+3}{6} = \frac{9+k}{9}$ , and cross-multiplication gives  $45k+27 = 54+6k$ . Solving for  $k$  yields  $k = \frac{9}{13}$ .

Choice A is not the correct answer. This value may result from not correctly applying the distributive property on the right-hand side, resulting in the expression  $13-4-k$  in the numerator. Correctly applying the distributive property yields  $13-(4-k) = 13-4+k$  in the numerator.

Choice C is not the correct answer. This value may result from not correctly applying the distributive property on the left-hand side, resulting in the expression  $5k+2-7$ . Correctly applying the distributive property yields  $5(k+2)-7 = 5k+3$  in the numerator.

Choice D is not the correct answer. This value may result from not using the appropriate order of operations when simplifying either numerator.

**SAMPLE 5**

---

$$4x - y = 3y + 7$$

$$x + 8y = 4$$

Based on the system of equations above, what is the value of the product  $xy$ ?

- A)  $-\frac{3}{2}$
- B)  $\frac{1}{4}$
- C)  $\frac{1}{2}$
- D)  $\frac{11}{9}$

CONTENT: Heart of Algebra

KEY: C

CALCULATOR USAGE: No calculator

This question rewards fluency in solving pairs of simultaneous linear equations. Rewriting equations in a way that allows the student to find the values of variables individually is the approach to take here. Students who lack facility in this area of the curriculum may resist just diving in, making success on the item less likely.

Choice C is correct. There are several solution methods possible, but all involve persevering in solving for the two variables and calculating the product. For example, combining like terms in the first equation yields  $4x - 4y = 7$  and then multiplying that by 2 gives  $8x - 8y = 14$ . When this transformed equation is added to the second given equation, the  $y$ -terms are eliminated, leaving an equation in just one variable:  $9x = 18$ , or  $x = 2$ . Substituting 2 for  $x$  in the second equation (one could use either to solve) yields  $2 + 8y = 4$ , which gives  $y = \frac{1}{4}$ . Finally, the product  $xy$  is  $2 \times \frac{1}{4} = \frac{1}{2}$ .

Choice A is not the correct answer. Students who select this option have most likely made a calculation error in transforming the second equation (using  $-4x - 8y = -16$  instead of  $-4x - 32y = -16$ ) and used it to eliminate the  $x$ -terms.

Choice B is not the correct answer. This is the value of  $y$  for the solution of the system, but it has not been put back into the system to solve for  $x$  to determine the product  $xy$ .

Choice D is not the correct answer. Not understanding how to eliminate a variable when solving a system, a student may have added the equations  $4x - 4y = 7$  and  $x + 8y = 4$  to yield  $5x + 4y = 11$ . From here, a student may mistakenly simplify the left-hand side of this resulting equation to yield  $9xy = 11$  and then proceed to use division by 9 on both sides in order to solve for  $xy$ .

### SAMPLE 6

---

If  $\frac{1}{2}x + \frac{1}{3}y = 4$ , what is the value of  $3x + 2y$ ?

CONTENT: Heart of Algebra

KEY: 24

CALCULATOR USAGE: No calculator

A student may find the solution to this problem by noticing the structure of the given equation and seeing that multiplying both sides of the equation  $\frac{1}{2}x + \frac{1}{3}y = 4$  by 6 to clear fractions from the equation yields  $3x + 2y = 24$ .

**SAMPLE 7**

---

The toll rates for crossing a bridge are \$6.50 for a car and \$10 for a truck. During a two-hour period, a total of 187 cars and trucks crossed the bridge, and the total collected in tolls was \$1,338. Solving which of the following systems of equations yields the number of cars,  $x$ , and the number of trucks,  $y$ , that crossed the bridge during the two hours?

A)  $x + y = 1,338$   
 $6.5x + 10y = 187$

B)  $x + y = 187$   
 $6.5x + 10y = \frac{1,338}{2}$

C)  $x + y = 187$   
 $6.5x + 10y = 1,338$

D)  $x + y = 187$   
 $6.5x + 10y = 1,338 \times 2$

CONTENT: Heart of Algebra

KEY: C

CALCULATOR USAGE: Calculator

This question assesses students' ability to create a system of linear equations that represents a real-world situation. Students will have to make sense of the situation presented, choose and define two variables to use, and set up the equations based on the relationships from the information given.

Choice C is correct. If  $x$  is the number of cars that crossed the bridge during the two hours and  $y$  is the number of trucks that crossed the bridge during the two hours, then  $x + y$  represents the total number of cars and trucks that crossed the bridge during the two hours, and  $6.5x + 10y$  represents the total amount collected in the two hours. Therefore, the correct system of equations is  $x + y = 187$  and  $6.5x + 10y = 1,338$ .

Choice A is not the correct answer. The student may have mismatched the symbolic expressions for total cars and trucks and total tolls collected with the two numerical values given. The expression  $x + y$  represents the total number of cars and trucks that crossed the bridge, which is 187.

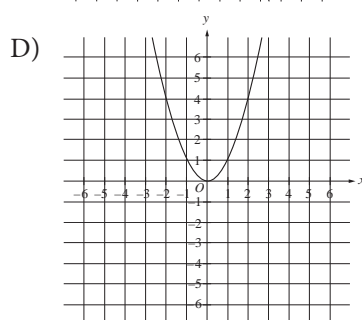
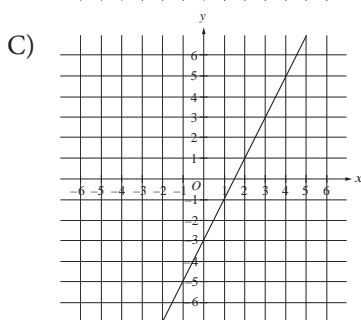
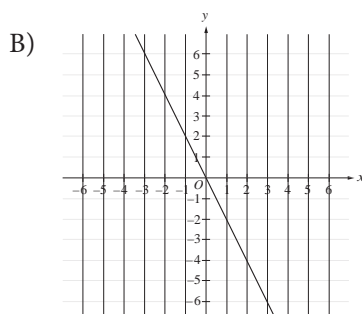
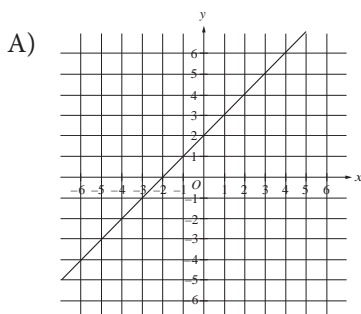


Choice B is not the correct answer. The student may have attempted to use the information that the counts of cars, trucks, and tolls were taken over a period of two hours, but this information is not needed in setting up the correct system of equations. The expression  $6.5x + 10y$  represents the total amount of tolls collected, which is \$1,338, not  $\frac{\$1,338}{2}$ .

Choice D is not the correct answer. The student may have attempted to use the information that the counts of cars, trucks, and tolls were taken over a period of two hours, but this information is not needed in setting up the correct system of equations. The expression  $6.5x + 10y$  represents the total amount of tolls collected, which is \$1,338, not  $\$1,338 \times 2$ .

### SAMPLE 8

If  $k$  is a positive constant different from 1, which of the following could be the graph of  $y - x = k(x + y)$  in the  $xy$ -plane?



CONTENT: Heart of Algebra

KEY: B

CALCULATOR USAGE: Calculator

This problem assesses students' ability to understand the relationship between an equation in two variables and the characteristics of its graph

(for example, shape, position, intercepts, extreme points, or symmetry). In addition, it requires the student to transform the given equation into a more suitable form and then make the connection between the obtained equation and the graph.

Choice B is correct. Manipulating the equation to solve for  $y$  gives

$y = \left(\frac{1+k}{1-k}\right)x$ , revealing that the graph of the equation must be a line that passes through the origin. Of the choices given, only the graph shown in choice B satisfies these conditions.

Choice A is not the correct answer. The student may have seen that the term  $k(x + y)$  is a multiple of  $x + y$  and wrongly concluded that this is the equation of a line with slope 1.

