PREPARATION MATERIAL FOR THE GRADUATE RECORD EXAMINATION (GRE)

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PROJECT 1000:
The Second Thousand

What are some practical tips to help prepare students for the GRE general test?

a. Read the free official *GRE Registration & Information Bulletin* you use to register for the test carefully and completely. It contains a great deal of valuable information, but its prose is very terse and economical with words. Some of the most important tips are given almost in passing. We suggest therefore that you read every word of the bulletin and outline all information related to preparing for the GRE. Pay particular attention to the sections on "Registration", "Taking the GRE Tests", "Score Reporting", "Preparing for the Tests", "Test-Taking Strategy", "General Test Sample Questions with Explanations", and "Practice General Test."

b. Take the GRE general test and, if required by the programs/universities to which you will be applying, the GRE subject test in your field no later than the December preceding the Fall semester for which you are seeking admission to graduate school. Project 1000 strongly encourages you to take the GRE general test either in June between your junior and senior years (when most students are not taking classes and thus have plenty of time to prepare for the test without major distractions) or in October of your senior year (when if something goes wrong unexpectedly such as a sudden illness you can still take the test in December in time for your application to graduate school to be complete before most graduate program deadlines).

c. If at all possible, begin preparing/studying for the GRE at least six weeks to two months prior to the date on which you plan to take the test. Be sure to register for the test even earlier in order to avoid missing the registration deadlines (printed on the back cover of the official *GRE Registration & Information Bulletin*). Try to commit at least an uninterrupted 30 minutes every day. It is generally more effective to work every or nearly every day for at least a few minutes than to work less often for larger amounts of time. Try to avoid having to "cram" a few days before the test date since this is considerably less effective than a more paced effort over a longer period of time. Nevertheless, generally speaking *any* preparation is an improvement over no preparation at all. Because the test presumes a certain familiarity with directions, question and answer formats, test procedure, and the parameters of the material being tested, you will be at a disadvantage compared to other test-takers if you do not make a reasonable effort to orient yourself to the test as fully as practicable.

d. Most experts agree that the best form of practice for the GRE is trying to answer actual old test questions under simulated circumstances. This form of practice familiarizes you implicitly with the test-taking situation, the type and range of subject material that will be covered, and test directions. It also allows you to experiment with and practice different strategies/approaches to analyzing and answering the questions asked (for example, skimming the questions in the reading comprehension portion of the verbal ability section before reading the passage itself versus reading the passage thoroughly first then the questions or skimming both the reading passage and questions before thoroughly reading the passage, etc.). Different strategies are more effective than others for different people; whatever helps you answer the most questions correctly within the time allotted is the most effective strategy for you. The only way you can hope to find out what strategies work most effectively for you is to experiment with various approaches to actual old GRE questions and to analyze the results *before* the test date. Areas you need to work on more than others (such as, for example, how to use the Pythagorean theorem to help solve a geometry problem or what is the meaning of "saturnine") will become readily apparent. Practice with simulated testing situations should also help to greatly reduce test-anxiety.

After each simulated testing session be sure to review carefully the questions you were unable to answer correctly until you understand both how to answer the question correctly and expeditiously and why you answered it incorrectly. Look up all mathematical formulae or vocabulary words you encounter that you

do not know. One possible schedule you may wish to try is to take one 30 minute verbal, quantitative, or analytical ability section on the first day (being sure to time yourself). The next two days you might check your answers to see whether they are correct and figure out both why you failed to answer correctly the incorrect ones and how the correct answers can be arrived at as expeditiously as possible. On the fourth day, if you have finished reviewing your first practice section, you would be ready to take another section under simulated testing conditions. After you have repeated this process several times, having taken and carefully reviewed several sections each of analytical, verbal, and quantitative reasoning, you may want to start concentrating on the section(s) which give(s) you the most difficulty and/or those sections most important to the academic field in which you intend to study (for example, the quantitative section for mathematics or engineering, the verbal section for English literature or history, the analytical section for philosophy, etc.). You may also determine at this point whether or not you need to spend time doing a basic math review.

