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# GRUBER'S COMPLETE NEWSAT<sup>®</sup> GUIDE 2018

20th Edition

Gary R. Gruber, Ph.D.

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Students often ask, "How can I raise my SAT<sup>®</sup> score?" My advice is to buy Dr. Gruber's book. Mathematics Teacher, official journal of the National Council of Teachers of Mathematics

Dr. Gruber's book is the only commercial book that I've seen that would actually help a test-taker. David Owen, Washington Post

> The most scholarly, useful, and complete work of its kind now on the market. Henry Lewenberg, Chairman, English Department, Channel Island High School, Oxnard, California

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#### Praise for Gruber's SAT® prep system . . .\*

Students often ask, "How can I raise my SAT score?" My advice is to buy Dr. Gruber's book. —Mathematics Teacher, *official journal of the National Council of Teachers of Mathematics* 

The most scholarly, useful, and complete work of its kind now on the market.—*Henry Lewenberg, Chairman, English Department, Channel Island High School, Oxnard, California* 

The best book I've seen in ages. It not only helps you learn the material but also teaches you what you did wrong. It gives you so many different tips on how to approach different types of problem questions. It raised my score from an 890 to a 1410. Thank you Gruber—this is the best!—*Amazon customer review* 

A teacher who recommends an SAT preparation book should do so only if the book follows the actual exam closely in regard to format, question types, and level of difficulty. Gruber's SAT is such a book.—*Robert Frankel, Math Department Chairman, Tottenville High School, Staten Island, New York* 

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Best SAT prep book. Period. Gruber's is by far the best SAT prep book around. I am a mathematics tutor (K through calculus, 25+ years), and this is the only SAT prep book I recommend to my SAT prep students, as well as to my own children, when they are preparing for the SAT! This book is well worth the minor cost, and more effective than any SAT course my students have attended. . . . Two of my children increased their scores by 100 points per section—300 points total—just by using this book.—*Amazon customer review* 

I was able to solve questions three to five times faster with your methods. As soon as you gave me a strategy, it clicked and I was just tickled that somebody finally exposed the code to efficient thinking.—*Dr. Larry Weitz, Psychologist, WLAC Radio, Nashville, Tennessee* 

I only wish he'd written this book when I took the SAT.-Peter Cleaveland, ABC Network News

"Excellent-plus" for the Math Refresher section and for the explanatory answers to the questions in the Practice Tests.—*John J. Bailey, Math Department Supervisor, Kingston City Schools, Kingston, New York* 

The Gruber program contains strategies that teachers can teach their students to use to achieve better scores on the SAT and other standardized tests. They also help students improve and refine their basic thinking and reasoning skills. Dr. Gruber's methods emphasize skills and strategies that lead to correct answers rather than reliance on rote memorization.—*Dana McDougald*, School Library Journal

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The explanatory answers for the practice tests are superlative.—*Bob Ingalls, English Department Chairman, Mount Vernon High School, Alexandria, Virginia* 

Truly the best SAT preparation book out there. . . . This book does not focus on drill, drill, drill, but instead on enhancing Critical Thinking Skills and teaching the Strategies needed to succeed on the SAT. The Strategies and Critical Thinking Skills in this book reflect those of the test-makers themselves and are a sure thing for SAT success! I would highly recommend it to anyone taking the SAT. The methods in this book will last a lifetime!—*Amazon customer review* 

By learning Dr. Gruber's strategies, a student can do well on *any* exam, not just the SAT.—Teen *magazine* 

This book is full of excellent strategies for how to take tests. I would recommend this book for any kid starting high school! Really, the people who tend to do best on tests are those who understand the process . . . not those who regurgitate information. When kids learn strategies, their scores will naturally rise even if they do not know all the answers. Glad I bought this, and will be using it for my kids in high school as well as the one entering in a few years!—*Amazon customer review* 

Gruber's book is no "quick" fix—instead it's a sure way. That's what I think is important—a sure way, more than a trick or something that might get you the answer.—*Amazon customer review* 

As the name says, indeed this book is a *complete* SAT guide. In this book you can find all grammar required for the SAT writing test in one place . . . as well as vocabulary. . . . The Math Refresher covers all math concepts needed for the SAT. Students who are self-motivated, focused, and hardworking can use this book and achieve great scores, and can save a lot of time and money not having to go to an SAT test prep center.—*Amazon customer review* 

As a college admissions consultant, SAT tutor, and Harvard alumnus, I highly recommend Gruber as a terrific guide and superb tool to help students prepare for the SAT test. Gruber provides detailed explanations. . . . His overview of math, grammar, vocabulary, critical reading and writing is outstanding. He is simply the best!—*Amazon customer review* 

What distinguishes this SAT review book from the others on the market is the emphasis on thinking rather than drill.—English Journal, *official magazine of the National Council of Teachers of English* 

This is simply a great book. It is organized into clear, concise strategies. After reading this book, I can safely say that I am confident in my math abilities. If you don't understand it, you're probably just skimming through it. Don't do that. Absorb it all, because each and every word is important. *—Amazon customer review* 

We've used the Gruber text in our community SAT prep programs for over five years with excellent results. A student using this inexpensive book is getting an experience comparable to any \$1000 course. Gruber's book is excellent.—*Amazon customer review* 

The Best Book on the SAT.—CBS Radio

What Dr. Gruber is giving the student is an increase in intelligence. . . . Gruber offers students preparation in test-taking strategies designed to save time in the testing room by zeroing in on a fast, logical way to answer a problem. . . . Get what you've missed out of four years of high school. *—Valerie Sullivan, United Press International* 

With the use of Gruber's special techniques, students can raise their test scores significantly and increase their general learning ability.—Courier Journal, *Louisville, Kentucky* 

Your approach to using the test as a vehicle for developing critical thinking skills is clear, practical, and very positive. Your regard for the test experience as a way for students to participate in the inherent joy of problem solving . . . was made "alive" for us by your obvious enthusiasm for [meeting] the kinds of challenges presented by the SAT/PSAT.—*Laura Alvarenga, Assistant Superintendent, San Francisco Unified School District* 

Top rating for the book in the areas of readability, vocabulary, critical thinking skills, and practice tests —with a special star for the explanatory answers.—*Paulette Dewey, English Department Chairperson, Robert S. Rogers High School, Toledo, Ohio* 

This is the man who knows the ins and outs of testing.—*Bob Lee*, Bob Lee Magazine, *KSL Radio*, *Salt Lake City*, *Utah* 

[Dr. Gruber's book] is the only commercial book that I've seen that would actually help a test-taker.—*David Owen,* Washington Post

Dr. Gruber is recognized as the leading expert on standardized tests. His results have been lauded throughout the country. His personal presentation spreads "contagious enthusiasm" like an epidemic with his audiences.—*Public Broadcasting Service* 

Gary Gruber is the Guru of College Testing Programs.-The Light, San Antonio Texas

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<sup>\*</sup>This book is a brand-new edition specifically tuned for the New SAT<sup>®</sup> exam by Dr. Gruber personally. The praise for Dr. Gruber's previous editions quoted here is documented.

# GRUBER'S COMPLETE NEW SAT® GUIDE 2018

## 20th Edition

## Gary R. Gruber, Ph.D.

The City College of New York (B.S., Physics) Columbia University (M.A., Physics) Yeshiva University (Ph.D., Astrophysics)



Davies Publishing, Inc. Los Angeles To the millions of students who have successfully used my books to markedly increase their scores and get into the college of their choice.

And to all of the students who seek to achieve and excel in both school and life, and to the parents and teachers who encourage their children in the path of curiosity, critical thinking, and joyful passion for life and learning.

Gary R. Gruber, Ph.D.

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## Introduction

## IMPORTANT NOTE ABOUT THIS BOOK AND ITS AUTHOR

This book is the most up-to-date and complete guide to the current SAT. Each practice exam is patterned after the SAT, and *all* the strategies and techniques deal with the SAT. The Gruber Critical-Thinking Strategies are useful for every SAT exam.

This book was written by Dr. Gary Gruber, the leading authority on the SAT, who knows more than anyone else in the test-prep field exactly what is being tested on the SAT. In fact, the procedures to answer the SAT questions rely more heavily on the Gruber Critical-Thinking Strategies than ever before, and this is the only book that has the exact thinking strategies you need to use to maximize your SAT score. Gruber's SAT books are used by the nation's school districts more than any other books and are proven to get the highest documented school district SAT scores.

Dr. Gruber has published more than 40 books with major publishers on test-taking and critical-thinking methods, with more than 7 million copies sold. He has also authored more than 1,000 articles on his work in scholarly journals and nationally syndicated newspapers, has appeared on numerous television and radio shows, and has been interviewed by hundreds of magazines and newspapers. He has developed major programs for school districts and for city and state educational agencies for improving and restructuring curriculum, increasing learning ability and test scores, increasing motivation, developing a passion for learning and problem solving, and decreasing the student dropout rate. For example, PBS (the Public Broadcasting Service) chose Dr. Gruber to train the nation's teachers on how to prepare students for the SAT through a national satellite teleconference and video. His results have been lauded by people throughout the country from all walks of life.

Dr. Gruber is recognized nationally as the leading expert on standardized tests. It is said that no one in the nation is better at assessing the thinking patterns behind the way a person answers questions and providing the mechanisms to improve faulty thinking.

Gruber's unique methods have been and are being used by the nation's learning centers, by international publications, textbooks, and teaching aids, by school districts throughout the country, in homes and workplaces across the nation, and by a host of other entities.