Choice C is not the correct answer. The student may have made incorrect steps when simplifying the equation or may have not seen the advantage that putting the equation in slope-intercept form would give in determining the graph, and thus wrongly concluded the graph has a nonzero  $y$ -intercept.

Choice D is not the correct answer. The student may not have seen that term  $k(x + y)$  can be multiplied out and the variables  $x$  and  $y$  isolated, and wrongly concluded that the graph of the equation cannot be a line.

**SAMPLE 9**

---

$$\begin{aligned}\frac{1}{2}x - \frac{1}{4}y &= 5 \\ ax - 3y &= 20\end{aligned}$$

In the system of linear equations above,  $a$  is a constant. If the system has no solution, what is the value of  $a$ ?

- A)  $\frac{1}{2}$
- B) 2
- C) 6
- D) 12

CONTENT: Heart of Algebra

KEY: C

CALCULATOR USAGE: No calculator

In addition to solving systems of linear equations that have a solution, students should be familiar with systems that have no solution or an infinite number of solutions. Knowing that there are no solutions when two simultaneous equations of the form  $ax + by = c$  only differ in their  $c$  values will be the first key step in determining the solution to this problem.

Choice C is correct. If the system of equations has no solution, the graphs of the equations in the  $xy$ -plane are parallel lines. To be parallel, the lines must have the same slope, and this will be true if the expression  $ax - 3y$  is a multiple of the expression  $\frac{1}{2}x - \frac{1}{4}y$ . Since  $-3y = 12\left(-\frac{1}{4}y\right)$ , the expression  $ax - 3y$  would have to be 12 times the expression

$\frac{1}{2}x - \frac{1}{4}y$ . This means  $ax = 12\left(\frac{1}{2}x\right)$ , so  $a = 6$ . The resulting system is  $\frac{1}{2}x - \frac{1}{4}y = 5$  and  $6x - 3y = 20$ , which is equivalent to  $6x - 3y = 60$  and  $6x - 3y = 20$ , which has no solution.

Choice A is not the correct answer. This may result from the misconception that if each equation in a system has the same  $x$ -coefficient, the system cannot have a solution. But if  $a = \frac{1}{2}$ , subtracting the two equations eliminates  $x$  and produces a solution to the system.

Choice B is not the correct answer. This may result from trying to make the second equation in the system a multiple of the first by looking at the ratio of the constants on the right sides,  $\frac{20}{5}$ , and wrongly concluding that the second equation must be 4 times the first, which would give  $a = 4\left(\frac{1}{2}\right)$ , or  $a = 2$ . But the two equations in a system are multiples only if the system has infinitely many solutions, not if the system has no solution.

Choice D is not the correct answer. The student may have found the factor, 12, that multiplies the left side of the first equation to yield the left side of the second, but then neglected to find  $a = 12\left(\frac{1}{2}\right)$ , or  $a = 6$ .

### SAMPLE 10

---

When a scientist dives in salt water to a depth of 9 feet below the surface, the pressure due to the atmosphere and surrounding water is 18.7 pounds per square inch. As the scientist descends, the pressure increases linearly. At a depth of 14 feet, the pressure is 20.9 pounds per square inch. If the pressure increases at a constant rate as the scientist's depth below the surface increases, which of the following linear models best describes the pressure  $p$  in pounds per square inch at a depth of  $d$  feet below the surface?

- A)  $p = 0.44d + 0.77$
- B)  $p = 0.44d + 14.74$
- C)  $p = 2.2d - 1.1$
- D)  $p = 2.2d - 9.9$

CONTENT: Heart of Algebra

KEY: B

CALCULATOR USAGE: Calculator

In approaching this problem, students must determine the relationship between the two variables described within the text: the depth and the pressure.

Choice B is correct. To determine the linear model, one can first determine the rate at which the pressure due to the atmosphere and surrounding water is increasing as the depth of the diver increases.

Calculating this gives  $\frac{20.9 - 18.7}{14 - 9} = \frac{2.2}{5}$ , or 0.44. Then one needs to

determine the pressure due to the atmosphere or, in other words, the pressure when the diver is at a depth of 0. Solving the equation  $18.7 = 0.44(9) + b$  gives  $b = 14.74$ . Therefore, the model that can be used to relate the pressure and the depth is  $p = 0.44d + 14.74$ .

Choice A is not the correct answer. The rate is calculated correctly, but the student may have incorrectly used the ordered pair (18.7, 9) rather than (9, 18.7) to calculate the pressure at a depth of 0 feet.

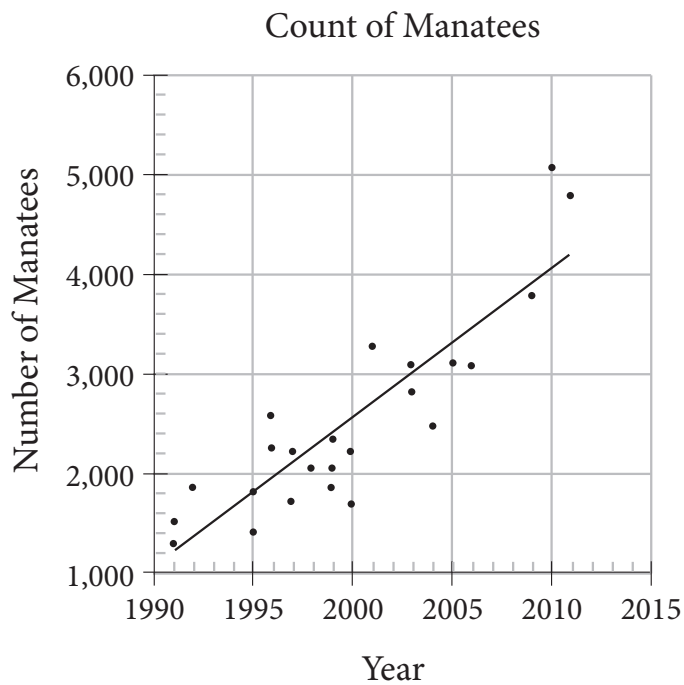
Choice C is not the correct answer. The rate here is incorrectly calculated by subtracting 20.9 and 18.7 and *not* dividing by 5. The student then uses the coordinate pair  $d = 9$  and  $p = 18.7$  in conjunction with the incorrect slope of 2.2 to write the equation of the linear model.

Choice D is not the correct answer. The rate here is incorrectly calculated by subtracting 20.9 and 18.7 and *not* dividing by 5. The student then uses the coordinate pair  $d = 14$  and  $p = 20.9$  in conjunction with the incorrect slope of 2.2 to write the equation of the linear model.

## Sample Questions: Problem Solving and Data Analysis

### SAMPLE 11

---



The scatterplot above shows counts of Florida manatees, a type of sea mammal, from 1991 to 2011. Based on the line of best fit to the data shown, which of the following values is closest to the average yearly increase in the number of manatees?

- A) 0.75
- B) 75
- C) 150
- D) 750

CONTENT: Problem Solving and Data Analysis

KEY: C

CALCULATOR USAGE: Calculator

Modeling with mathematics is a multistep process, and rich applications are instrumental for assessing students' knowledge/skills at every step of the modeling process. In this example, students must interpret the slope of the line of best fit for the scatterplot as the average increase in the number of manatees per year, while taking the scales of the axes into consideration.

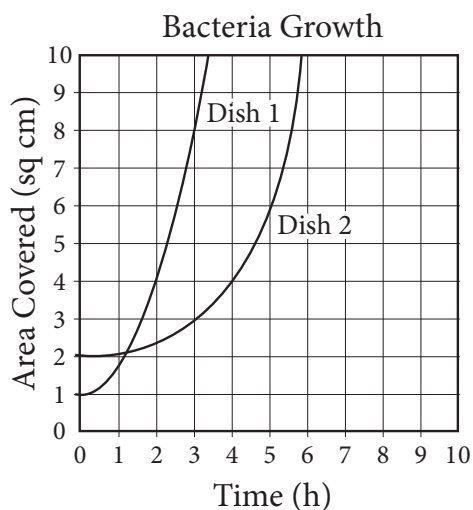
Choice C is correct. The slope of the line of best fit is the value of the average increase in manatees per year. Using approximate values found along the line of best fit (1,200 manatees in 1991 and 4,200 manatees in 2011), the approximate slope can be calculated as  $\frac{3,000}{20} = 150$ .