e. The free official *GRE Registration & Information Bulletin* has one section each of verbal ability, quantitative ability, and analytical ability old test questions taken from previously administered actual GRE general tests. Additional actual old GRE general tests may be ordered directly from the Educational Testing Service (publishers of the GRE) using the "GRE Publications Order Form" found in the back of the official *GRE Registration & Information Bulletin*. They are available in both printed (approximately $15 for 1992-93) and software (approximately $80 during 1992-93) forms under the name *Practicing to take the GRE General Test*. In addition to six actual GRE general tests with answers, the printed version of this series now (#9 on but not earlier editions) also includes one additional test with explanations and a math review section. Older editions (#8 and earlier) of the printed version provide three additional old actual GRE tests, but without the math review or any explanations of how to arrive at the correct answer given. The software version has included the latter for some time. When ordering be careful not to confuse the various subject test practice booklets with those of the general test. Please note that although many commercial vendors have GRE preparation booklets of varying comprehensiveness and utility for sale, only GRE/ETS own the copyright to actual old GRE questions. Other companies must write their own simulated questions in an attempt to replicate the copyrighted actual GRE test. If at all possible, you should try to practice with actual old GRE questions. To save money, you may want to pool your resources with friends and order *Practicing to take the GRE General Test* to share with them or buy it yourself with a prearrangement to resell it to someone else who will be taking the test later than you (after you have already taken the test and no longer have need for it).

f. The quantitative ability section of the GRE General Test includes *only* arithmetic, algebra, and geometry (*excluding* the ability to construct proofs). It does *not* include or require any trigonometry or calculus. The math review sections of the free official *GRE Registration & Information Bulletin* and especially the more detailed official *Practicing to take the GRE General Test* (official printed version #9 or later or any official software version) sold by GRE/ETS are excellent places to start your review. Most of the commercial guides available also have excellent math review sections. The advantage of using a math review designed especially for the GRE is that it helps you save time and effort by focusing immediately on what you need to know to do well on the test without wasting any time on the innumerable things you do *not* need to know to do well on the quantitative ability section of the GRE general test.

g. The analytical ability section of the GRE general test requires *no* knowledge of formal logic or the terminology of formal logic. To quote p. 31 of the 1992-93 official *GRE Registration & Information Bulletin* "analytical reasoning problems can be solved using knowledge, skills, vocabulary, and computational ability (simple addition and subtraction) common to college students." However, because many students at first find the questions in both the analytical reasoning and logical reasoning sub-sections of the analytical ability section of the GRE general test unusual at best and somewhat bizarre at worst, it is essential that you familiarize yourself with the format of the questions and expected answers. The only effective method doing this that Project 1000 can suggest is for you to practice these questions for as long as necessary until you are comfortable with the format and can answer them reasonably confidently, accurately, and expeditiously.

h. Knowledge of cognates (the thousands of words that are similar in meaning and spelling in both English and Spanish due to their derivation from a common ancestor in Latin) is a resource that students with some degree of fluency in Spanish may find helpful with the verbal section of the GRE general test. For example, some words that are relatively uncommon in English (such as "felicity") have cognates that are much more frequently used in Spanish (in this case, "felicidad"). Be careful, however, of "false cognates" (for example, "éxito" in Spanish means "success" *not* "exit" or "leave") which may be the result of coincidences in spelling between the two languages or the evolution of meanings over time. A knowledge of prefixes, suffixes, and word roots derived from Latin that are common in English (and Spanish) can also help you figure out the meaning of words you otherwise are unfamiliar with.

i. When practicing with actual old GRE test questions be sure to learn the distinctly different question and answer format of each sub-section of the three major sections of the GRE general test. More specifically, learn carefully the different rules, expectations, and answer formats of the "Analogies", "Antonyms", "Sentence Completions", and "Reading Comprehension" sub-sections of the Verbal Abilities section; the "Quantitative Comparison", "Discrete Quantitative", and "Data Interpretation" sub-sections of the Quantitative Abilities section; and the "Logical Reasoning" and "Analytical Reasoning" sub-sections of the Analytical Abilities sections of the GRE general test. Familiarity with these sub-sections will save you time during the test that you can use either to answer more questions or to have more time to think about the answers to difficult questions.

j. Pace yourself carefully when taking the test. Your GRE general test score is determined entirely by the number of correct answers that are recorded on your answer sheet. Every single question answered correctly no matter how simple it was to answer counts exactly the same toward your score as the most difficult question to answer. It only makes sense therefore that you should first answer the questions that take the least time and seem easiest and save the more difficult questions for last. You may then want to consider dividing the difficult questions into two categories: (1) those you have no idea how to answer or do not have enough time remaining to answer; and (2) those you can probably answer correctly, but need time to do so. It's probably a good idea to guess outright the answers to #1 while working through those in #2 until you determine the answer. Do not spend too much time on any one question, however, unless you have answered all the others first! You may find it helpful to know that generally speaking questions are ordered from easiest first to most difficult last within each sub-section (be sure to note however that there are two to four sub-sections within each 30 minute section—each subsequent sub-section beginning over again with the easiest first). Needless to say, what one person finds easy another may find difficult and vice-versa.