His goal and mission is to get people's potential realized and the nation impassioned with learning and problem solving, so that they don't merely try to get a fast, uncritical answer, but actually enjoy and look forward to solving problems and learning.

For more information on Gruber courses and additional Gruber products, visit www.drgarygruber.com.

**Important:** Many books do not reflect the SAT questions. Don't practice with questions that misrepresent the actual questions on the SAT. For example, the math questions created by the test makers are oriented toward allowing you to solve many problems without a calculator as fast as you could with one, and some can be solved faster without a calculator. The strategies contained in this book are exactly those needed to be used on the SAT. It is said that only Dr. Gruber has the expertise and ability to provide you with the tools needed for success on the exam far better than any competitor! Don't trust your future with less than the best material.

## KEY POINTS YOU SHOULD KNOW ABOUT THE NEW SAT

Many students ask what the New SAT is about. On the New SAT:

- 1. Some questions may be tedious and memory oriented but you still need strategies and critical-thinking skills to answer them.
- 2. *Important Note:* On the actual SAT there will be only 4 choices. For all instructional material in this book I have used 5 choices. The two Practice Tests at the end of the book, however, use the 4 choices you will find on the actual SAT.
- 3. You will have grammar questions based on reading passages, so you need to concentrate not only on grammar but also on the meaning of the reading passage.
- 4. On the New SAT, questions in reading ask which part of the passage enables you to get your answer.
- 5. I advised the College Board to have separate calculator and noncalculator sections, and they took my advice. On the New SAT, there is a math section where you can use a calculator and a math section where you cannot. However, they ultimately did this superficially. Many of the questions in the calculator section do not require the use of a calculator, while many of the questions in the noncalculator section do not challenge the test taker since they are easily answered without a calculator. Nevertheless, in the calculator section you should be able to determine when to use a calculator if you learn the right strategies. For example in this question: What is the value of

$$\frac{2}{3} \times \frac{3}{4} \times \frac{4}{5} \times \frac{5}{6} \times \frac{6}{7}$$

you should realize that if you canceled like numerators and denominators, you would get  $\frac{2}{7}$  as an

answer almost immediately. You can imagine how much longer it would take you if you used a calculator for this particular question.

- 6. On the New SAT, many of the items in the Math, Reading, and Writing/Language sections will test data analysis through graphs, charts, and tables. This is useful in the real world.
- 7. The New SAT contains questions on trigonometry and imaginary numbers.

The key element is to learn the strategies and basic skills and when tackling a question on the New SAT try to extract something from the question, maybe even something that is *curious, that will lead you to the next step without getting fixated on just getting an answer*. Be *active* in your reading of the questions. For example, if a Reading passage states something like "Half a thousand years ago," figure out what that would translate to—"500 years ago." So you've figured the time period to be about "1500." This tells you what period of time you are in and psychologically motivates your interest in reading the rest of the passage. If in a math question you see it says "whole numbers" make sure you use that information actively in the problem.

Specific strategies let you answer a question without racking your brain, and even though you can do the problem almost mechanically, without anxiety, you still get the excitement of solving it. Here is an example: What percent of 20 is 200? By translating "what" to x,

"of" to  $\times$  (times), "is" to =, and "percent" to  $\overline{100}$ , you can almost solve the problem immediately and mechanically, and without any anxiety or probability of making a mistake.

## THE AUTHOR HAS SOMETHING IMPORTANT TO TELL YOU ABOUT HOW TO RAISE YOUR SAT SCORE

#### What Are Critical-Thinking Skills?

First of all, I believe that intelligence can be taught. Intelligence, simply defined, is the ability to reason things out. I am convinced that *you can learn to think logically* and figure things out better and faster, *particularly in regard to SAT Math and Verbal problems*. But someone must give you the tools. Let us call these tools *strategies*. And that's what Critical-Thinking Skills are all about—*strategies*.

#### Learn the Strategies to Get More Points

The Strategy Section (beginning on page 63) will sharpen your reasoning ability so that you can increase your score dramatically on each part of the SAT.

These Critical-Thinking Skills—5 General Strategies, 19 Math Strategies, and 13 Verbal Strategies course right through this book. The Explanatory Answers for the 2 Practice Tests in the book direct you to those strategies that may be used to answer specific types of SAT questions. The strategies in Part 4 of this book are usable for more than 90 percent of the questions that will appear on your SAT. *Each additional correct answer you get gives you approximately 10 more points.* It is obvious, then, that your *learning* and *using* the 37 easy-to-understand strategies in this book will very likely raise your SAT score substantially.

## Are the Practice Tests in This Book Like an Actual SAT?

If you compare the 2 Practice Tests in this book with an actual SAT, you will find the Practice Tests very much like the *actual* test in regard to *format, question types,* and *level of difficulty*. Compare these Practice Tests with one of the official tests published by the College Board!

#### Building Your Vocabulary Can Make a Big Difference on Your Test

Knowing how to figure out the meanings of words in the Reading and Writing/Language sections is important. Instead of bogging you down with a 3,400-word list I used to publish in my books, I have created four compact tools to give you the meanings of more than 150,000 words:

- 1. 3 Vocabulary Strategies (page 148)
- 2. The Gruber Prefix-Root-Suffix List (page 309)
- 3. Hot Prefixes and Roots (Appendix A, page 627)
- 4. The 250 Most Common SAT Vocabulary Words (page 315)

## THE INSIDE TRACK ON HOW SAT QUESTIONS ARE DEVELOPED AND HOW THEY VARY FROM TEST TO TEST

When SAT questions are developed, they are based on a set of criteria and guidelines. Knowing how these guidelines work should demystify the test-making process and explain why the strategies in this book are so critical to getting a high score.

Inherent in the SAT questions are Critical-Thinking Skills, which embrace strategies that enable you to solve a question by the quickest method with the least amount of panic and brain-racking, and describe an elegance and excitement in problem solving. Adhering to and using the strategies (which the test makers use to develop the questions) will let you sail through the SAT. This is summed up in the following statement:

Show me the solution to a problem, and I'll solve that problem. Show me a Gruber strategy for solving the problem, and I'll solve hundreds of problems.

Here's a sample of a set of guidelines presented for making up an SAT-type question in the math area:

The test maker is to create a hard problem in the regular math multiple-choice area, which involves

- (A) algebra
- (B) two or more equations
- (C) two or more ways to solve: one way being standard substitution; the other, faster way using the *strategy* of merely *adding* or *subtracting* equations.\*

Previous examples given to the test maker for reference:

- 1. If x + y = 3, y + z = 4, and z + x = 5, find the value of x + y + z.
  - (A) 4
  - (B) 5
  - (C) 6
  - (D) 7

Solution: Add equations and get 2x + 2y + 2z = 12; divide both sides of the equation by 2 and we get x + y + z = 6. (Answer is C)

- 2. If 2x + y = 8 and x + 2y = 4, find the value of x y.
  - (A) 3
  - (B) 4
  - (C) 5
  - (D) 6

Solution: Subtract equations and get x - y = 4. (Answer is B)

Here's an example from a recent SAT.

If y - x = 5 and 2y + z = 11, find the value of x + y + z.

- (A) 3
- (B) 6
- (C) 8
- (D) 16

Solution: Subtract equation y - x = 5 from 2y + z = 11.

We get 2y - y + z - (-x) = 11 - 5.

So, 
$$y + z + x = 6$$
. (Answer is B)

\*Note: See Math Strategy #13 on page 102.

## WHAT ARE CRITICAL-THINKING SKILLS?

Critical-Thinking Skills, a current buzz phrase, are generic skills for finding the most creative and effective way of solving a problem or evaluating a situation. The most effective way of solving a problem is to extract some piece of information or observe something curious from the problem and then use one or more of the specific strategies or Critical-Thinking Skills (together with basic skills or information you already know) to get to the next step in the problem. This next step will catapult you toward a solution with further use of the specific strategies or thinking skills.

#### 1. Extract or observe something curious.

#### 2. Use specific strategies together with basic skills.

These specific strategies will enable you to "process" think rather than just be concerned with the end result; the latter usually gets you to a fast, rushed, and wrong answer. The Gruber strategies have been shown to make test takers more comfortable with problem solving and to make the process enjoyable. The skills will last a lifetime, and you will develop a passion for problem solving. These Critical-Thinking Skills show that conventional "drill and practice" is a waste of time unless the practice is based on these generic thinking skills.

#### Here's a simple example of how these Critical-Thinking Skills can be used in a math problem:

Which is greater,  $7\frac{1}{7} \times 8\frac{1}{8} \times 6\frac{1}{6}$  or  $8\frac{1}{8} \times 6\frac{1}{6} \times 7$ ? **Long and tedious way:** Multiply  $7\frac{1}{7} \times 8\frac{1}{8} \times 6\frac{1}{6}$  and compare it with  $8\frac{1}{8} \times 6\frac{1}{6} \times 7$ .

**Error in doing the problem the "long way":** You don't have to *calculate;* you just have to *compare,* so you need a *strategy* for *comparing* two quantities.

#### **Critical-Thinking way:**

1. *Observe:* Each expression contains  $8\frac{1}{8}$  and  $6\frac{1}{6}$ .

2. Use strategy: Since both  $8\frac{1}{8}$  and  $6\frac{1}{6}$  are just weighting factors, like the same quantities on both sides of a balance scale, just *cancel* them from both multiplied quantities above.