Choice A is not the correct answer. This value may result from disregarding the actual scale when approximating the slope and interpreting the scale as if each square represents one unit.

Choice B is not the correct answer. This value may result from disregarding the actual scale when approximating the slope, and interpreting the scale as if each square along the  $x$ -axis represents one year and each tick mark along the  $y$ -axis represents 100 manatees.

Choice D is not the correct answer. This value may result from disregarding the actual scale along the  $x$ -axis when approximating the slope and interpreting each square along the  $x$ -axis as one year.

## SAMPLE 12



A researcher places two colonies of bacteria into two petri dishes that each have area 10 square centimeters. After the initial placement of the bacteria ( $t = 0$ ), the researcher measures and records the area covered by the bacteria in each dish every ten minutes. The data for each dish were fit by a smooth curve, as shown above, where each curve represents the area of a dish covered by bacteria as a function of time, in hours. Which of the following is a correct statement about the data above?

- A) At time  $t = 0$ , both dishes are 100% covered by bacteria.
- B) At time  $t = 0$ , bacteria covers 10% of Dish 1 and 20% of Dish 2.
- C) At time  $t = 0$ , Dish 2 is covered with 50% more bacteria than Dish 1.
- D) For the first hour, the area covered in Dish 2 is increasing at a higher average rate than the area covered in Dish 1.

CONTENT: Problem Solving and Data Analysis

KEY: B

CALCULATOR USAGE: Calculator

In this question, students need to synthesize all the information given in the graph and the prompt and determine which pieces of information in the graph will help provide them with a description of the colonies when they are first placed in the petri dishes and during the first hour afterward.



Choice B is the correct answer. Each petri dish has area 10 square centimeters, and so at time  $t = 0$ , Dish 1 is 10% covered  $\left(\frac{1}{10}\right)$  and Dish 2 is 20% covered  $\left(\frac{2}{10}\right)$ . Thus the statement in B is true.

Choice A is not the correct answer. At the end of the observations, both dishes are 100% covered with bacteria, but at time  $t = 0$ , neither dish is 100% covered.

Choice C is not the correct answer. At time  $t = 0$ , Dish 1 is covered with 50% less bacteria than is Dish 2, but Dish 2 is covered with 100% more, not 50% more, bacteria than is Dish 1.

Choice D is not the correct answer. After the first hour, it is still true that more of Dish 2 is covered by bacteria than is Dish 1, but for the first hour the area of Dish 1 that is covered has been increasing at a higher average rate (about 0.8 sq cm/hour) than the area of Dish 2 (about 0.1 sq cm/hour).

### SAMPLE 13

---

A typical image taken of the surface of Mars by a camera is 11.2 gigabits in size. A tracking station on Earth can receive data from the spacecraft at a data rate of 3 megabits per second for a maximum of 11 hours each day. If 1 gigabit equals 1,024 megabits, what is the maximum number of typical images that the tracking station could receive from the camera each day?

- A) 3
- B) 10
- C) 56
- D) 144

CONTENT: Problem Solving and Data Analysis

KEY: B

CALCULATOR USAGE: Calculator

In this problem, students must use the unit rate (data-transmission rate) and the conversion between gigabits and megabits as well as conversions in units of time. Unit analysis is critical to solving the problem correctly, and the problem represents a typical calculation that would be done when working with electronic files and data-transmission rates.

A calculator is recommended in solving this problem.

Choice B is correct. The tracking station can receive 118,800 megabits each day  $\left(\frac{3 \text{ megabits}}{1 \text{ second}} \times \frac{60 \text{ seconds}}{1 \text{ minute}} \times \frac{60 \text{ minutes}}{1 \text{ hour}} \times 11 \text{ hours}\right)$ , which is about 116 gigabits each day  $\left(\frac{118,800}{1,024}\right)$ . If each image is 11.2 gigabits, then the number of images that can be received each day is  $\frac{116}{11.2} \approx 10.4$ . Since the question asks for the maximum number of typical images, rounding the answer down to 10 is appropriate because the tracking station will not receive a completed 11th image in one day.

Choice A is not the correct answer. The student may not have synthesized all of the information. This answer may result from multiplying 3 (rate in megabits per second) by 11 (hours receiving) and dividing by 11.2 (size of image in gigabits), neglecting to convert 3 megabits per second into megabits per hour and to utilize the information about 1 gigabit equaling 1,024 megabits.

Choice C is not the correct answer. The student may not have synthesized all of the information. This answer may result from converting the number of gigabits in an image to megabits (11,470), multiplying by the rate of 3 megabits per second (34,410), and then converting 11 hours into minutes (660) instead of seconds.

Choice D is not the correct answer. The student may not have synthesized all of the information. This answer may result from converting 11 hours into seconds (39,600), then dividing the result by 3 gigabits converted into megabits (3,072), and multiplying by the size of one typical image.

## Sample Problem Set

Questions 14 and 15 refer to the following information.

A survey was conducted among a randomly chosen sample of U.S. citizens about U.S. voter participation in the November 2012 presidential election. The table below displays a summary of the survey results.

### Reported Voting by Age (in thousands)

	VOTED	DID NOT VOTE	NO RESPONSE	TOTAL
18- to 34-year-olds	30,329	23,211	9,468	63,008
35- to 54-year-olds	47,085	17,721	9,476	74,282
55- to 74-year-olds	43,075	10,092	6,831	59,998
People 75 years old and over	12,459	3,508	1,827	17,794
Total	132,948	54,532	27,602	215,082

### SAMPLE 14

According to the table, for which age group did the greatest percentage of people report that they had voted?

- A) 18- to 34-year-olds
- B) 35- to 54-year-olds
- C) 55- to 74-year-olds
- D) People 75 years old and over

## SAMPLE 15

---

Of the 18- to 34-year-olds who reported voting, 500 people were selected at random to do a follow-up survey where they were asked which candidate they voted for. There were 287 people in this follow-up survey sample who said they voted for Candidate A, and the other 213 people voted for someone else. Using the data from both the follow-up survey and the initial survey, which of the following is most likely to be an accurate statement?

- A) About 123 million people 18 to 34 years old would report voting for Candidate A in the November 2012 presidential election.
- B) About 76 million people 18 to 34 years old would report voting for Candidate A in the November 2012 presidential election.
- C) About 36 million people 18 to 34 years old would report voting for Candidate A in the November 2012 presidential election.
- D) About 17 million people 18 to 34 years old would report voting for Candidate A in the November 2012 presidential election.

## SOLUTION SAMPLE 14

CONTENT: Problem Solving and Data Analysis

KEY: C

CALCULATOR USAGE: Calculator

To succeed on these questions, students must conceptualize the context and retrieve relevant information from the table, next manipulating it to form or compare relevant quantities. The first question asks students to select the relevant information from the table to compute the percentage of self-reported voters for each age group and then compare the percentages to identify the largest one, choice C. Of the 55- to 74-year-old group's total population (59,998,000), 43,075,000 reported that they had voted, which represents 71.8% and is the highest percentage of reported voters from among the four age groups.

Choice A is not the correct answer. The question is asking for the age group with the largest percentage of self-reported voters. This answer reflects the age group with the smallest percentage of self-reported voters. This group's percentage of self-reported voters is 48.1%, or  $\frac{30,329}{63,008}$ , which is less than that of the 55- to 74-year-old group.

Choice B is not the correct answer. The question is asking for the age group with the largest percentage of self-reported voters. This answer reflects the age group with the largest number of self-reported voters, not the largest percentage. This group's percentage of self-reported voters is 63.4%, or  $\frac{47,085}{74,282}$ , which is less than that of the 55- to 74-year-old group.