k. There is no penalty or subtraction from your score for wrong answers on the GRE general test (*although there is on the GRE subject tests which unlike the GRE general test require a more restrained guessing strategy*). Because every correct answer on the GRE general test counts exactly the same toward your final scores, and because there is no penalty for wrong answers, you should never leave the answer "bubble" blank for any question. If you do not know the answer to a given question, or do not have enough time remaining to answer the question, you should guess. If you are able to eliminate one or more possible answers, record your best guess on the answer sheet. For all questions that you do not have enough time to even look at or for which you cannot eliminate any of the possible answers, you should consistently enter the same answer. This should be your choice of "A", "B", "C", or "D" (do not guess "E" unless you have already eliminated some other choice or choices because it is an option on only some questions). Since the test is designed so that there are roughly an equal number of "A"s, "B"s, "C"s, and "D"s, guessing the same "favorite" letter every time you do not know the answer or cannot eliminate any of the possible answers should answer approximately 25% of these questions correctly. Depending on how many questions you are forced to answer by guessing in this manner, the positive effect on your score as opposed to leaving them blank could be quite significant.

l. Project 1000 participants are invited to attend free workshops on preparing for taking the GRE to be held in select cities across the nation (travel will be at the student's own expense). Call Project 1000 staff for information regarding sites and dates.

m. Do not be discouraged if even after repeated practice you are unable to answer all questions in a given section within the 30 minutes allotted. The test is designed so that *most* test-takers will not have enough time to comfortably answer every question. After careful practice, learn to answer as many questions on the GRE general test as you can and to effectively guess answers for the rest. Keep in mind that the test is designed so that nearly half the people taking the test will answer less than half the questions correctly.

n. Relax as much as possible and remember that the GRE is only one of many factors that are considered in graduate school admissions.

When is the best time to take the GREs?

It is strongly recommended that you take the GRE general test in the Fall preceding the year for which you are trying to gain admission rather than in the Spring immediately prior to the semester of planned admission (and even better still during the June between your *junior* and senior years). The best time to take the GRE subject test (if required by the programs to which you are applying) is during December of your senior year (unlike the GRE general test your scores should improve the more you learn, but you cannot take it any later and still have the scores reported in time to meet most graduate school application deadlines). Higher percentages of Hispanic students take the GRE later in the year than Anglo students. This is not the best strategy because it greatly reduces the opportunities to be admitted into selective graduate programs and especially to receive financial aid if admitted.

Can Project 1000 help with the cost of the GRE?

The Graduate Records Examinations Board provides Project 1000 with a limited number of vouchers which can be submitted to GRE/ETS *in lieu of payment* of their standard fees for taking the general test, taking the subject test, and requesting additional score reports. Eligibility for these fee waiver vouchers is based on both eligibility for Project 1000 and financial need. If you have been receiving financial aid as an undergraduate student or if you have been out of school for several years and your working income has been low, you may be eligible. To be considered, please complete your GRE registration form, attach a copy of your GAPSFAS or other Financial Statement, and send it to Project 1000. If Project staff determine that you are eligible for a Project 1000/GRE fee waiver voucher, we will forward your GRE registration form with a fee waiver voucher directly to GRE/ETS for processing. Conversely, if Project staff determine that you are ineligible for a Project 1000/GRE fee waiver voucher, we will return your GRE registration form directly to you. In the latter circumstance, you then would need to send your GRE registration form *with payment* directly to GRE/ETS. IMPORTANT NOTE: Since it will take several weeks to receive, review, and forward or return your GRE registration form and fee waiver request, be sure you send them to us *well before the registration deadline* for the date you wish to take the GRE. Please contact Project 1000 (1-800-327-4893) if you have any questions about this procedure or would like additional information about GRE fee waivers.

Test-Taking Tip Sheet

General

This is one of a series of test-taking tip sheets developed to provide Latino and other Hispanic students with important information about preparing for standardized tests. This tip sheet provides general information. All of the tip sheets have been written by Educational Testing Service (ETS) staff members experienced in the development of tests, in collaboration with representatives of the ASPIRA Association, Inc. Other separate tip sheets provide information on analytical, reading, verbal, writing, and quantitative questions.■

By the time you have reached college, you have probably taken several standardized multiple-choice tests. You are likely to remember your elementary and high school teachers administering those tests in your classroom. Through such experience, you have probably learned that tests are important because they let you show how much you have learned over the years or in a particular course. At this point, you may be thinking about becoming a teacher or going on to graduate school — perhaps business, law, or medical school. In most cases, you will have to take at least one standardized test as you pursue your goal. What follows is some basic information that you should have to increase your chances of doing well on any standardized test you may need to take now or in the future. The best preparation, however, remains good solid academic courses taken with enthusiasm.