You are then left comparing  $7\frac{1}{7}$  with 7, so the first quantity,  $7\frac{1}{7}$ , is greater. Thus  $7\frac{1}{7} \times 8\frac{1}{8} \times 6\frac{1}{6}$  is greater than  $8\frac{1}{8} \times 6\frac{1}{6} \times 7$ .

#### Here's a simple example of how Critical-Thinking Skills can be used for a verbal problem:

If you see a word such as *delude* in a sentence or in a reading passage, you can assume that the word *delude* is negative and probably means "taking away from something" or "distracting," since the prefix *de-* means "away from" and thus has a negative connotation. Although you may not get the exact meaning of the word (in this case the meaning is to "deceive" or "mislead"), you can see how the word may be used in the context of the sentence in which it appears, and thus get the flavor or feeling of the sentence or paragraph. I have researched and developed more than 50 prefixes and roots (included in Appendix A to this book) that let you make use of this context strategy.

Notice that the Critical-Thinking approach gives you a fail-safe and exact path to the solution without requiring you to try to solve the problem superficially or merely guess at it. This book contains all the Critical-Thinking Strategies you need to know for the SAT test, allowing you to solve hundreds of problems.

I have researched hundreds of SAT tests, including many of the New SAT tests (thousands of SAT questions), and documented 37 Critical-Thinking Strategies (all found in this book) common to every test. These strategies can be used for any Math or Verbal problem.

In short, you can learn how to solve a specific problem and thus find how to answer that specific problem, or you can learn a powerful logical-thinking strategy that will enable you to answer hundreds of problems.

### MULTILEVEL APPROACHES TO THE SOLUTION OF PROBLEMS

How a student answers a question is more important than the answer given by the student. For example, the student may have randomly guessed, the student may have used a rote and unimaginative method for reaching a solution, or the student may have used a very creative method. It seems that one should judge the student by the way he or she answers the question and not just by whether that student gets the correct answer to the question.

#### **Example:**

*Question:* Without using a calculator, which is greater:

 $355 \times 356$  or  $354 \times 357$ ?

- *Case 1:* **Rote Memory Approach** (a completely mechanical approach that does not take into account the possibility of a faster method based on patterns or connections of the numbers in the question): The student multiplies  $355 \times 356$ , gets 126,380, and then multiplies  $354 \times 357$  and gets 126,378.
- *Case 2:* **The Observer's Rote Approach** (an approach that makes use of a mathematical strategy that can be memorized and tried for various problems): The student does the following:

He or she divides both quantities by 354.

He or she then gets  $\frac{355 \times 356}{354}$  compared with  $\frac{354 \times 357}{354}$ . He or she then divides these quantities by 356 and gets  $\frac{355}{354}$  compared with  $\frac{357}{356}$ . Now he or she realizes that  $\frac{355}{354} = 1\frac{1}{354}$ ;  $\frac{357}{356} = 1\frac{1}{356}$ . He or she then reasons that since the left side,

 $1\frac{1}{354}$ , is greater than the right side,  $1\frac{1}{356}$ , the left side of the original quantities,  $355 \times 356$ , is greater than the right side of the original quantities,  $354 \times 357$ .

*Case 3:* **The Pattern Seeker's Method** (the most mathematically creative method—an approach in which the student looks for a pattern or sequence in the numbers and then is astute enough to represent the pattern or sequence in more general algebraic language to see the pattern or sequence more clearly):

Look for a pattern. Represent  $355 \times 356$  and  $354 \times 357$  by symbols.

Let x = 354.

Then 355 = x + 1; 356 = x + 2; 357 = x + 3. So  $355 \times 356 = (x + 1)(x + 2)$  and  $354 \times 357 = x(x + 3)$ .

Multiplying the factors, we get

 $355 \times 356 = x^2 + 3x + 2$  and  $354 \times 357 = x^2 + 3x$ .

The difference is  $355 \times 356 - 354 \times 357 = x^2 + 3x + 2 - x^2 - 3x$ , which is just 2.

So  $355 \times 356$  is greater than  $354 \times 357$  by 2.

*Note*: You could have also represented 355 by *x*. Then 356 = x + 1; 354 = x - 1; 357 = x + 2. We would then get  $355 \times 356 = (x)$ (x + 1) and  $354 \times 357 = (x - 1)(x + 2)$ . Then we would use the method above to compare the quantities.

—OR—

You could have written 354 as *a* and 357 as *b*. Then 355 = a + 1 and 356 = b - 1. So  $355 \times 356 = (a + 1)(b - 1)$  and  $354 \times 357 = ab$ . Let's see what  $(355 \times 356) - (354 \times 357)$  is. This is the same as (a + 1)(b - 1) - ab, which is (ab + b - a - 1) - ab, which is in turn b - a - 1. Since b - a - 1 = 357 - 354 - 1 = 2, the quantity  $355 \times 356 - 354 \times 357 = 2$ , so  $355 \times 356$  is greater than  $354 \times 357$  by 2.

*Case 4:* **The Astute Observer's Approach** (the simplest approach—an approach that attempts to figure out a connection between the numbers and uses that connection to figure out the solution):

 $355 \times 356 = (354 + 1) \times 356 = (354 \times 356)$ + 356 and  $354 \times 357 = 354 \times (356 + 1) = (354 \times 356)$ + 354

One can see that the difference is just 2.

*Case 5:* **The Observer's Common Relation Approach** (the approach that people use when they want to connect two items to a third to see how the two items are related):

 $355 \times 356$  is greater than  $354 \times 356$  by 356.  $354 \times 357$  is greater than  $354 \times 356$  by 354.

So this means that  $355 \times 356$  is greater than  $354 \times 357$ .

*Case 6:* Scientific, Creative, and Observational Generalization Method (a highly creative method and the most scientific method, as it spots a critical and curious aspect of the sums being equal and provides for a generalization to other problems of that nature):

Represent 354 = a, 357 = b, 355 = c, and 356 = d

We have now that (1) a + b = c + d(2) |b - a| > |d - c|

We want to prove: ab < dc

Proof:

Square inequality (2):  $(b - a)^2 > (d - c)^2$ Therefore: (3)  $b^2 - 2ab + a^2 > d^2 - 2dc + c^2$ Multiply (3) by -1, and this reverses the inequality sign:  $-(b^2 - 2ab + a^2) < -(d^2 - 2dc + c^2)$ 

or

 $(4) -b^2 + 2ab - a^2 < -d^2 + 2dc - c^2$ 

Now square (1): (a + b) = (c + d) and we get: (5)  $a^2 + 2ab + b^2 = c^2 + 2dc + d^2$ 

Add inequality (4) to equality (5) and we get:

4ab < 4dc

Divide by 4 and we get:

ab < dc

The generalization is that for any positive numbers *a*, *b*, *c*, *d*, when |b - a| > |d - c| and a + b = c + d, then ab < dc.

This also generalizes in a geometrical setting where for two rectangles whose perimeters are the same (2a + 2b = 2c + 2d), the rectangle whose absolute difference in sides |d - c| is *least* has the *greatest* area.

*Case 7:* Geometric and Visual Approach\* (the approach used by visual people or people who have a curious geometric bent and possess "out-of-the-box" insights):



Where a = 354, b = 357, c = 355, and d = 356, we have two rectangles where the first one's length is *d* and width is *c*, and the second one's length is *b* (dotted line) and width is *a*.

Now the area of the first rectangle (dc) is equal to the area of the second (ab) minus the area of the rectangular slab, which is (b - d)a, plus the area of the rectangular slab (c - a)d. So we get: cd = ab - (b - d)a + (c - a)d. Since b - d = c - a, we get cd = ab - (c - a)a +(c - a)d = ab + (d - a)(c - a).

Since d > a and c > a, cd > ab. So  $355 \times 356 > 354 \times 357$ .

<sup>\*</sup>This method of solution was developed by and sent to the author from Dr. Eric Cornell, a Nobel laureate in Physics.

*Note*: Many people have thought that by multiplying units digits from one quantity and comparing that with the product of the units digits from the other quantity, they would get the answer. For example, they would multiply  $5 \times 6 = 30$  from  $355 \times 356$ , then multiply  $4 \times 7 = 28$  from  $354 \times 357$ , and then say that  $355 \times 356$  is greater than  $354 \times 357$  because

 $5 \times 6 > 4 \times 7$ . They would be lucky. That works if the sum of units digits of the first quantity is the same as or greater than the sum of units digits of the second quantity. However, if we want to compare something like  $354 \times 356 = 126,024$  with  $352 \times 359$ = 126,368, that method would not work.

## QUESTIONS RECENTLY ASKED OF DR. GRUBER IN INTERVIEWS

#### How Did You Get Started in Test Prep? Do You Still Personally Train Students?

When I was in fifth grade, I scored 90 (below average) on an IQ test. My father, who was a high school teacher at the time, was concerned, so he was able to get me an IQ test, hoping I could study it and increase my score. However, when I looked at the test, I was so fascinated with what the questions were trying to assess, I started to figure out what strategies and thinking could have been used for the questions and saw interesting patterns for what the test maker was trying to test.

I increased my IQ to 126 and then to 150. The initial experience of scoring so low on my first IQ test and being branded as "dull minded" actually sparked my fascination and research with standardized tests. I was determined to help all other students obtain my knowledge and experience so they would be able to reach their full potential, as I had. So I constantly write books, newspaper and magazine articles and columns, and software, and I personally teach students and teachers.