Choice D is not the correct answer. The question is asking for the age group with the largest percentage of self-reported voters. This answer reflects the age group with the smallest number of self-reported voters, not the largest percentage. This group's percentage of self-reported voters is 70.0%, or  $\frac{12,459}{17,794}$ , which is less than that of the 55- to 74-year-old group.

### SOLUTION SAMPLE 15

CONTENT: Problem Solving and Data Analysis

KEY: D

CALCULATOR USAGE: Calculator

The second question asks students to extrapolate from a random sample to estimate the number of 18- to 34-year-olds who voted for Candidate A: this is done by multiplying the fraction of people in the random sample who voted for Candidate A by the total population of voting 18- to 34-year-olds:  $\frac{287}{500} \times 30,329,000 \approx 17$  million, choice D. Students without a clear grasp of the context and its representation in the table might easily arrive at one of the other answers listed.

Choice A is not the correct answer. The student may not have multiplied the fraction of the sample by the correct subgroup of people (18- to 34-year-olds who voted). This answer may result from multiplying the fraction by the entire population, which is an incorrect application of the information.

Choice B is not the correct answer. The student may not have multiplied the fraction of the sample by the correct subgroup of people (18- to 34-year-olds who voted). This answer may result from multiplying the fraction by the total number of people who voted, which is an incorrect application of the information.

Choice C is not the correct answer. The student may not have multiplied the fraction of the sample by the correct subgroup of people (18- to 34-year-olds who voted). This answer may result from multiplying the

fraction by the total number of 18- to 34-year-olds, which is an incorrect application of the information.

### SAMPLE 16 (STUDENT-PRODUCED RESPONSE)

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An international bank issues its Traveler credit cards worldwide. When a customer makes a purchase using a Traveler card in a currency different from the customer's home currency, the bank converts the purchase price at the daily foreign exchange rate and then charges a 4% fee on the converted cost.

Sara lives in the United States, but is on vacation in India. She used her Traveler card for a purchase that cost 602 rupees (Indian currency). The bank posted a charge of \$9.88 to her account that included the 4% fee.

#### PART 1

What foreign exchange rate, in Indian rupees per one U.S. dollar, did the bank use for Sara's charge? Round your answer to the nearest whole number.

#### PART 2

A bank in India sells a prepaid credit card worth 7,500 rupees. Sara can buy the prepaid card using dollars at the daily exchange rate with no fee, but she will lose any money left unspent on the prepaid card. What is the least number of the 7,500 rupees on the prepaid card Sara must spend for the prepaid card to be cheaper than charging all her purchases on the Traveler card? Round your answer to the nearest whole number of rupees.

CONTENT: Problem Solving and Data Analysis

KEY: 63 (Part 1), 7,212 (Part 2)

CALCULATOR USAGE: Calculator

Solution Part 1: \$9.88 represents the conversion of 602 rupees plus a 4% fee on the converted cost.

To calculate the original cost of the item in dollars,  $x$ :

$$1.04x = 9.88$$

$$x = 9.5$$

Since the original cost is \$9.50, to calculate the exchange rate  $r$ , in Indian rupees per one U.S. dollar:

$$9.50 \text{ dollars} \times \frac{r \text{ rupees}}{1 \text{ dollar}} = 602 \text{ rupees}$$

$$\begin{aligned} r &= \frac{602}{9.50} \\ &\approx 63 \text{ rupees} \end{aligned}$$

Solution Part 2: Let  $d$  dollars be the cost of the 7,500-rupee prepaid card. This implies that the exchange rate on this particular day is  $\frac{d}{7,500}$  dollars per rupee. Suppose Sara's total purchases on the prepaid card were  $r$  rupees. The value of the  $r$  rupees in dollars is  $\left(\frac{d}{7,500}\right)r$  dollars. If Sara spent the  $r$  rupees on the Traveler card instead, she would be charged  $(1.04)\left(\frac{d}{7,500}\right)r$  dollars. To answer the question about how many rupees Sara must spend in order to make the Traveler card a cheaper option (in dollars) for spending the  $r$  rupees, we set up the inequality  $1.04\left(\frac{d}{7,500}\right)r \geq d$ . Rewriting both sides reveals  $1.04\left(\frac{r}{7,500}\right)d \geq (1)d$ , from which we can infer  $1.04\left(\frac{r}{7,500}\right) \geq 1$ .

Dividing on both sides by 1.04 and multiplying on both sides by 7,500 finally yields  $r \geq 7,212$ . Hence the least number of rupees Sara must spend for the prepaid card to be cheaper than the Traveler card is 7,212.

## Sample Questions: Passport to Advanced Math

### SAMPLE 17

If  $a^2 + 14a = 51$  and  $a > 0$ , what is the value of  $a + 7$ ?

CONTENT: Passport to Advanced Math

KEY: 10

CALCULATOR USAGE: No calculator

There is more than one way to solve this problem. A student can apply standard techniques by rewriting the equation  $a^2 + 14a = 51$  as  $a^2 + 14a - 51 = 0$  and then factoring. Since the coefficient of  $a$  is 14 and the constant term is  $-51$ , factoring  $a^2 + 14a - 51 = 0$  requires writing 51 as the product of two numbers that differ by 14. This is  $51 = (3)(17)$ , which gives the factorization  $a^2 + 14a - 51 = (a + 17)(a - 3) = 0$ . The possible values of  $a$  are  $a = -17$  and  $a = 3$ . Since it is given that  $a > 0$ , it must be true that  $a = 3$ . Thus, the value of  $a + 7$  is  $3 + 7 = 10$ .

A student could also use the quadratic formula to find the possible values of  $a$ :

$$a = \frac{-14 \pm \sqrt{14^2 - 4(1)(-51)}}{2(1)} = \frac{-14 \pm \sqrt{196 - (-204)}}{2} = \frac{-14 \pm \sqrt{400}}{2} = \frac{-14 \pm 20}{2}.$$

The possible values of  $a$  are  $a = \frac{-14 - 20}{2} = -17$  and  $a = \frac{-14 + 20}{2} = 3$ .

Again, since it is given that  $a > 0$ , it must be true that  $a = 3$ . Thus, the value of  $a + 7$  is  $3 + 7 = 10$ .

There is another way to solve this problem that will reward the student who recognizes that adding 49 to both sides of the equation yields  $a^2 + 14a + 49 = 51 + 49$ , or rather  $(a + 7)^2 = 100$ , which has a perfect square on each side. Since  $a > 0$ , the solution  $a + 7 = 10$  is evident.



**SAMPLE 18**

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The function  $f$  is defined by  $f(x) = 2x^3 + 3x^2 + cx + 8$ , where  $c$  is a constant. In the  $xy$ -plane, the graph of  $f$  intersects the  $x$ -axis at the three points  $(-4, 0)$ ,  $(\frac{1}{2}, 0)$ , and  $(p, 0)$ . What is the value of  $c$ ?

- A)  $-18$
- B)  $-2$
- C)  $2$
- D)  $10$

CONTENT: Passport to Advanced Math

KEY: A

CALCULATOR USAGE: Calculator

Students could tackle this problem in many different ways, but the focus is on their understanding of the zeros of a polynomial function and how they are used to construct algebraic representations of polynomials.

Choice A is correct. The given zeros can be used to set up an equation to solve for  $c$ . Substituting  $-4$  for  $x$  and  $0$  for  $y$  yields  $-4c = 72$ , or  $c = -18$ .

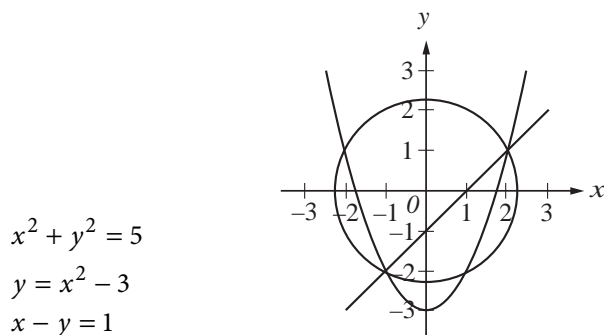
Alternatively, since  $-4$ ,  $\frac{1}{2}$ , and  $p$  are zeros of the polynomial function  $f(x) = 2x^3 + 3x^2 + cx + 8$ , it follows that  $f(x) = (2x - 1)(x + 4)(x - p)$ . Were this polynomial multiplied out, the constant term would be  $(-1)(4)(-p) = 4p$ . (We can see this without performing the full expansion.) Since it is given that this value is  $8$ , it goes that  $4p = 8$  or rather,  $p = 2$ . Substituting  $2$  for  $p$  in the polynomial function yields  $f(x) = (2x - 1)(x + 4)(x - 2)$ , and after multiplying the factors one finds that the coefficient of the  $x$  term, or the value of  $c$ , is  $-18$ .