■ Be a good consumer

The best source of information about a particular test is usually the test maker. Most test publishers today provide either free or at a modest cost copies of actual tests that have been given previously. Make sure you have at least one of these disclosed tests. Be sure to review it and any other material provided by the publisher. *This is important!*

Know what the test is supposed to measure and what it is *not* supposed to measure. Know how the agencies and/or schools to which you are applying use the test. For example, is there a cut score — i.e., a score below which your application or certification will not be considered? If so, set your desired score above, not at, the minimum required. Thus, your strategy in preparing for the test allows for encountering more difficult items than you had anticipated.

Plan to do your best the first time you take the test. There are several reasons for this suggestion. First, it saves you time and money. Second, if you don't do much by way of preparation in the interim between two tests, it is unlikely that your score will increase, and it could *decrease*. Finally, unless you are required to reach a certain minimum score, as, for example, with examinations that are used nationally for teachers, schools are generally encouraged

to average your two scores, rather than simply take the higher score.

Once you have a sense of why you are taking the test, what it measures, and what score you are aiming for, it is time to begin preparation. The next section is divided into three parts: what you should do *before* taking a test, what you should do *during* a test, and what you should do *after* taking a test.■

■ Before the test

You should have in hand the most up-to-date information on the test you will be taking. You need the testing program's bulletin of information for the current academic year. It is vital that you have the current version of the bulletin because it will reflect any changes that have been made in the test.

Assessing your strengths and weaknesses

Becoming familiar with the types of questions on the test increases your confidence. Also, some question types seem complex if you first see them in the actual testing situation. To take a sample test, spend some time each day sitting at your desk with a timer. Take one section of the test in the time allocated. Put the test away and go on with other activities. The next day, find the answer key and score the section. Try to determine why you got the correct answers and why you got the incorrect ones. On the third day, take another timed section. On day four, score it and try to determine again why you answered correctly or incorrectly. Continue this way until you have finished the entire test. Then compute your score using the information provided with the test you are using. At some point you should begin to spot patterns to your responses. For example, are you good at determining the tone of a passage, but not very good at inferences? Are you terrific with fractions, but terrible with the placement of decimal points? You may discover that what you thought were your weaknesses are not really your weaknesses at all. Work hard defining your problem areas.

Once problem areas are identified, you need to decide if the test contains enough of those types of questions to make it unlikely that you would score well. If so, try to practice that question type as much as possible. Consider going to the reading, writing, or math skills center and asking for help. This leads to an obvious point that is often overlooked. *Don't procrastinate* in taking the sample test. The earlier you identify strengths and weaknesses, the longer you have to work on any problems.

Getting prepared

If you haven't had mathematics in a long time or if you have been using a calculator or the computer to do high-level math, consider a math review. Most standardized tests at the graduate level require arithmetic, first-year algebra, and plane geometry, *not calculus*. Your review of the practice test may have already made you aware of this.

Know the time allocated for each section, how many sections there are in the test, and what the time "feels like." Practicing with this in mind should be helpful to you.

Make sure you completely understand the directions with the help of the bulletin of information. Some question types have lengthy and complex directions. Not knowing them well before you take the test cuts down the time you can give to working on the questions themselves. This is particularly true with the analytical question types that are a part of the Graduate Management Admission Test, the Graduate Record Examinations General Test, and the Law School Admission Test.

Make sure you know prefixes and suffixes so you can guess intelligently at words you do not know. Here are some; consult a good grammar book or an English professor for others.

Prefixes

a = not
bio = life, living things
co = with
de = away from
ex = out, former
inter = between
micro = small
omni = all
peri = around, about
retro = backward, back, behind
syn = together, with
trans = beyond, across
ultra = beyond, very much

Suffixes

ary = pertaining to
ance = state of being
ee = one who is
ic = like, made of
ier = one who does
ology = study of
tude = condition, state of being

Find out what materials you may and may *not* take to the testing site. You probably will need several No. 2 pencils and a watch. You probably will *not* be permitted to take a calculator, extra blank paper (write directly in the test book), or any materials for last-minute cramming. In many cases, photo identification may be necessary. *Don't forget your admission ticket!*

Find out whether there is a penalty for guessing. The bulletin of information should provide this information. If there is *not*, then be sure to fill in an answer to *every* question. You have nothing to lose since no points will be subtracted. If there is a penalty for guessing, by practicing on the sample test you can find out how good a guesser you are. For many tests you lose one-third to one-fourth of a point for each wrong answer. This total is then subtracted from the actual number of questions you answered correctly in determining your score. Most sources indicate that if you can narrow the possible answers to two, you increase your chances of getting the right answer. This does little good, however, if you are a terrible guesser. Find out before the actual test. Then either find some ways to improve your guessing ability or decide, by reviewing your guessing pattern, approximately how many questions you can afford to guess.■

■ During the test

Get to the test site *early* — perhaps a half hour before the time you are required to report. This gives you a chance to find the testing room, relax, and become aware of any unanticipated circumstances like a room that feels cold, a shortage of left-handed desks, and so forth. The test center supervisor may then be able to meet your needs.