## What Is the "Gruber Method" and How Does It Differ from Other Test Prep Methods?

The unique aspect of my method is that I provide a mechanism and process whereby students internalize the use of the strategies and thinking skills I've developed and honed over thirty years. The method reinforces those strategies and skills so that students can answer questions on the SAT or ACT without panic or brain-racking. This is actually a fun process. The Gruber Method focuses on the students' patterns of thinking and how each student should best answer the questions. I have even developed a nationally syndicated test—the only one of its kind—that actually tracks a student's thinking approach to the SAT (and ACT) and directs the student to the exact strategies necessary for him or her to learn. Instead of just learning how to solve one problem at a time, if you learn a Gruber strategy you can use it to solve thousands of problems.

#### How Do You Ensure That the Practice Tests in Your Books Are Accurate Reflections of What Students Will See on the Actual Tests?

There are two processes for this. First, I am constantly critically reviewing and analyzing all the current questions and patterns on the actual tests. The second process is that I am directly in touch with the research development teams for any new items or methods used in the questions on any upcoming tests, so I am probably the only one besides the actual SAT or ACT staff who knows exactly what is being tested and why it is being tested on current and upcoming exams.

#### What Percentage of Test Prep Study Time Should Students Spend Learning Vocabulary Words?

Students should not spend too much time on this perhaps 4 hours at most. The rest of the time should be invested in learning the "Hot Prefixes and Roots" list (page 627).

## What Advice Can You Give to Students Suffering from Test Anxiety?

I find that when students learn specific strategies, they see how a strategy can be used for a multitude of questions. And when they see a question on an actual SAT that uses the strategy, it reinforces their self-confidence and reduces their sense of panic. Students can also treat the SAT as a game by using my strategic approaches, and this also reduces panic.

## SAT vs. ACT: How Should Students Decide Which Test to Take?

The correlation happens to be very high for both tests, so if you score well on one, you will score equivalently on the other. The material is about the same; for example, there is grammar on both tests. Math is about the same, except the ACT is less strategically oriented. There is reading on both tests, and those sections test about the same things. However, on the ACT there is a whole section on scientific data interpretation (the SAT has some questions on this topic in the Math section). And the ACT is more memory-oriented than the SAT. If you are more prone to using memory, I would take the ACT. If you are more prone to strategizing or if you like puzzles, I would take the SAT. In any event, I would check with the schools to which you're applying to find out which test they prefer.

#### What Is the Single Most Important Piece of Advice You Can Give to Students Taking the SAT or ACT?

Learn some specific strategies, which can be found in my books. This will let you think mechanically without racking your brain. When answering the questions, don't concentrate on or panic about finding the answer. Try to extract something in the question that is curious and/or will lead you to the next step in the question. Through this, you will process the question, enabling you to reach an answer.

#### What Is the Single Most Important Piece of Advice You Can Give to Tutors Teaching the SAT or ACT?

Make sure you learn the strategies. Teach students those strategies by using many different questions that employ each strategy, so students will see variations on how each particular strategy is used.

#### What Recommendations Can You Give to Tutors Who Want to Use Your Books in Their Test Prep Programs?

The sections "A 4-Hour Study Program for the SAT" (page xxvi) and "Longer-Range Study Program and Helpful Steps for Using This Book" (page xxvii) present a condensed and a more comprehensive approach to studying for the SAT. You can use this information to create a program for teaching the student. Always try to reinforce the strategic approach, where the student can focus on and internalize strategies so he or she can use them for multitudes of questions.

#### Apparently, Very Few People Know the Answer to This Important Question: When Should Students Take the SAT or ACT?

Students should find out from the school to which they are applying the preferred test dates for the SAT or ACT that they need to register for. However, if a student wants to take an SAT or ACT for practice, he or she should take it only on the test dates that are earmarked for later test disclosure, which means that the test answers and the students' answers are given back to them. For the SAT, check the College Board's website at www.collegeboard.org and https: //collegereadiness.collegeboard.org/pdf/sat-answerverification-service-order-form.pdf, and for the ACT, check www.actstudent.org. After getting the test and the results for each question back, students can learn from their mistakes by going through the questions they got wrong and then working on the strategies and basic skills they could have used to solve those questions.

# PART 1

# Strategy Diagnostic Test for the New SAT

## Take This Test to Find Out What Strategies You Don't Know

The purpose of this test is to find out *how* you approach SAT problems of different types and to reveal your understanding and command of the various strategies and Critical-Thinking Skills. After checking your answers in the table at the end of the test, you will have a profile of your performance. You will know exactly what strategies you must master and where you may learn them. *Important Note:* On the actual SAT there will be only 4 choices. For instructional purposes, in this and other diagnostic tests I have used 5 choices. The two Practice Tests at the end of the book, however, use the 4 choices you will find on the actual SAT.

#### DIRECTIONS

For each odd-numbered question (1, 3, 5, 7, etc.), choose the best answer. In the even-numbered questions (2, 4, 6, 8, etc.), you will be asked how you solved the preceding odd-numbered question. Make sure that you answer the even-numbered questions carefully, as your answers will determine whether or not you used the right strategy. Be completely honest in your answers to the even-numbered questions, since you do want an accurate assessment in order to be helped. *Note:* Only the odd-numbered questions are SAT-type questions that would appear on the actual exam. The even-numbered questions are for self-diagnosis purposes only.

#### **Example:**

- 1. The value of  $17 \times 98 + 17 \times 2 =$ 
  - (A) 1,550
  - (B) 1,600
  - (C) 1,700
  - (D) 1,800
  - (E) 1,850

(The correct answer is Choice C.)

- 2. How did you get your answer?
  - (A) I multiplied  $17 \times 98$  and added that to  $17 \times 2$ .
  - (B) I approximated and found the closest match in the choices.
  - (C) I factored out the 17 to get 17(98 + 2).
  - (D) I guessed.
  - (E) By none of the above methods.

In question 2:

- If you chose A, you did the problem the long way unless you used a calculator.
- If you chose B, you probably approximated 98 by 100 and got 1,700.
- If you chose C, you factored out the 17 to get 17(98 + 2) = 17(100) = 1,700. This was the best strategy to use.
- If you chose D, you probably didn't know how to solve the problem and just guessed.
- If you chose E, you did not use any of the methods above but used your own different method.

*Note*: In the even-numbered questions, you may have used a different approach from what will be described in the answer to that question. It is, however, a good idea to see if the alternate approach is described, as you may want to use that approach for solving other questions. Now turn to the next page to take the test.

#### **ANSWER SHEET**

It is recommended that you use a No. 2 pencil. It is very important that you fill in the entire circle darkly and completely. If you change your response, erase as completely as possible. Incomplete marks or erasures may affect your score.

Complete Mark ● Examples of Incomplete Marks ●⊗⊝⊘⊘⊖⊙●

#### **SECTION 1: VERBAL ABILITY**

$\begin{array}{c c} A & B & C & D & E \\ 1 & \bigcirc & \bigcirc & \bigcirc & \bigcirc & \bigcirc \\ \end{array}$	A B C D E 10 0 0 0 0 0	A B C D E 19 0 0 0 0 0	A B C D E 28 0 0 0 0 0	A B C D E 37 0 0 0 0 0
$\begin{array}{c ccccccccccccccccccccccccccccccccccc$	A B C D E 11 0 0 0 0 0	A B C D E 20 0 0 0 0 0	A B C D E 29 0 0 0 0 0	A B C D E 38 0 0 0 0 0
$\begin{array}{cccc} A & B & C & D & E \\ 3 & \bigcirc & \bigcirc & \bigcirc & \bigcirc & \bigcirc & \bigcirc \end{array}$	A B C D E 12 0 0 0 0 0	A B C D E 21 0 0 0 0 0	A B C D E 30 0 0 0 0 0	A B C D E 39 0 0 0 0 0
$\begin{array}{cccc} A & B & C & D & E \\ 4 & \bigcirc & \bigcirc & \bigcirc & \bigcirc & \bigcirc & \bigcirc \end{array}$	A B C D E 13 0 0 0 0 0	A B C D E 22 O O O O O	A B C D E 31 0 0 0 0 0	
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$\begin{array}{cccc} A & B & C & D & E \\ 6 & \bigcirc & \bigcirc & \bigcirc & \bigcirc & \bigcirc & \bigcirc \end{array}$	A B C D E 15 0 0 0 0 0	A B C D E 24 O O O O O	A B C D E 33 0 0 0 0 0	
$\begin{array}{cccc} A & B & C & D & E \\ 7 & \bigcirc & \bigcirc & \bigcirc & \bigcirc & \bigcirc & \bigcirc \end{array}$	$\begin{array}{cccccccccccccccccccccccccccccccccccc$	A B C D E 25 0 0 0 0 0	A B C D E 34 ○ ○ ○ ○ ○ ○	A B C D E 43 0 0 0 0 0
$\begin{array}{cccc} A & B & C & D & E \\ 8 & \bigcirc \end{array}$	A B C D E 17 0 0 0 0 0	A B C D E 26 0 0 0 0 0	A B C D E 35 ○ ○ ○ ○ ○ ○	
A B C D E 9 0 0 0 0 0	A B C D E 18 0 0 0 0 0	A B C D E 27 0 0 0 0 0	A B C D E 36 0 0 0 0 0	