Choice B is not the correct answer. This value is a misunderstood version of the value of  $p$ , not  $c$ , and the relationship between the zero and the factor (if  $a$  is the zero of a polynomial, its corresponding factor is  $x - a$ ) has been confused.

Choice C is not the correct answer. This is the value of  $p$ , not  $c$ . Using this value as the third factor of the polynomial will reveal that the value of  $c$  is  $-18$ .

Choice D is not the correct answer. This represents a sign error in the final step in determining the value of  $c$ .

## SAMPLE 19



A system of three equations and their graphs in the  $xy$ -plane are shown above. How many solutions does the system have?

- A) One
- B) Two
- C) Three
- D) Four

CONTENT: Passport to Advanced Math

KEY: B

CALCULATOR USAGE: Calculator

Students must also demonstrate their conceptual understanding of mathematics. In this problem, the word “solutions” needs to be contextualized within the situation described, and students must recognize that only points where all three graphs have a point in common are solutions to the system.

Choice B is correct. The solutions to the system of equations are the points where the circle, parabola, and line all intersect. These points are  $(-1, 2)$  and  $(2, 1)$ , and these are the only solutions to the system.

Choice A is not the correct answer. This answer may reflect the misconception that a system of equations can have only one solution.

Choice C is not the correct answer. This answer may reflect the misconception that a system of equations has as many solutions as the number of equations in the system.

Choice D is not the correct answer. This answer may reflect the misconception that the solutions of the system are represented by the points where any two of the curves intersect, rather than the correct concept that the solutions are represented only by the points where all three curves intersect.

## SAMPLE 20

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What is one possible solution to the equation  $\frac{24}{x+1} - \frac{12}{x-1} = 1$ ?

CONTENT: Passport to Advanced Math

KEY: 5 or 7

CALCULATOR USAGE: No calculator

Students should look for the best solution methods for solving rational equations before they begin. Looking for structure and common denominators will prove very useful at the onset and will help prevent complex computations that do not lead to a solution.

In this problem, multiplying both sides of the equation by the common denominator  $(x+1)(x-1)$  yields  $24(x-1) - 12(x+1) = (x+1)(x-1)$ . Multiplication and simplification then yields  $12x - 36 = x^2 - 1$ , or  $x^2 - 12x + 35 = 0$ . Factoring the quadratic gives  $(x-5)(x-7) = 0$ , so the solutions occur at  $x = 5$  and  $x = 7$ , both of which should be checked in the original equation to ensure that they are not extraneous. In this case, both values are solutions.

## SAMPLE 21

$$\frac{1}{x} + \frac{2}{x} = \frac{1}{5}$$

Anise needs to complete a printing job using both of the printers in her office. One of the printers is twice as fast as the other, and together the printers can complete the job in 5 hours. The equation above represents the situation described. Which of the following describes what the expression  $\frac{1}{x}$  represents in this equation?

- A) The time, in hours, that it takes the slower printer to complete the printing job alone
- B) The portion of the job that the slower printer would complete in one hour
- C) The portion of the job that the faster printer would complete in two hours
- D) The time, in hours, that it takes the slower printer to complete  $\frac{1}{5}$  of the printing job

CONTENT: Passport to Advanced Math

KEY: B

CALCULATOR USAGE: No calculator

This question requires students to interpret/decipher an expression/equation (already constructed for them) that models a real-world situation. This is an important skill to develop and a good practice to foster students' reasoning skills. The students who answer this question correctly are able to interpret the whole expression (or specific parts) in terms of its context.

Choice B is correct. From the description given,  $\frac{1}{5}$  is the portion of the job that the two printers, working together, can complete in one hour, and each term in the sum on the left side is the part of this  $\frac{1}{5}$  of the job that one of the printers contributes. Since one of the printers is twice as fast as the other,  $\frac{2}{x}$  describes the portion of the job that the faster printer is able to complete in one hour and  $\frac{1}{x}$  describes the portion of the job that the slower printer is able to complete in one hour.

Choice A is not the correct answer. The student may have not seen that in this context, the rates (that is, the work completed in a fixed time) of

the printers can be added to get the combined rate, but the times it takes each printer to complete the job cannot be added to get the time for both printers working together, since the time for printers working together is less than, not greater than, the times for each printer alone. Hence the terms in the sum cannot refer to hours worked. In fact, the time it would take the slower printer to complete the whole job is  $x$  hours.

Choice C is not the correct answer. The student may have seen that  $\frac{1}{x}$  is the smaller term in the sum, wrongly concluded that the smaller term must apply to the faster printer, and then assumed the 2 in the numerator of the second term implies the equation describes work completed in 2 hours. In fact, the portion of the job that the faster printer could complete in 2 hours is  $(2)\left(\frac{2}{x}\right) = \frac{4}{x}$ .

Choice D is not the correct answer. The student may have correctly seen that the value  $\frac{1}{5}$  on the right side refers to the portion of the job completed, but not seen that in this context, the rates (that is, the work completed in a fixed time) of the printers can be added to get the combined rate, but the times it takes each printer to complete the job cannot be added to get the time for both printers working together. Hence the terms in the sum cannot refer to hours worked. In fact, the time it takes the slower printer to complete  $\frac{1}{5}$  of the job is  $\frac{x}{5}$  hours.

**SAMPLE 22**

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$$\begin{aligned}x^2 + y^2 &= 153 \\ y &= -4x\end{aligned}$$

If  $(x, y)$  is a solution to the system of equations above, what is the value of  $x^2$ ?

- A) -51
- B) 3
- C) 9
- D) 144

CONTENT: Passport to Advanced Math

KEY: C

CALCULATOR USAGE: Calculator

In this question, students are asked to manipulate one equation to use in another in order to solve for a given value, making use of structure where appropriate.

Choice C is correct. The second equation gives  $y$  in terms of  $x$ , so a student can use this to rewrite the first equation in terms of  $x$ . Substituting  $-4x$  for  $y$  in the equation  $x^2 + y^2 = 153$  gives  $x^2 + (-4x)^2 = 153$ . This can be simplified to  $x^2 + 16x^2 = 153$ , or  $17x^2 = 153$ . Since the question asks for the value of  $x^2$ , not  $x$ , dividing both sides of  $17x^2 = 153$  by 17 gives the answer:  $x^2 = \frac{153}{17} = 9$ .

Choice A is not the correct answer. This answer may result from neglecting to square the coefficient  $-4$  in  $y = -4x$ , which would give  $y^2 = -4x^2$ . Then the first equation would become  $x^2 - 4x^2 = -3x^2 = 153$ , which would give  $-51$  as the value of  $x^2$ .

Choice B is not the correct answer. This answer may result from finding the value for  $x$ , not the value of  $x^2$ .

Choice D is not the correct answer. This answer may result from finding the value of  $y^2$ , not  $x^2$ .

### SAMPLE 23

If the expression  $\frac{4x^2}{2x-1}$  is written in the equivalent form  $\frac{1}{2x-1} + A$ , what is  $A$  in terms of  $x$ ?

- A)  $2x + 1$
- B)  $2x - 1$
- C)  $4x^2$
- D)  $4x^2 - 1$

CONTENT: Passport to Advanced Math

KEY: A

CALCULATOR USAGE: Calculator

This question assesses the ability to transform a given expression in a more useful form (from improper to proper rational form). There are multiple approaches to this problem, some longer and more routine, some faster and more insightful.