Work carefully on the designated test section. Remember, since you have to read a question in order to find out what it's asking and what the answer choices are, you should simultaneously make a determination on whether:

1) You know the answer and should immediately mark the answer sheet, or
2) You think that if you have enough time you can get the answer, or
3) There is *no way* you have any idea of what is being asked.

For the sake of organization, for situations (2) and (3) you may want to consider making two types of marks in your test book — for example, a pencil dot if you think you can answer with enough time and a minus sign where it appears hopeless. Remember, if there is no penalty for guessing you are going to answer every question anyway, so the minus sign is just a way of reminding yourself where these questions are.

For the section you are working on, save a few minutes to go back to questions that need more time. Five minutes should be enough. In cases where there is *no* penalty for guessing, use the last 30 seconds before time is called to make sure that for each question you have filled in a space on the answer sheet.

Do *not* let other test takers distract you from your task. Those who receive your scores do *not* know if you finished first or last. This is *not* the time to worry about whether someone else has finished before you.■

■ After the test

It is hoped that following the suggestions above will help you have a wonderful test-taking experience. But if you feel you did *not* do your best because you were sick or too nervous or not well enough prepared, consider canceling your scores. This can generally be done by speaking to the test center supervisor or by contacting the test maker within a few days after the test. You should realize, however, that your answer sheet will *not* be scored at all, and, in some cases, the institutions you have designated will receive your name on the score roster with a notation that your scores were cancelled. Check your bulletin for information about score cancellation.

If you are a junior and taking the test early, consider having the scores sent only to you. This will give you the chance to review your scores in light of your goals and consider whether you earned a score that you feel is in line with your abilities. You should be aware, however, that if you have your scores sent just to you, you will probably have to pay additional fees for score reports to be sent to the agencies and institutions you want to receive them. In any case, if you have used the available practice tests under timed conditions, you may not need to use this option since you should have a fairly good idea of how you are likely to perform on the actual test before you take it.

If it is available, consider ordering a copy of the actual test you took and a copy of your answer sheet. You can review your performance, and you may find the review useful in preparing for your next standardized test.

Use the following list to get information about some of the major standardized tests:

Graduate Management Admission Test
(GMAT)
P.O. Box 6101
Princeton, NJ 08541-6101
(609) 771-7330

Graduate Record Examinations Program
(GRE)
Educational Testing Service
P.O. Box 6000
Princeton, NJ 08541-6000
(609) 771-7670

Law School Admissions Council
(LSAT)
Box 2000
Newtown, PA 18940-0998
(215) 968-1001

Association of American Medical Colleges
(MCAT)
Suite 200
One Dupont Circle, NW
Washington, DC 20036
(202) 828-0400

Teacher Programs and Services
(NTE)
Educational Testing Service
Box 6051
Princeton, NJ 08541-6051
(609) 771-7670

This test preparation tip sheet was originally prepared by Carole D. Slaughter of Educational Testing Service at the request of the Steering Committee for the HBCU-ETS Collaboration. Inquiries may be addressed to the Office of the Corporate Secretary, Educational Testing Service, Princeton, NJ 08541.

Information about the programs and services provided by ASPIRA can be obtained from the ASPIRA Association, Inc., 1112 16th Street, NW, Suite 340, Washington, DC 20036

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HO 1.2

WHAT WOULD YOU DO?

Read each statement carefully; decide whether each is true or false. To indicate your answer, circle "T" for true or "F" for false.

T F 1. Test questions should be answered in order no matter how long it takes for each answer.

T F 2. You don't need to bother with the directions given within the test. It's easy to figure out what to do without reading the directions.

T F 3. If there is time left after finishing the test, you should review your answers, even those you weren't sure of.

T F 4. Even though there is a time limit on the test, it's okay to spend as much time as necessary on each question.

T F 5. When you're not sure of the answer to a question, you can sometimes eliminate choices and then guess from the remaining choices.

T F 6. With a multiple-choice question, you don't need to read all the possible choices before answering.

T F 7. After answering each question, it's a good idea to make sure you have marked the answer you meant to mark on your answer sheet.

T F 8. The more nervous you are while taking a test, the better your chances of getting a good score.

T F 9. You are in the testing room. The test supervisor has just explained about taking the test and asks, "Are there any questions?" You should not ask questions if no one else does.

T F 10. Suddenly you realize that you marked the answer to question 25 opposite number 24 on your answer sheet. This means that you probably skipped an answer somewhere and you should go back to find where.