#### **SECTION 2: MATH ABILITY**

$\begin{array}{c c} A & B & C & D & E \\ 1 & \bigcirc & \bigcirc & \bigcirc & \bigcirc & \bigcirc \\ \end{array}$	A B C D E 9 0 0 0 0 0	$\begin{array}{c} A & B & C & D & E \\ 17 & \bigcirc & \bigcirc & \bigcirc & \bigcirc & \bigcirc & 2 \end{array}$	$\begin{array}{cccccccccccccccccccccccccccccccccccc$
A B C D E 2 0 0 0 0 0	A B C D E 10 0 0 0 0 0	A B C D E 18 0 0 0 0 0 2	$\begin{array}{cccccccccccccccccccccccccccccccccccc$
$\begin{array}{cccc} A & B & C & D & E \\ 3 & \bigcirc & \bigcirc & \bigcirc & \bigcirc & \bigcirc & \bigcirc \end{array}$	$\begin{array}{cccccccccccccccccccccccccccccccccccc$	$\begin{array}{cccccccccccccccccccccccccccccccccccc$	
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$\begin{array}{cccc} A & B & C & D & E \\ 5 & \bigcirc & \bigcirc & \bigcirc & \bigcirc & \bigcirc & \bigcirc \end{array}$	A B C D E 13 0 0 0 0 0	$\begin{array}{cccccccccccccccccccccccccccccccccccc$	
$\begin{array}{cccc} A & B & C & D & E \\ 6 & \bigcirc & \bigcirc & \bigcirc & \bigcirc & \bigcirc & \bigcirc \end{array}$	$\begin{array}{cccccccccccccccccccccccccccccccccccc$	$\begin{array}{cccccccccccccccccccccccccccccccccccc$	$\begin{array}{cccc} A & B & C & D & E \\ 30 & \bigcirc & \bigcirc & \bigcirc & \bigcirc & \bigcirc \\ \end{array}$
A B C D E 7 0 0 0 0 0	A B C D E 15 0 0 0 0 0	$\begin{array}{cccccccccccccccccccccccccccccccccccc$	
A B C D E 8 0 0 0 0 0	A B C D E 16 0 0 0 0 0	$\begin{array}{cccccccccccccccccccccccccccccccccccc$	$\begin{array}{cccccccccccccccccccccccccccccccccccc$

## **SECTION 1: VERBAL ABILITY**

#### Vocabulary

#### Directions

Each of the following questions consists of a word in capital letters, followed by five lettered words or phrases. Choose the word or phrase that is most nearly *opposite* in meaning to the word in capital letters. Since some of the questions require you to distinguish fine shades of meaning, consider all the choices before deciding which is best.

#### **Example:**

GOOD:

- (A) sour
- (B) bad
- (C) red
- (D) hot
- (E) ugly
- $\overset{A}{\bigcirc} \overset{B}{\bullet} \overset{C}{\bigcirc} \overset{D}{\bigcirc} \overset{E}{\bigcirc} \overset{E}{\bigcirc} \overset{C}{\bigcirc} \overset{D}{\bigcirc} \overset{E}{\bigcirc}$

*Note*: Although antonyms are no longer a part of the SAT, we are still testing vocabulary through antonyms on this particular test, since it is important for you to develop vocabulary strategies for the Reading Comprehension parts of the SAT.

- 1. TENACIOUS:
  - (A) changing
  - (B) stupid
  - (C) unconscious
  - (D) poor
  - (E) antagonistic
- 2. How did you get your answer?
  - (A) I knew the meaning of the word *tenacious*.
  - (B) I knew what the root *ten* meant and looked for the opposite of that root.
  - (C) I did not know what *tenacious* meant but knew a word that sounded like *tenacious*.

- (D) I guessed.
- (E) none of these
- 3. PROFICIENT:
  - (A) antiseptic
  - (B) unwilling
  - (C) incompetent
  - (D) antagonistic
  - (E) awkward
- 4. How did you get your answer?
  - (A) I knew what the prefix *pro* meant and used it to figure out the capitalized word, but I didn't use any root of *proficient*.
  - (B) I used the meaning of the prefix *pro-* and the meaning of the root *fic* to figure out the meaning of the word *proficient*.
  - (C) I knew from memory what the word *proficient* meant.
  - (D) I guessed.
  - (E) none of these
- 5. DELUDE:
  - (A) include
  - (B) guide
  - (C) reply
  - (D) upgrade
  - (E) welcome
- 6. How did you get your answer?
  - (A) I knew what the prefix *de* meant and used it to figure out the meaning of the word *delude*, but I didn't use any root of *delude*.
  - (B) I used the meaning of the prefix *de* and the meaning of the root *lud* to figure out the meaning of the word *delude*.
  - (C) I knew from memory what the word *delude* meant.
  - (D) I guessed.
  - (E) none of these

- 7. POTENT:
  - (A) imposing
  - (B) pertinent
  - (C) feeble
  - (D) comparable
  - (E) frantic
- 8. How did you get your answer?
  - (A) I knew what the capitalized word meant.
  - (B) I knew a word or part of a word that sounded the same as *potent* or had a close association with the word *potent*.
  - (C) I knew a prefix or root of the capitalized word, which gave me a clue to the meaning of the word.
  - (D) I knew from a part of the capitalized word that the word had a negative or positive association. Thus, I selected a choice that was opposite in flavor (positive or negative).
  - (E) none of these
- 9. RECEDE:
  - (A) accede
  - (B) settle
  - (C) surrender
  - (D) advance
  - (E) reform
- 10. How did you get your answer?
  - (A) I found a word opposite in meaning to the word *recede*, *without* looking at the choices. Then I matched my word with the choices.
  - (B) I used prefixes and/or roots to get the meaning of the word *recede*.
  - (C) I looked at the choices to see which word was opposite to *recede*. I *did not* try first to get my own word that was opposite to the meaning of *recede*, as in Choice A.
  - (D) I guessed.
  - (E) none of these
- 11. THERMAL:
  - (A) improving
  - (B) possible
  - (C) beginning
  - (D) reduced
  - (E) frigid

- 12. How did you get your answer?
  - (A) I knew what the capitalized word meant.
  - (B) I knew a word or part of a word that sounded the same as *thermal* or had a close association with the word *thermal*.
  - (C) I knew a prefix or root of the capitalized word, which gave me a clue to the meaning of the word.
  - (D) I knew from a part of the capitalized word that the word had a negative or positive association. Thus, I selected a choice that was opposite in flavor (positive or negative).
  - (E) none of these
- 13. SLOTHFUL:
  - (A) permanent
  - (B) ambitious
  - (C) average
  - (D) truthful
  - (E) plentiful
- 14. How did you get your answer?
  - (A) I knew what the capitalized word meant.
  - (B) I knew a word or part of a word that sounded the same as *sloth* or had a close association with the word *sloth*.
  - (C) I knew a prefix or root of the capitalized word, which gave me a clue to the meaning of the word.
  - (D) I knew from a part of the capitalized word that the word had a negative or positive association. Thus, I selected a choice that was opposite in flavor (positive or negative).
  - (E) none of these
- 15. MUNIFICENCE:
  - (A) disloyalty
  - (B) stinginess
  - (C) dispersion
  - (D) simplicity
  - (E) vehemence
- 16. How did you get your answer?
  - (A) I knew what the capitalized word meant.
  - (B) I knew a word or part of a word that sounded the same as *munificence* or had a close association with the word *munificence*.
  - (C) I knew a prefix or root of the capitalized word, which gave me a clue to the meaning of the word.

- (D) I knew from a part of the capitalized word that the word had a negative or positive association. Thus, I selected a choice that was opposite in flavor (positive or negative).
- (E) none of these
- 17. FORTITUDE:
  - (A) timidity
  - (B) conservatism
  - (C) placidity
  - (D) laxness
  - (E) ambition
- 18. How did you get your answer?
  - (A) I knew what the capitalized word meant.
  - (B) I knew a word or part of a word that sounded the same as *fortitude* or had a close association with the word *fortitude*.
  - (C) I knew a prefix or root of the capitalized word, which gave me a clue to the meaning of the word.
  - (D) I knew from a part of the capitalized word that the word had a negative or positive association. Thus, I selected a choice that was opposite in flavor (positive or negative).
  - (E) none of these
- 19. DETRIMENT:
  - (A) recurrence
  - (B) disclosure
  - (C) resemblance
  - (D) enhancement
  - (E) postponement
- 20. How did you get your answer?
  - (A) I knew what the capitalized word meant.
  - (B) I knew a word or part of a word that sounded the same as *detriment* or had a close association with the word *detriment*.
  - (C) I knew a prefix or root of the capitalized word, which gave me a clue to the meaning of the word.
  - (D) I knew from a part of the capitalized word that the word had a negative or positive association. Thus, I selected a choice that was opposite in flavor (positive or negative).
  - (E) none of these

- 21. CIRCUMSPECT:
  - (A) suspicious
  - (B) overbearing
  - (C) listless
  - (D) determined
  - (E) careless
- 22. How did you get your answer?
  - (A) I knew what the capitalized word meant.
  - (B) I knew a word or part of a word that sounded the same as *circumspect* or had a close association with the word *circumspect*.
  - (C) I knew a prefix or root of the capitalized word, which gave me a clue to the meaning of the word.
  - (D) I knew from a part of the capitalized word that the word had a negative or positive association. Thus, I selected a choice that was opposite in flavor (positive or negative).
  - (E) none of these
- 23. LUCID:
  - (A) underlying
  - (B) complex
  - (C) luxurious
  - (D) tight
  - (E) general
- 24. How did you get your answer?
  - (A) I knew what the capitalized word meant.
  - (B) I knew a word or part of a word that sounded the same as *lucid* or had a close association with the word *lucid*.
  - (C) I knew a prefix or root of the capitalized word, which gave me a clue to the meaning of the word.
  - (D) I knew from a part of the capitalized word that the word had a negative or positive association. Thus, I selected a choice that was opposite in flavor (positive or negative).
  - (E) none of these

#### **Reading Passages**

#### Directions

Each of the following passages is followed by questions based on its content. Answer all questions following a passage on the basis of what is *stated* or *implied* in that passage.