Choice A is correct. The form of the equation suggests performing long division on  $\frac{4x^2}{2x-1}$ :

$$\begin{array}{r}
 2x+1 \\
 2x-1 \overline{)4x^2} \\
 \underline{4x^2-2x} \phantom{0} \\
 2x \phantom{0} \\
 \underline{2x-1} \\
 1
 \end{array}$$

Since the remainder 1 matches the numerator in  $\frac{1}{2x-1}$ , it is clear that  $A = 2x + 1$ .

A short way to find the answer is to use the structure to rewrite the numerator of the expression as  $(4x^2 - 1) + 1$ , recognizing the term in parentheses as a difference of squares, making the expression equal to  $\frac{(2x-1)(2x+1)+1}{2x-1} = 2x+1 + \frac{1}{2x-1}$ . From this, the answer  $2x+1$  is apparent. Another way to find the answer is to isolate  $A$  in the form  $A = \frac{4x^2}{2x-1} - \frac{1}{2x-1}$  and simplify. As with the first approach, this approach also requires students to recognize  $4x^2 - 1$  as a difference of squares that factors.

Choice B is not the correct answer. The student may have made a sign error while subtracting partial quotients in the long division.

Choice C is not the correct answer. The student may misunderstand how to work with fractions and may have tried the incorrect calculation

$$\frac{4x^2}{2x-1} = \frac{(1)(4x^2)}{2x-1} = \frac{1}{2x-1} + 4x^2.$$

Choice D is not the correct answer. The student may misunderstand how to work with fractions and may have tried the incorrect calculation

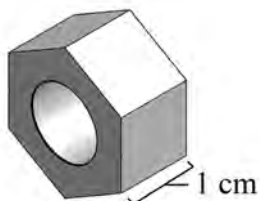
$$\frac{4x^2}{2x-1} = \frac{1+4x^2-1}{2x-1} = \frac{1}{2x-1} + 4x^2 - 1.$$



## Sample Questions: Additional Topics in Math

### SAMPLE 24

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The figure above shows a metal hex nut with two regular hexagonal faces and a thickness of 1 cm. The length of each side of a hexagonal face is 2 cm. A hole with a diameter of 2 cm is drilled through the nut. The density of the metal is 7.9 grams per cubic cm. What is the mass of this nut, to the nearest gram? (Density is mass divided by volume.)

CONTENT: Additional Topics in Math

KEY: 57

CALCULATOR USAGE: Calculator

The question above asks students to make connections between physical concepts such as mass and density and essential geometric ideas such as the Pythagorean Theorem and volume formulas. There are multiple approaches to solving this problem, but in any of them, the aim is to find the volume of the metal nut and then use the density of the metal to calculate the mass of the nut (57 grams). This is a multistep problem that requires students to devise a multistep strategy and carry out all the algebraic and numerical steps without error.

To solve this problem, students need to find the volume of the hex nut and then use the given fact that density is mass divided by volume.

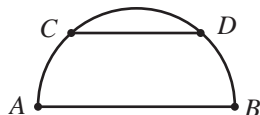
Finding the volume of the hex nut requires several steps. The first step is to calculate the area of one of the hexagonal faces (without the drilled hole). Each face is a regular hexagon, which can be divided into 6 equilateral triangles with side lengths of 2 cm. Using 30-60-90 triangle properties, the height of each equilateral triangle is  $\sqrt{3}$  cm. In turn, the area of one equilateral triangle is  $\frac{1}{2}bh = \frac{1}{2}(2)(\sqrt{3}) = \sqrt{3}$  square cm, so the area of the

hexagonal face is  $6\sqrt{3}$  square cm. The volume of the hexagonal prism is the area of one face multiplied by the height (or thickness in this case),  $(6\sqrt{3})(1) = 6\sqrt{3}$  cubic cm. Then, to account for the drilled hole, students need to calculate the volume of a cylinder with diameter 2 cm (or radius 1 cm) and height 1 cm,  $V = \pi r^2 h = \pi(1^2)(1) = \pi$  cubic cm, and subtract it from the volume of the hexagonal prism to yield  $6\sqrt{3} - \pi$  cubic cm.

Finally, density is mass divided by volume,  $7.9 = \frac{\text{mass}}{6\sqrt{3} - \pi}$ . Multiplying both sides of the equation by  $(6\sqrt{3} - \pi)$  yields the mass of the hex nut as  $7.9(6\sqrt{3} - \pi)$  grams. When the values for  $\sqrt{3}$  and  $\pi$  are substituted and the result is rounded to the nearest gram, the answer is approximately 57 grams. Note that it is critical for students to attend to the precision of their calculations when solving this problem and not apply any intermediate rounding until the final answer is reached. Here, the use of a calculator provides the ability to attend to precision more effectively and thus is highly encouraged.

**SAMPLE 25**


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The semicircle above has a radius of  $r$  inches, and chord  $\overline{CD}$  is parallel to the diameter  $\overline{AB}$ . If the length of  $\overline{CD}$  is  $\frac{2}{3}$  of the length of  $\overline{AB}$ , what is the distance between the chord and the diameter in terms of  $r$ ?

- A)  $\frac{1}{3}\pi r$
- B)  $\frac{2}{3}\pi r$
- C)  $\frac{\sqrt{2}}{2}r$
- D)  $\frac{\sqrt{5}}{3}r$

CONTENT: Additional Topics in Math

KEY: D

CALCULATOR USAGE: No calculator

This problem requires students to make use of properties of circles and parallel lines in an abstract setting. Students will have to draw an additional line in order to find the relationship between the distance of the chord from the diameter and the radius of the semicircle. Again, this item provides an opportunity for using different approaches to find the distance required: one can use either the Pythagorean Theorem or the trigonometric ratios.

Choice D is correct. This represents the length of the distance between the chord and the diameter, using a radius of the circle to create a triangle, and then the Pythagorean Theorem to solve correctly:

$r^2 = x^2 + \left(\frac{2}{3}r\right)^2$ , where  $r$  represents the radius of the circle and  $x$  represents the distance between the chord and the diameter.

Choice A is not the correct answer. It does not represent the length of the distance between the chord and the diameter. The student who selects this answer may have tried to use the circumference formula to determine the distance rather than making use of the radius of the circle to create a triangle.

Choice B is not the correct answer. It does not represent the length of the distance between the chord and the diameter. The student who selects this answer may have tried to use the circumference formula to determine the distance rather than making use of the radius of the circle to create a triangle.

Choice C is not the correct answer. It does not represent the length of the distance between the chord and the diameter. The student who selects this answer may have made a triangle within the circle, using a radius to connect the chord and the diameter, but then may have mistaken the triangle for a 45-45-90 triangle and tried to use this relationship to determine the distance.

### SAMPLE 26

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It is given that  $\sin x = a$ , where  $x$  is the radian measure of an angle and  $\frac{\pi}{2} < x < \pi$ .

If  $\sin w = -a$ , which of the following could be the value of  $w$ ?

- A)  $\pi - x$
- B)  $x - \pi$
- C)  $2\pi + x$
- D)  $x - 2\pi$

CONTENT: Additional Topics in Math

KEY: B

CALCULATOR USAGE: No calculator

In problems like this, students must reason how angles  $x$  and  $w$  are related based on their corresponding sine values and determine the radian measure of angle  $w$ , given the parameters of angle  $x$ .

Choice B is correct. If an angle with radian measure  $x$  such that  $\frac{\pi}{2} < x < \pi$  is placed in standard position, its terminal side will fall in Quadrant II, and  $\sin x = a$  will be the  $y$ -coordinate of the point  $P$  where its terminal side intersects the unit circle. If  $\sin w = -a$ , then when the angle with radian measure  $w$  is placed in standard position, its terminal side will intersect the unit circle at a point with  $y$ -coordinate equal to  $-a$ . There are two such points on the unit circle: the reflection of  $P$  across the  $x$ -axis, which

would correspond to an angle with radian measure  $-x$  (and also with radian measures  $\dots -6\pi - x, -4\pi - x, -2\pi - x, 2\pi - x, 4\pi - x, 6\pi - x \dots$ ); and the reflection of  $P$  through the origin, which would correspond to an angle with radian measure  $x - \pi$  (and also with radian measures  $\dots x - 5\pi, x - 3\pi, x + \pi, x + 3\pi, x + 5\pi \dots$ ). Thus, of the choices given, only  $x - \pi$  could be the value of  $w$ .