Answers to WHAT WOULD YOU DO?

1. FALSE. Test questions should be answered in the order they appear until you come to a question that you can't answer or aren't sure of. You should leave that question blank and go on to questions that you can answer. If you have time, you can go back to that question and spend more time on it later. Spend your time on the questions that you are most likely to get right.
2. FALSE. It's important to be very sure that you understand the directions given on the test; otherwise, you might be giving wrong answers to questions when you really know the answer. You should become familiar with the directions before the test, and then you need only read the directions quickly to be sure of the kind of questions to expect.
3. TRUE. Use every available minute to review the test and to work on the more difficult questions.
4. FALSE. You should pace yourself so that you spend your time on the questions that you have the best chance of getting correct. Within each question type, the easier questions come first, except for reading comprehension questions. Some question types take longer to answer than others. (Later in this course you will learn how to pace yourself during the PSAT/NMSQT.)
5. TRUE. This is a good way to increase the chances of picking the correct answer, even when you don't know the answer.
6. FALSE. Often, multiple-choice question directions tell you to pick the best answer. You have to read all of the choices to be sure that you have picked the best answer.
7. TRUE. If you are not careful to mark the answer in the right place, the scoring machine will count your answer wrong even though you knew the right answer. Check often to be sure that you are answering the same number question that you are marking on the answer sheet.
8. FALSE. A little anxiety may help you do better by focusing your attention on the test, but very high anxiety may have the opposite effect, making you worry about the test and how you are doing instead of using your energy to work on the test questions. (If you think you have a problem in this area, ask the teacher to help you with some of the information that is provided with this course.)
9. FALSE. Ask questions until you are sure you understand what you are to do with the test. The supervisor can't help you with the answers, of course, but he or she has the responsibility to explain anything about the oral directions or the testing situation that is not clear to you.
10. TRUE. Otherwise, the answers that are in the wrong place will probably be scored as wrong. If you don't realize that this has happened until the end of the test, you should tell the test supervisor.

HO 3.2

FOLLOWING DIRECTIONS

Let's check up on your ability to read and follow directions. The exercise below is a special set of tasks to see how good you are at following directions. You will need a sheet of paper to work on.

Directions:

1. Read all of the directions before doing anything else.
2. Write your name in the upper right-hand corner of the paper.
3. Fold the paper in half lengthwise.
4. Write your name on the outside of the folded paper.
5. Print the letters of the alphabet beneath your name.
6. Add these numbers and print the sum beneath the alphabet: 2, 32, 6, 90, 45, 209.
7. Open the paper up and write your teacher's name.
8. Write your date of birth beneath your teacher's name.
9. Place your folded paper on the floor.
10. Do not do anything asked for in 2 through 9. Raise both hands high and smile. Do not say anything.

HO 12.1

TIMING AND PACING

1. Set up a schedule for progress through the test (or test section). Know when you should be one-quarter of the way through and one-half of the way through the test. Every now and then, check your progress against your schedule.
2. Begin to work as soon as the testing time begins. Keep your attention focused on the test. Don't daydream.
3. Answer questions you are sure of first; mark those you are unsure of in the test book so you can easily locate them later. Don't ponder over alternatives on this first pass through the test. Be sure that you skip the same number on the answer sheet for the question that you skipped.
4. Go back and try the questions you skipped, using guessing strategy if necessary.
5. In the last few minutes, check your answers to avoid careless mistakes.
6. Check your answer sheet to make sure that there are no stray marks and that all erasures are clean.

HO 23.1

SUMMARY OF TEST-TAKING STRATEGIES

1. **Getting ready**
   a. Get plenty of sleep the night before the test. "Cramming" won't help.
   b. Don't take the test hungry. Eat your breakfast.
   c. Be on time and be alert.
   d. Bring your watch and several sharpened No. 2 pencils.
   e. Put everything else out of your mind and think only of doing your best.
   f. Dress comfortably.
   g. If you wear glasses, be sure you have them and wear them!
   h. Visit the bathroom before the test begins.

2. **Getting into a good mind-set for taking the test**
   a. Be alert, but calm—no one test is that important. Panic will not help!
   b. Remember that the results of the PSAT/NMSQT can be helpful to you and your school in planning your education.
   c. Try to do your best without getting tense.
   d. Memory lapses are normal. If you "block" on a question, go on and come back later if you have time.
   e. Don't expect to be able to answer every question on the test. There are usually some hard questions that even the best students find very difficult.
   f. Don't be upset if there are questions on skills that you have not learned yet. You don't need to get every question right to get a good score.
   g. Don't be afraid to mark an answer if you think it's right—even if you're not 100% positive.