## Questions 25–30 are based on the following passage.

She walked along the river until a policeman stopped her. It was one o'clock, he said. Not the best time to be walking alone by the side of a half-frozen river. He smiled at her, then offered to walk her home. It was the

- 5 first day of the new year, 1946, eight and a half months after the British tanks had rumbled into Bergen-Belsen. That February, my mother turned twenty-six. It was difficult for strangers to believe that she had ever been a concentration camp inmate. Her face was smooth and
- 10 round. She wore lipstick and applied mascara to her large dark eyes. She dressed fashionably. But when she looked into the mirror in the mornings before leaving for work, my mother saw a shell, a mannequin who moved and spoke but who bore only a superficial
- 15 resemblance to her real self. The people closest to her had vanished. She had no proof that they were truly dead. No eyewitnesses had survived to vouch for her husband's death. There was no one living who had seen her parents die. The lack of confirmation haunted her.
- 20 At night before she went to sleep and during the day as she stood pinning dresses she wondered if, by some chance, her parents had gotten past the Germans or had crawled out of the mass grave into which they had been shot and were living, old and helpless, somewhere in
- 25 Poland. What if only one of them had died? What if they had survived and had died of cold or hunger after she had been liberated, while she was in Celle\* dancing with British officers?

She did not talk to anyone about these things. No

30 one, she thought, wanted to hear them. She woke up in the morning, went to work, bought groceries, went to the Jewish Community Center and to the housing office like a robot.

#### Questions

- 25. The policeman stopped the author's mother from walking along the river because
  - (A) the river was dangerous
  - (B) it was the wrong time of day
  - (C) it was still wartime
  - (D) it was too cold
  - (E) she looked suspicious
- 26. Which part of the passage gives you the best clue for getting the right answer?
  - (A) Line 2: "It was one o'clock, he said."
  - (B) Lines 2–3: "It was one o'clock, he said. Not the best time to be walking alone. . . . "
  - (C) Lines 2–3: "It was one o'clock, he said. Not the best time to be walking alone by the side of a half-frozen river."
  - (D) none of these
  - (E) I don't know.
- 27. The author states that his mother thought about her parents when she
  - (A) walked along the river
  - (B) thought about death
  - (C) danced with the officers
  - (D) arose in the morning
  - (E) was at work
- 28. Which part of the passage gives you the best clue for getting the right answer?
  - (A) Line 20: "At night before she went to sleep...."
  - (B) Lines 20–21: "... and during the day as she stood pinning dresses she wondered...."
  - (C) Lines 11–12: "But when she looked into the mirror in the mornings. . . ."
  - (D) Lines 25–28: "What if they had survived and died of cold . . . while she was . . . dancing with British officers?"
  - (E) I don't know.
- 29. When the author mentions his mother's dancing with the British officers, he implies that his mother
  - (A) compared her dancing to the suffering of her parents
  - (B) had clearly put her troubles behind her

<sup>\*</sup>Celle is a small town in Germany.

- (C) felt it was her duty to dance with them
- (D) felt guilty about dancing
- (E) regained the self-confidence she once had
- 30. Which words expressed in the passage lead us to the right answer?
  - (A) Line 26: "had survived"
  - (B) Line 26: "had died of cold or hunger"
  - (C) Line 22: "gotten past the Germans"
  - (D) Line 33: "like a robot"
  - (E) I don't know.

## Questions 31–36 are based on the following passage.

This passage is adapted from Claude M. Fuess, "The Retreat from Excellence," Saturday Review, March 26, 1960, p. 21.

That one citizen is as good as another is a favorite American axiom, supposed to express the very essence of our Constitution and way of life. But just what do we mean when we utter that platitude? One surgeon

- 5 is not as good as another. One plumber is not as good as another. We soon become aware of this when we require the attention of either. Yet in political and economic matters we appear to have reached a point where knowledge and specialized training count for very
- 10 little. A newspaper reporter is sent out on the street to collect the views of various passersby on such a question as "Should the United States defend Afghanistan?" The answer of the barfly who doesn't even know where the country is located, or that it is a country, is quoted
- 15 in the next edition just as solemnly as that of the college teacher of history. With the basic tenets of democracy that all people are born free and equal and are entitled to life, liberty, and the pursuit of happiness—no decent American can possibly take issue. But that the opinion
- 20 of one citizen on a technical subject is just as authoritative as that of another is manifestly absurd. And to accept the opinions of all comers as having the same value is surely to encourage a cult of mediocrity.

#### Questions

- 31. Which phrase best expresses the main idea of this passage?
  - (A) the myth of equality
  - (B) a distinction about equality
  - (C) the essence of the Constitution

- (D) a technical subject
- (E) knowledge and specialized training
- 32. Which is the best title for this passage?
  - (A) "Equality—for Everyone, for Every Situation?"
  - (B) "Dangers of Opinion and Knowledge"
  - (C) "The American Syndrome"
  - (D) "Freedom and Equality"
  - (E) I don't know.
- 33. The author most probably included the example of the question on Afghanistan (line 12) in order to
  - (A) move the reader to rage
  - (B) show that he is opposed to opinion sampling
  - (C) show that he has thoroughly researched his project
  - (D) explain the kind of opinion sampling he objects to
  - (E) provide a humorous but temporary diversion from his main point
- 34. The distinction between a "barfly" and a college teacher (lines 12–16) is that
  - (A) one is stupid, the other is not
  - (B) one is learned, the other is not
  - (C) one is anti-American, the other is not
  - (D) one is pro-Afghani, the other is not
  - (E) I don't know.
- 35. The author would be most likely to agree that
  - (A) some men are born to be masters; others are born to be servants
  - (B) the Constitution has little relevance for today's world
  - (C) one should never express an opinion on a specialized subject unless he is an expert in that subject
  - (D) every opinion should be treated equally
  - (E) all opinions should not be given equal weight
- 36. Which lines give the best clue to the answer to this question?
  - (A) Lines 3-6
  - (B) Lines 4-6
  - (C) Lines 14-18
  - (D) Lines 19-23
  - (E) I don't know.

## Questions 37–44 are based on the following passage.

#### This passage is attributed to D. G. Schueler.

Mist continues to obscure the horizon, but above us the sky is suddenly awash with lavender light. At once the geese respond. Now, as well as their cries, a beating roar rolls across the water as if five thousand house-

- 5 wives have taken it into their heads to shake out blankets all at one time. Ten thousand housewives. It keeps up—the invisible rhythmic beating of all those goose wings—for what seems a long time. Even Lonnie is held motionless with suspense.
- 10 Then the geese begin to rise. One, two, three hundred—then a thousand at a time—in long horizontal lines that unfurl like pennants across the sky. The horizon actually darkens as they pass. It goes on and on like that, flock after flock, for three or four minutes,
- 15 each new contingent announcing its ascent with an accelerating roar of cries and wingbeats. Then gradually the intervals between flights become longer. I think the spectacle is over, until yet another flock lifts up, following the others in a gradual turn toward the north-
- 20 eastern quadrant of the refuge.

Finally the sun emerges from the mist; the mist itself thins a little, uncovering the black line of willows on the other side of the wildlife preserve. I remember to close my mouth—which has been open for some

- 25 time—and inadvertently shut two or three mosquitoes inside. Only a few straggling geese oar their way across the sun's red surface. Lonnie wears an exasperated, proprietary expression, as if he had produced and directed the show himself and had just received a bad
- 30 review. "It would have been better with more light," he says; "I can't always guarantee just when they'll start moving." I assure him I thought it was a fantastic sight. "Well," he rumbles, "I guess it wasn't too bad."

#### Questions

- 37. In the descriptive phrase "shake out blankets all at one time" (lines 5–6), the author is appealing chiefly to the reader's
  - (A) background
  - (B) sight
  - (C) emotions
  - (D) thoughts
  - (E) hearing
- 38. Which words preceding the descriptive phrase "shake out blankets all at one time" (lines 5–6)

give us a clue to the correct answer to the previous question (question 37)?

- (A) "into their heads"
- (B) "lavender light"
- (C) "across the water"
- (D) "a beating roar"
- (E) I don't know.
- 39. The mood created by the author is one of
  - (A) tranquility
  - (B) excitement
  - (C) sadness
  - (D) bewilderment
  - (E) unconcern
- 40. Which word in the passage is most closely associated with the correct answer?
  - (A) mist
  - (B) spectacle
  - (C) geese
  - (D) refuge
  - (E) I don't know.
- 41. The main idea expressed by the author about the geese is that they
  - (A) are spectacular to watch
  - (B) are unpredictable
  - (C) disturb the environment
  - (D) produce a lot of noise
  - (E) fly in large flocks
- 42. Which line or lines give us a clue to the answer?
  - (A) Line 1
  - (B) Lines 17-18
  - (C) Line 21
  - (D) Line 33
  - (E) I don't know.
- 43. Judging from the passage, the reader can conclude that
  - (A) the speaker dislikes nature's inconveniences
  - (B) the geese's timing is predictable
  - (C) Lonnie has had the experience before
  - (D) both observers are hunters
  - (E) the author and Lonnie are the same person
- 44. Which gives us a clue to the right answer?
  - (A) Lines 10–11
  - (B) Line 21
  - (C) Lines 23–25
  - (D) Lines 31–32
  - (E) I don't know.