Choice A is not the correct answer. In general  $\sin(-x) = -\sin x$  and  $\sin(x + \pi) = -\sin x$ , so  $\sin(\pi - x) = -\sin(-x) = -(-\sin x) = \sin x$ . Therefore,  $\sin(\pi - x) = a$ , not  $-a$ .

Choice C is not the correct answer. In general,  $\sin(2\pi + x) = \sin x$ , so  $\sin(2\pi + x) = a$ , not  $-a$ .

Choice D is not the correct answer. In general,  $\sin(x - 2\pi) = \sin x$ , so  $\sin(x - 2\pi) = a$ , not  $-a$ .

## Executive Summary

SECTION I	Behind the Redesign
SECTION II	The Redesigned SAT: Evidentiary Foundation
SECTION III	Test Specific tions: SAT Evidence-Based Reading and Writing and SAT Essay
SECTION IV	Test Specific tions: SAT Math Test
<b>SECTION V</b>	<b>Our Commitment</b>
APPENDIX A	The Craft of Developing the SAT: How We Do It

These draft test specific tions, sample questions and other materials are just that — drafts — and will systematically evolve over time. These sample questions are meant to illustrate the shifts in the redesigned SAT® and are not a full reflection of what will be tested. Actual questions used on the exam are going through extensive reviews and pretesting to help ensure that they are clear and fair and that they measure what is intended. The test specific tions as well as the research foundation defining what is measured on the test will continue to be refined based on ongoing research.

## OUR COMMITMENT

# The Redesigned SAT: The College Board's Pledge

We will make the redesigned SAT the most transparent exam in the assessment field. This document is just the first in a series of efforts that will provide information about and examples of the redesigned exam as early and completely as possible so that all students will know what to expect on the day of the test, and all other stakeholders will have a clear sense of what the test contains. What the test measures will be no mystery. How we go about measuring students' reading, writing, language, and mathematics skills will be widely known.

The exam students receive on test day will be a challenging yet appropriate and fair assessment of what they know and can do. The questions will not be tricky or obscure but will instead focus on the knowledge, skills, and understandings that matter most for college and career readiness and success. As is true of the current SAT, our extensive and intensive test development process (see Appendix A) will identify and then improve or remove questions that contain errors, more than one correct answer (or no good answer), imprecision, ambiguities, biases, or other flaws.

The SAT will continue to be a carefully designed test that measures students' critical thinking and problem-solving abilities. The predictive validity of the test will be as strong as it is today, if not stronger, both in the aggregate and across demographic groups. By carrying out our opportunity agenda (see Section I), we will also provide many new chances for students to take advantage of opportunities they have earned.

We will continue to be guided by research and evidence as we develop the redesigned SAT. In the months leading up to its release, for example, we may find through research that we need to adjust such elements described in this document as time limits, number of questions, or scores reported. When and if we make these or other changes, our only aim will be to improve the quality of the test, and these changes will be widely disseminated in an appropriately timely manner.

We will remain steadfast in our commitment to equity and opportunity. To that end, we are continuing to develop the College Board College

and Career Readiness System to forge a powerful and dynamic connection between assessment and instruction so that the assessment components reflect rigorous instructional tasks and, in turn, inform rigorous instruction; help propel students into the opportunities they have earned both in high school and in college; identify those students who have fallen behind so that timely interventions can be made to help them catch up; and continue to focus on the knowledge, skills, and understandings that the best available research tells us are most essential for college and career readiness and success.



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SECTION V	Our Commitment
<b>APPENDIX A</b>	<b>The Craft of Developing the SAT: How We Do It</b>

These draft test specific tions, sample questions and other materials are just that — drafts — and will systematically evolve over time. These sample questions are meant to illustrate the shifts in the redesigned SAT® and are not a full refle tion of what will be tested. Actual questions used on the exam are going through extensive reviews and pretesting to help ensure that they are clear and fair and that they measure what is intended. The test specific tions as well as the research foundation defining wh t is measured on the test will continue to be refined based on ongoing esearch.

## APPENDIX A

# The Craft of Developing the SAT: How We Do It

At the College Board, we have set a high bar for the redesigned SAT. We seek to make the exam an excellent assessment that will deeply reflect the work that students need to do to be ready for and successful in college and in career paths. The individual questions and the test as a whole reflect a deep commitment to craft, reinforce enriching and valuable schoolwork, and can be used by states and teachers to help define the level of rigor required for students to be college and career ready by no later than the end of high school.

We work with various committees and consultants throughout the test design and development process to ensure that we produce the highest-quality assessments possible, ones that serve students well as they work to become college and career ready. Our external committees and consultants, which include secondary and postsecondary classroom teachers, advise us throughout the development process, from determining what constitutes academic preparation needed for college, to designing the test, helping develop specifications, and reviewing every question multiple times before it is placed on an operational test form. When reviewing test questions and forms, our test development committees help us to ensure that the questions are measuring important and nontrivial knowledge, skills, and understandings, that the questions align well with the test specifications in terms of content and rigor, that the test questions are fair to all students, and that the questions are written in a way that models good instruction for the teacher and productive practice for the student.

We work with K–12 teachers and postsecondary instructors who teach entry-level courses to construct challenging questions for the test that represent the kinds of tasks that students need to be able to perform if they are to be successful in higher education.

## Guiding Principles of the College Board’s Test Development Process

To achieve the vision outlined above, each and every test form for the redesigned SAT must be developed with care and expertise at every stage of the process. To that end, we have implemented a test development process that helps ensure that our SAT questions:

- » are evidence based, focused on the core set of knowledge, skills, and understandings that are most important to prepare students for the rigors of college and career (see Section II);
- » measure student knowledge, skills, and understandings as directly and authentically as possible by employing a range of question types relevant to instruction and life;
- » are worth doing, crafted out of rich, engaging passages and contexts, reflective of best instructional practices, and rewarding of the academic excellence that any student can attain through deliberate practice;
- » are motivating and interesting, as engaging and relevant to students as possible;
- » are written with the help of classroom teachers at the middle school, high school, and postsecondary levels;
- » are reviewed by multiple independent experts active in the field of education for content and fairness issues prior to pretesting and again prior to operational administration; and
- » are accessible and fair to all students, having been developed to be content relevant, accurate, authentic and respectful in representation, and consistent with universal design principles.

The test development process for the redesigned SAT, described in this section and represented in the graphic below, is based on these guiding principles.

## The Development Process for the Redesigned SAT®



## The Test Development Process

The primary purpose of the redesigned SAT is to determine the degree to which students are prepared to succeed without remediation in college and workforce training programs. All test content aligns with this purpose. Each test within the redesigned SAT is designed to collect evidence from student performance in support of a broad claim about what students know and can do (see Sections III and IV), and each claim is aligned to the SAT's primary purpose of assessing college and career readiness.

The SAT is, at its core, a postsecondary admission and guidance exam, and as such is designed to be a strong predictor of postsecondary success as measured by first-year GPA, retention to second and subsequent years, and overall completion of postsecondary education. The predictive validity of the exam — its ability to estimate the likelihood of success in postsecondary education — is what makes the exam a valuable part of the admission process in colleges and universities. The SAT has been redesigned to maintain if not strengthen this predictive validity while accomplishing other aims, such as offering greater insight into student performance.

### DEFINING THE TEST DOMAINS

The redesigned SAT's test domain definitions are based on the highest-quality information and resources available about the essential requirements for college and career readiness and success. Scholarly research and empirical data derived from curriculum surveys conducted by the College Board and other organizations play an important role in informing these definitions. College Board measurement and content staff work with educational experts in examining the evidence and defining the domain of knowledge, skills, and understandings to be measured in accordance with the SAT's primary purpose and the claims associated with each test.