3. **Following directions**
   a. Listen carefully (standardized tests contain important directions that are read aloud).
   b. Be sure you understand the written test directions before answering questions.
   c. Pay close attention to directions concerning time.
   d. Be sure you understand what you are to do and how you are to respond to the test.
   e. If you don't understand the directions, ask the supervisor immediately for clarification.

4. Using the answer sheet

a. Understand the proper way to mark responses (if this is not clear, immediately ask the supervisor).

b. Select the correct answer and mark it in the correct space on the answer sheet. Mark quickly and neatly. Check to see that the number on the answer sheet and the number of the question match.

c. Mark no more than one answer on a single multiple-choice question.

d. Don't make stray marks on the answer sheet, and erase answers completely when changing them.

e. Be sure to keep your place in the test book and on the answer sheet. If you skip a question on the test, be sure to skip the corresponding space on the answer sheet.

5. Using time efficiently

a. Set up a schedule for progress through the test (or test section). Know when you should be one quarter of the way through, and one half of the way through the test. Every now and then, check your progress against your schedule.

b. Begin to work as soon as the testing time begins. Keep your attention focused on the test. Don't daydream.

c. Answer questions you are sure of first; mark those you are unsure of in the test book so you can easily locate them later. Don't ponder over alternatives on this first pass through the test. Be sure that you skip the same number on the answer sheet for the question that you skipped.

d. Go back and try the questions you skipped, using guessing strategy if necessary.

e. In the last few minutes, check your answers to avoid careless mistakes.

f. Check your answer sheet to make sure that there are no stray marks and that all erasures are clean.

6. Guessing strategy

a. Guess only after you've tried your best to answer the question.

b. Eliminate one or more answers that you know are wrong. Cross them out in your test book, so you can see clearly which choices are left. If you cannot eliminate one or more answers, guessing will probably not be to your advantage.

c. After you have eliminated the choices that you know are wrong, guess from the remaining answer choices; your chances of getting the correct answer are improved.

7. **Miscellaneous**

   a. Don't be afraid to change an answer if you feel you should. Sometimes you remember something or better understand the question, and your second response is better than your first.

   b. Read each choice before marking the answer sheet.

   c. Don't worry about others and their performance, concentrate on the test and on doing your best.

   d. For the PSAT/NMSQT use your test book NOT your answer sheet for making calculations, outlines, etc.

RELAXATION TECHNIQUES

If your test-taking performance is less than it should be because of tension, relaxation exercises may help. Just as your body tenses in response to threats, your relaxation mechanism can work to calm you. When the relaxation response occurs, your rate of breathing slows, your heartbeat slows down, blood pressure is reduced, and your extremities feel warm. Relaxation can be practiced effectively by everyone.

Relaxation techniques must be practiced over time in order for them to be effective. This means that you should practice these methods for several weeks before taking your test. Relaxation can be achieved with three basic exercises: muscle relaxation, breathing exercises, and concentration. You can practice these exercises regularly when a few minutes of quiet and relaxation seem like a good idea, and when the time comes to take the test, you'll be ready.

Muscle relaxation

First, get quiet and comfortable. Dim the lights and stretch out on your floor, sofa, or bed.

Close your eyes. Now, think about your feet. Wiggle your toes. Now, relax your feet. Just let them go loose.

Now, think about your lower legs. Let them go loose. Now, think about your upper legs. Let them go loose.

And so on, with lower body, chest, fingers, lower arms, upper arms, and especially your shoulders and neck.

Do this slowly, especially at first. If you have difficulty relaxing any muscle groups, try tightening or tensing them first for a count of three. Then, wiggle or shake the body part and turn it just as loose as you can. Do the same for each of the muscle groups.

You might also add jaw muscles, eye muscles, and forehead to the list. Clench the jaw, then allow it to hang loose. Turn your eyes to one side as far as possible, then close and relax them. Make as severe a frown with your forehead as you can, then relax.

Breathing exercise

Once you have relaxed your whole body, focus on your breathing. Breathe slowly through the nose. Notice the feelings of relaxation that you experience as you breathe deeply.

Concentration

Now, close your eyes. Breathe as slowly and as deeply as possible. Exhale slowly and fully, and each time say to yourself, "one." Do not count; just say the word "one" over and over with each exhalation. Don't work at this; it should be done in an easy fashion, without thinking.

The saying of "one" is just a device to keep you from thinking of other things. The breathing is directly opposite to the breathing pattern of anxiety, as is the quiet environment and the direct relaxation of muscle groups.

After several practice sessions, it may not be necessary to go through the steps of consciously thinking of all the muscle groups and relaxing them. The special breathing technique will tend to take care of that after some practice. By the time you get to the test, you should be able to close your eyes, start breathing properly, and say the word "one" to yourself. By doing this, you should find that you can lower your tension level very quickly.