## **SECTION 2: MATH ABILITY**

#### Directions

For this section, solve each problem and decide which is the best of the choices given. Fill in the corresponding circle on the answer sheet. You may use any available space for scratch work.

#### Notes

- 1. The use of a calculator is permitted.
- 2. All numbers used are real numbers.
- 3. Figures that accompany problems in this test are intended to provide information useful in solving the problems. They are drawn as accurately as possible EXCEPT when it is stated in a specific problem that the figure is not drawn to scale. All figures lie in a plane unless otherwise indicated.
- 4. Unless otherwise specified, the domain of any function *f* is assumed to be the set of all real numbers *x* for which *f*(*x*) is a real number.

#### **Geometry Reference**



The number of degrees of arc in a circle is 360. The sum of the measures in degrees of the angles of a triangle is 180.

#### **Mathematical Symbols**

- multiplication dot; as in  $x \cdot y$
- () parentheses; used to group expressions
- % percent
- ÷ division
- : ratio
- = equals
- $\neq$  does not equal
- < less than
- > greater than
- $\leq$  less than or equal to
- $\geq$  greater than or equal to
- $\sqrt{}$  square root

 $\pi$  pi, the ratio of the circumference of a circle to its

diameter, which is approximately equal to  $\frac{22}{7}$  or 3.14.

- $\angle$  angle
- is parallel to
- $\perp$  is perpendicular to
- $\wedge$  and
- $\lor$  or
- $\sim$  is similar to, or approximately
- $\rightarrow$  implies
- $\in$  belongs to
- $\subseteq$  is a subset of

1. If 
$$P \times \frac{11}{14} = \frac{11}{14} \times \frac{8}{9}$$
, then  $P =$   
(A)  $\frac{8}{9}$ 

- (B)  $\frac{g}{d}$
- (D) 8
- (C) 8
- (D) 11
- (E) 14
- 2. How did you get your answer?
  - (A) I multiplied  $\frac{11}{14}$  by  $\frac{8}{9}$ , reducing first.
  - (B) I multiplied  $11 \times 8$  and then divided the product by  $14 \times 9$ .
  - (C) I canceled  $\frac{11}{14}$  from both sides of the equals sign.
  - (D) I guessed.
  - (E) none of these
- 3. Sarah is twice as old as John. Six years ago, Sarah was 4 times as old as John was then. How old is John now?
  - (A) 3
  - (B) 9
  - (C) 18
  - (D) 20
  - (E) cannot be determined
- 4. How did you get your answer?
  - (A) I substituted S for Sarah, = for is, and J for John in the first sentence of the problem. Then I translated the second sentence into mathematical terms also.
  - (B) I tried specific numbers for *Sarah* and/or *John*.
  - (C) I racked my brain to figure out the ages but didn't write any equations down.
  - (D) I guessed.
  - (E) none of these
- 5. 200 is what percent of 20?

(A) 
$$\frac{1}{10}$$

- (B) 10
- (C) 100
- (D) 1,000
- (E) 10,000

- 6. How did you get your answer?
  - (A) I translated *is* to =, *what* to a variable, *of* to  $\times$ , etc. Then I was able to set up an equation.
  - (B) I just divided the two numbers and multiplied by 100 to get the percentage.
  - (C) I tried to remember how to work with *is-of* problems, putting the *of* over *is* or the *is* over *of*.
  - (D) I guessed.
  - (E) none of these
- 7. In the diagram below,  $\Delta XYZ$  has been inscribed in a circle. If the circle encloses an area of 64, and the area of  $\Delta XYZ$  is 15, then what is the area of the shaded region?



- (A) 25
- (B) 36
- (C) 49
- (D) 79
- (E) cannot be determined
- 8. How did you get your answer?
  - (A) I tried to calculate the area of the circle and the area of the triangle.
  - (B) I used a special triangle or tried different triangles whose area was 15.
  - (C) I subtracted 15 from 64.
  - (D) I guessed.
  - (E) none of these
- 9.  $66^2 + 2(34)(66) + 34^2 =$ 
  - (A) 4,730
  - (B) 5,000
  - (C) 9,860
  - (D) 9,950
  - (E) 10,000

- 10. How did you get your answer?
  - (A) I multiplied  $66 \times 66$ ,  $2 \times 34 \times 66$ , and  $34 \times 34$  and added the results.
  - (B) I approximated a solution.
  - (C) I noticed that  $66^2 + 2(34)(66) + 34^2$  had the form of  $a^2 + 2ab + b^2$  and set the form equal to  $(a + b)^2$ .
  - (D) I guessed.
  - (E) none of these
- 11. The average height of three students is 68 inches. If two of the students have heights of 70 inches and 72 inches respectively, then what is the height (in inches) of the third student?
  - (A) 60
  - (B) 62
  - (C) 64
  - (D) 65
  - (E) 66
- 12. How did you get your answer?
  - (A) I used the following equation:

(68 + 2) + (68 + 4) + x = 68 + 68 + 68Then I got:

68 + 68 + (x + 6) = 68 + 68 + 68, and crossed off the two 68s on both sides of the equation to come up with x + 6 = 68.

- (B) I was able to eliminate the incorrect choices without figuring out a complete solution.
- (C) I got the equation  $\frac{(70 + 72 + x)}{3} = 68$ , then solved for *x*.
- (D) I guessed.
- (E) none of these
- 13. If 0 < x < 1, then which of the following must be true?
  - I. 2x < 2
  - II. x 1 < 0
  - III.  $x^2 < x$
  - (A) I only
  - (B) II only
  - (C) I and II only
  - (D) II and III only
  - (E) I, II, and III

- 14. How did you get your answer?
  - (A) I plugged in only one number for *x* in I, II, and III.
  - (B) I plugged in more than one number for *x* and tried I, II, and III using each set of numbers.
  - (C) I used the fact that 0 < x and x < 1 and manipulated those inequalities in I, II, and III.
  - (D) I guessed.
  - (E) none of these
- 15. The sum of the cubes of any two consecutive positive integers is always
  - (A) an odd integer
  - (B) an even integer
  - (C) the cube of an integer
  - (D) the square of an integer
  - (E) the product of an integer and 3
- 16. How did you get your answer?
  - (A) I translated the statement into the form  $x^3 + (x + 1)^3 =$ \_\_\_\_\_ and tried to see what I would get.
  - (B) I tried numbers like 1 and 2 for the consecutive integers. Then I calculated the sum of the cubes of those numbers. I was able to eliminate some choices and then tried some other numbers for the consecutive integers to eliminate more choices.
  - (C) I said, of two consecutive positive integers, one is even and therefore its cube is even. The other integer is odd; therefore its cube is odd. An odd + an even is an odd.
  - (D) I guessed.
  - (E) none of these
- 17. If *p* is a positive integer, which *could* be an odd integer?
  - (A) 2p + 2
  - (B)  $p^3 p$
  - (C)  $p^2 + p$
  - (D)  $p^2 p$
  - (E) 7*p* − 3

- 18. How did you get your answer?
  - (A) I plugged in a number or numbers for *p* and started testing all the choices, *starting with Choice A*.
  - (B) I plugged in a number or numbers for *p* in each of the choices, *starting with Choice E*.
  - (C) I looked at Choice E first to see if 7p 3 had the form of an even or odd integer.
  - (D) I guessed.
  - (E) none of these
- 19. In this figure,

*A*\_\_\_\_\_*l* 

two points, B and C, are placed to the right of

point A such that 4AB = 3AC. The value of  $\frac{BC}{AB}$ 

- (A) equals  $\frac{1}{3}$
- (B) equals  $\frac{2}{3}$
- (C) equals  $\frac{3}{2}$
- (D) equals 3
- (E) cannot be determined
- 20. How did you get your answer?
  - (A) I drew points *B* and *C* on the line and labeled *AB* as *a* and *BC* as *b* and then worked with *a* and *b*.
  - (B) I substituted numbers for AB and AC.
  - (C) I drew points *B* and *C* on the line and worked with equations involving *BC* and *AB*.
  - (D) I guessed.
  - (E) none of these
- 21. A man rode a bicycle a straight distance at a speed of 10 miles per hour. He came back the same way, traveling the same distance at a speed of 20 miles per hour. What was the man's total number of miles for the trip back and forth if his total traveling time was one hour?
  - (A) 15
  - (B)  $13\frac{1}{3}$
  - (C)  $7\frac{1}{2}$
  - (D)  $6\frac{2}{3}$

(E) 
$$6\frac{1}{3}$$

- 22. How did you answer this question?
  - (A) I used Rate  $\times$  Time = Distance and plugged in my own numbers.
  - (B) I averaged 10 and 20 and worked from there.
  - (C) I called the times going back and forth by two different unknown variables but noted that the sum of these times was 1 hour.
  - (D) I guessed.
  - (E) none of these
- 23. If the symbol  $\phi$  is defined by the equation

 $a \phi b = a - b - ab$ for all a and b, then  $\left(-\frac{1}{3}\right) \phi (-3) =$ (A)  $\frac{5}{3}$ (B)  $\frac{11}{3}$ (C)  $-\frac{13}{5}$ (D) -4(E) -5

- 24. How did you get your answer?
  - (A) I played around with the numbers  $-\frac{1}{3}$  and -3

to get my answer. I didn't use any substitution method.