### TEST AND QUESTION/TASK SPECIFICATIONS

Given the defined test domains, College Board measurement and content staff also work with educational experts to prepare test and question/task specifications that represent the depth and breadth of the defined domains and help ensure the consistent development of assessments of the highest quality. The specifications define the question/task types and formats required to measure most directly and authentically the domains of knowledge, skills, and understandings relevant to the SAT's primary purpose and the test's overall claims.

## STIMULI AND QUESTION DEVELOPMENT

The redesigned SAT measures durably powerful knowledge, skills, and understandings needed in postsecondary education, work, and life. All content area tests are developed to elicit from students work worth doing through questions that resemble the best classroom practices. We do this by working with hundreds of k–12 teachers and postsecondary instructors of entry-level courses across the United States.

In order to consistently develop tests with engaging, authentic stimulus materials and contexts that lend themselves to high-quality questions, the College Board has developed and continues to maintain a range of test-support materials intended to help make sure that all questions are evidence based, valid, and accessible to all students — in short, that they meet the highest possible standards. These materials include question writer guidelines, prototypes, and templates; fairness guidelines; and accessibility guidelines. The College Board contracts with classroom teachers at both the high school and postsecondary levels and with other independent content and instructional experts to develop and/or review all questions. In this way, those most familiar with the student population of interest and knowledgeable in the instructional best practices in the field make the most significant contribution to assessment content. This helps ensure that the test materials included in the assessment are engaging, instructionally appropriate, and fair to all students.

### Reading Test

In the redesigned SAT's Reading Test, students engage with texts worth reading and worthy of careful consideration. All passages are selected from previously published, authentic writing that represents the best of the genres represented on the test. The passages are powerful, insightful pieces that students will likely find themselves thinking about long after they have finished the test.

The essential first step of question development is a close and careful reading of the text. Test questions resemble questions that might emerge naturally in a thoughtful classroom conversation, and they return students to the text to examine closely the information and ideas within it. Moreover, the best test questions develop out of a sensitive engagement with the passage rather than an effort to try to cover in a mechanical way every possible testing point in the domain. Such superficial coverage weakens the overall quality of the assessment, favoring rigid adherence to specifications over a more organic development process that respects

the unique natures of rich, authentic texts in a variety of content areas. In addition, questions on the SAT Reading Test unfold in a thoughtful sequence that helps make the investigation of the passage more natural and meaningful for students with broader questions (such as ones about central ideas and themes) coming first, followed by questions about smaller portions of the passage.

## Writing and Language Test

The redesigned SAT's Writing and Language Test comprises passages that are engaging and challenging and questions that focus clearly on a core of writing and language skills empirically linked to college and career readiness requirements. These commissioned passages (passages written for the test rather than excerpted or adapted from preexisting sources) are designed to provide meaningful contexts for the skills being addressed. Passages are held to the highest standards of accuracy and writing quality and exemplify the qualities of effective arguments, informative/explanatory texts, and nonfiction narratives. Test questions assess writing and language skills and understandings in extended prose contexts rather than in isolation and require students to make active choices in revising and editing rather than simply identify errors.

## Essay

The redesigned SAT's Essay asks students to produce a clear and cogent written analysis using evidence drawn from a given source text. The Essay task, therefore, clearly aligns with the demands of college and career readiness, which require that students draw on evidence to support their arguments and inform their writing rather than just offer their opinions or convey their experiences. The passages used in the Essay are generally drawn from a category that might be described as arguments written for a broad audience — that is, engaging, well-written, well-argued texts that take and develop, in a widely accessible way, a position on an issue. The task design, as noted in Section III, is uniform across test administrations, meaning that what's expected of students is transparent, the key variable being the passage itself (which is only revealed at the time of testing).

## Math Test

The redesigned SAT's Math Test is deeply focused on the mathematics that matter most for college and career readiness and success. Students are asked to demonstrate their command of the mathematics most provably useful in a range of college courses and career environments. Knowing a few things well, rather than trying to master broad knowledge across a wide range of mathematical topics, gives students a wide-ranging readiness. The SAT Math Test provides the opportunity for richer applications of the most essential math to address real-world situations and problems and includes multipart applications of this core of useful math. These core topics are examined extensively and require a very high level of proficiency.

Test questions are thoughtfully examined by teachers with a deep knowledge of the target mathematical content and practices. The problems on each Math Test explore the full dynamic range of each content area through precisely crafted questions that emphasize the use of math in unlocking insights and solving problems. The test design allows the core of math to be examined with the range of rigor required (as defined through evidence) to be college and career ready, addressing at the same time procedure, understanding, and application. Rather than covering a broad number of topics that most students will never see again, the test focuses on a deep core that students can draw upon again and again in their schooling, college, and career. At the same time, the assessment includes pure math problems that focus on abstract reasoning essential for success in solving diverse problems and engaging in demanding disciplines.

### CONTENT AND FAIRNESS REVIEWS PRIOR TO PRETESTING

Prior to pretesting, all questions are reviewed by external, independent reviewers who are asked to evaluate each question according to a set of criteria for content accuracy and fairness. These reviewers are typically active classroom teachers drawn from across the nation from both the secondary and postsecondary levels and are deeply familiar with the student population of interest and the nature and purpose of the test.

Content reviewers are focused on ensuring the soundness of each question and stimulus and evaluating its relationship to the construct (e.g., reading) being measured, its relevance and appropriateness to the work students do in high school, and its value in terms of measuring



students' degree of college and career readiness. Fairness reviewers are charged with helping ensure that test questions and stimuli are broadly accessible to the wide-ranging student population that takes the exam, that the questions are clearly stated and unambiguous in their intent, and that the questions do not offer unfair advantages to some students.

## QUESTION PILOTING AND PRETESTING

Whenever any new question type, especially a new student-produced response format, is designed, the College Board develops prototypes with the help of K–12 and postsecondary educators and other subject-matter experts and then pilots these prototypes with students. Question specifications are revised according to the results obtained from the piloting. These pilots, although small in scale, are set up to include a wide range of students in terms of achievement level and other characteristics that might affect performance.

All questions are then pretested on a motivated sample of students that resembles the SAT population and is sufficient in size to allow the College Board to evaluate the materials statistically in terms of difficulty, to discern whether the questions can differentiate between lower- and higher-achieving students, and to ensure that students from different racial/ethnic groups do not differentially respond to the questions. The questions are administered to students in test administrations like those in which the SAT is given. The data from 1,000 to 3,000 students responding to each question are used to evaluate question performance.

Once questions and tasks have been pretested and statistics associated with them have been computed, the materials are reviewed by measurement and content specialists (including active classroom teachers at both the secondary and postsecondary levels) for content accuracy, fairness, statistical discrimination, difficulty, and differential performance among groups of tested students.

## ASSEMBLY OF INITIAL OPERATIONAL FORMS

Initial operational test forms are constructed according to test specifications, with content coverage of primary concern and statistical requirements secondary. All forms are evaluated to ensure that they meet specifications and are parallel in terms of both content and statistics.

## OPERATIONAL FORM CONTENT AND FAIRNESS REVIEWS

Once test forms are initially constructed, they undergo multiple internal and external content and fairness reviews prior to finalization and preparation for publication. External review committee members are typically active classroom teachers drawn from across the nation and from both the secondary and postsecondary levels.

## PREPARATION AND QUALITY ASSURANCE OF FINAL OPERATIONAL FORMS

Final match-to-specifications tables are prepared and proofread. Scoring keys are produced from an item bank, reviewed by content and measurement specialists, and proofread multiple times by an editorial team.

## POSTOPERATIONAL ADMINISTRATION STATISTICAL REVIEW

Following an operational test administration, statistical analyses of individual questions and tasks and of the form as a whole are conducted to ensure that all questions are functioning as expected.

By taking all of these steps and engaging educators at key points in the process, we at the College Board strive to ensure that the SAT consistently reflects the guiding principles on which it was designed and the best of rigorous classroom instruction.