- (B) I substituted in  $a \neq b = a b ab$ ,  $\left(-\frac{1}{3}\right)$  for a and -3 for b.
- (C) I worked backward.
- (D) I guessed.
- (E) none of these
- 25. If  $y^8 = 4$  and  $y^7 = \frac{3}{x}$ , what is the value of y in terms of x?
  - (A)  $\frac{4x}{3}$ (B)  $\frac{3x}{4}$
  - (C)  $\frac{4}{x}$
  - · ´ )
  - (D)  $\frac{x}{4}$
  - (E)  $\frac{12}{r}$

- 26. How did you get your answer?
  - (A) I solved for the value of y from  $y^8 = 4$ . Then I substituted that value of y in  $y^7 = \frac{3}{x}$ .
  - (B) I took the seventh root of y in the second equation.
  - (C) I divided the first equation by the second equation to get y alone in terms of x.
  - (D) I guessed.
  - (E) none of these

## 27. If 4x + 5y = 10 and x + 3y = 8, then $\frac{5x + 8y}{3} =$

- (A) 18
- (B) 15
- (C) 12
- (D) 9
- (E) 6
- 28. How did you get your answer?
  - (A) I solved both simultaneous equations for x and for y, then substituted the values of x and y into  $\frac{(5x + 8y)}{3}.$
  - (B) I tried numbers for *x* and for *y* that would satisfy the first two equations.
  - (C) I added both equations to get 5x + 8y. Then I divided my result by 3.
  - (D) I guessed.
  - (E) none of these
- 29. The circle with center *A* and radius *AB* is inscribed in the square here. *AB* is extended to *C*. What is the ratio of *AB* to *AC*?



(D)  $\frac{\sqrt{2}}{2}$ 

(E) none of these

- 30. How did you get your answer?
  - (A) I approximated the solution. I looked to see what the ratio of *AB* to *AC* might be from the diagram. Then I looked through the choices to see which choice was reasonable or to eliminate incorrect choices.
  - (B) I saw a relationship between *AB* and *AC* but didn't draw any other lines.
  - (C) I dropped a perpendicular from A to one of the sides of the square, then worked with the isosceles right triangle. I also labeled length AB by a single letter, and BC by another single letter.
  - (D) I guessed.
  - (E) none of these
- 31. In the accompanying figure, *BD* is a straight line. What is the value of *a*?



(Note: Figure is not drawn to scale.)

- (A) 15
- (B) 17
- (C) 20
- (D) 24
- (E) 30
- 32. How did you get your answer?
  - (A) I first said that 2y + 6y + a = 180.
  - (B) I *first* said that 6y + 3y = 180, then solved for *y*.
  - (C) I first said 3y = 2y + a.
  - (D) I guessed.
  - (E) none of these

33. What is the perimeter of the accompanying figure if *B* and *C* are right angles?



(Note: Figure is not drawn to scale.)

- (A) 14
- (B) 16
- (C) 18
- (D) 20
- (E) cannot be determined

34. How did you get your answer?

- (A) I tried to first find angles A and D.
- (B) I drew a perpendicular from *A* to *DC* and labeled *BC* as an unknown (*x* or *y*, etc.).
- (C) I labeled BC as an unknown (x or y, etc.) but did not draw a perpendicular line from A to DC.
- (D) I guessed.
- (E) none of these
- 35. Which of the angles below has a degree measure that can be determined?



(Note: Figure is not drawn to scale.)

- (A)  $\angle WOS$
- (B) ∠SOU
- (C)  $\angle WOT$
- (D)  $\angle ROV$
- (E)  $\angle WOV$

- 36. How did you get your answer?
  - (A) I first said that 4a + 2b = 360, got 2a + b = 180, and then looked through the choices.
  - (B) I looked through the choices first.
  - (C) I knew that the sum of the angles added up to 360° but didn't know where to go from there.
  - (D) I guessed.
  - (E) none of these

This is the end of the Strategy Diagnostic Test for the New SAT. You've answered the questions in both the Verbal and Math sections, and you've recorded how you arrived at each answer.

Now you're ready to find out how you did. Go right to the table that follows for answer checking, diagnosis, and prescription.

Remember, the questions are in pairs: the oddnumbered ones are the questions themselves; the evennumbered ones, the approach you used to solve the questions. If either or both of your answers—solution and/or approach—fail to correspond to the answers given in the table, you should study the strategy for that pair.

The table also gives the SAT score increase that's possible if you master that strategy. The approximate time it should take to answer a particular question is also supplied. By using the best strategies throughout the actual SAT, you should increase accuracy, make the best use of your time, and thus improve your score dramatically.

*Note:* If the even-numbered answer (for questions 2, 4, 6, etc.) does not match with your answer, you may want to look at the approach described in the answer, as you may be able to use that approach with other questions.

# DR. GARY GRUBER



For over 40 years, Dr. Gruber has been recognized nationally as the leading expert on standardized tests and originator and developer of the critical-thinking skills necessary for use on them. It is said that no one is better at assessing the thinking patterns of "how" a person answers questions and providing the mechanism to improve faulty thinking approaches.

#### **Dr. Gruber's Mission**

Dr. Gruber's lifelong mission has been to get the nation to be passionate about problem solving and to develop and hone critical-thinking abilities to last a lifetime.

#### Dr. Gruber's Story

In fifth grade Dr. Gruber received a 90 IQ score (below average). His father, a high school teacher at the time, was concerned but able to get a copy of the IQ test. His hope was that his son could study and increase his score. However, when the young Gruber looked at the test he became fascinated with what exactly the questions were trying to assess. As he attempted to figure out which strategies and thinking skills he should have used the first time around, he quickly uncovered an interesting pattern. Two years later, when his IQ was again tested, Gruber had increased his score to 126. Several years later that score soared to 150 (genius level). Later, *The Washington Post* would call him "America's Super Genius."

The initial experience of scoring so low on his first IQ test and being branded "dull-minded" actually spurred his fascination with standardized tests. He became determined to afford all other students the knowledge and experience he had gained so that they might show their true potential. Dr. Gruber continues to write books, newspaper articles, magazine articles, and columns. He also continues to personally teach students and teachers his innovative test-taking techniques.

#### Dr. Gruber's Achievements

Dr. Gruber's SAT score improvements with students have been documented to be the highest in the nation. His unique methods have been used by the Public Broadcasting Service (PBS), Sylvan Learning Centers, and Grolier's encyclopedias, and his techniques continue to be used by school districts throughout the country, in homes and workplaces across the nation, and by a host of other entities. PBS observed that he spreads contagious enthusiasm to his audiences. Most recently he has trained the University of California's teachers to create programs for specific critical-thinking and problem-solving skills for the minority programs. Holding a doctorate in physics, Dr. Gruber has published more than 40 books with major publishers on test-taking and critical-thinking methods, with more than 7 million copies sold. At one point, three of his books were listed among the 30 top-selling trade paperback books in the nation. His books have been translated into Chinese, Russian, and Korean.

Established in 1981, Davies Publishing Inc. has a long history of publishing landmark works in medicine, surgery, and diagnostic imaging. It is currently a leader in education, test preparation, and continuing education in diagnostic medical sonography. Now we are excited to be extending our reach to students bound for college and graduate programs. We never forget that it is a privilege to help our customers succeed in both learning and life.

**Dr. Gary Gruber** is nationally recognized as the leading expert on test prep, test-taking methods, and critical-thinking skills. His acclaimed books have sold more than 7 million copies. Visit drgarygruber.com.

College-bound students are blessed—and likely confused—by the abundance of available SAT<sup>®</sup>-prep books. Most are published by big-box corporations that measure their success by market share, return on investment, and other business metrics. The authors tend to be corporate staff and writers-for-hire. The books are sold by size and even weight (really). The approach is familiar: drilling, and more drilling.

This book is different.

GRUBER'S COMPLETE NEW SAT® GUIDE 2018 is the culmination of one man's life's work. Gary Gruber has devoted his life to developing the critical-thinking skills and strategies that have been proven to increase your score. He has given millions of test-takers the tools to solve even the hardest problems in the fastest, easiest ways. For Dr. Gruber, this is not business; it is personal. Here you will find no useless tricks, gimmicks, fake strategies, or untested tips and advice. Master Dr. Gruber's 37 essential strategies (each amply illustrated by SAT®-equivalent examples), perfect your use of them in his two practice tests, and you *will* increase your score. Guaranteed.\*

#### Gruber's Complete SAT® Study Guide Highlights:

The World's Shortest New SAT<sup>®</sup> Practice Test—estimate your score in only 20 questions \* A Complete Diagnostic Test that reveals your strengths and weaknesses \* The 101 most important math questions you need to know how to answer \* 19 easy-to-learn Math Strategies for solving every problem type, breaking it down to its simplest form \* A Mini Math Refresher and a Complete Math Refresher \* 13 Verbal Strategies to sharpen your reading comprehension and vocabulary \* 250 Most Common SAT<sup>®</sup> Vocabulary Words \* Refreshers to help you master the SAT<sup>®</sup> basics \* The Gruber Prefix-Root-Suffix List that unlocks the meanings of more than 150,000 words \* Complete practice tests with explanatory answers keyed to the Gruber strategies and basic skills \* Why you got questions wrong—and how to get them right \* Exclusive 4-hour study program for the week before the test

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