During a long test, tension often builds. You can pause for a few seconds occasionally and relax before going on.

Note: Once you become familiar with this three-part exercise (relaxing, breathing, and concentrating), you can use it whenever you are in an anxiety-producing situation. Try it out to see how it works for you. While you won't be able to dim the lights and stretch out on the floor in the test room, your skills at relaxing, breathing deeply, and concentrating will help you focus on the test.

GETTING INTO A GOOD MIND-SET FOR TAKING THE TEST

1. Be alert, but calm—no one test is *that* important. Panic will not help!
2. Remember that the results of the PSAT/NMSQT can be helpful to you and your school in planning for your education.
3. Try to do your best without getting tense.
4. Memory lapses are normal. If you "block" on a question, go on and come back to it later if you have time.
5. Don't expect to be able to answer every question on the test. There usually are some very hard questions that most students find difficult.
6. Don't be upset if there are questions on skills that you have not yet learned. You don't need to get every question right to get a good score. PSAT/NMSQT test takers who answer about half the questions right score near the national average.
7. Don't be afraid to mark an answer if you think it's right—even if you're not 100% positive.
8. Don't be afraid to take chances—use the guessing strategy you've learned.

GRE General Examination

	Paper and Pencil	Computer-Adaptive
Mode of Test Delivery	Questions (and if appropriate, stimulus material such as reading passage) presented in traditional test booklet	Questions (and stimulus material) presented on computer screen; for passages, scrolling is necessary.
Mode of Indicating Answers	Answer to each question indicated by bubbling-in oval on answer sheet	Answer to each question indicated through clicking on mouse; each answer verified by clicking on mouse
• Question Types		
Verbal	Antonyms, analogies, sentence completions, reading comprehension	Same
Quantitative	Problem solving, quantitative comparison	Same
Analytical	Logical reasoning, analytical reasoning	Same
Number of Scores Generated	3: V, Q, A	SAME
Scale of Scores	200—800	SAME
Numbers of Sections	6 + 1 pretest 2 V = V score 2 Q = Q score 2 A = A score 1 pretest = V,Q, or A	3 + 1 pretest 1 V = V score 1 Q = Q score 1 A = A score 1 pretest = V,Q, or A
Number of Questions/Timing		
Verbal	76 in 2 30-minute sections	30 in 1 30-minute section
Quantitative	60 in 2 30-minute sections	28 in 1 45-minute section
Analytical	50 in 2 30-minute sections	35 in 1 60-minute section
Variable (V,Q, or A	1 30-minute section	1 section: 30, 45, or 60 minutes
Computer Tutorial	N//A	Untimed: about 30 minutes needed
Nature and sequence of Questions		
• Difficulty	Usually start easy and move toward hard	Difficulty of each question usually depends on whether previous question was answered correctly
• Ordering	Questions within an item type presented together	Any item type can appear any time in a section
• Scoring	Each question "counts" the same	Score for each question depends on nature of the question, particularly on its difficulty

Answering Questions	Examinee can omit and can answer in any order within a section	Examinee must answer each question as it is presented before the next question is presented
Pacing	Self-paced by examinee	Same
Time Indication	Examinee should bring own watch	Clock on screen unless shut off by examinee
Changing Answers	Examinee can erase an answer, indicate a new answer, etc. within each section	Examinee cannot change an answer after it has been entered and verified (can change before verification)
Scratchwork	Scratchwork done in test booklet	Scratch paper provided and collected after test
Registration	Registration about 5 weeks before pre-set test dates	Flexible and faster registration closer to test date; flexibility of test date and test time
Score Report	Score report by mail about 6 weeks after test	Scores appear on screen immediately after test; official score report by mail about 2 weeks after test
Score Cancellation Policy	Examinee must indicate desire to cancel on answer sheet or by mail within 7 days	Examinee must indicate desire to cancel before scores appear on computer screen
Score Report Recipients	Indicated on registration form; can request others later	Indicated immediately after test-- on computer; can request others later

FORM GR 88-9

01

THE GRADUATE RECORD EXAMINATIONS

General Test

Do not break the seal until you are told to do so.

The contents of this test are confidential. Disclosure or reproduction of any portion of it is prohibited.

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SECTION 2

Time—30 minutes

38 Questions

Directions: Each sentence below has one or two blanks, each blank indicating that something has been omitted. Beneath the sentence are five lettered words or sets of words. Choose the word or set of words for each blank that best fits the meaning of the sentence as a whole.

1. Heavily perfumed white flowers, such as gardenias, were favorites with collectors in the eighteenth century, when —— was valued much more highly than it is today.

   (A) scent (B) beauty (C) elegance
   (D) color (E) variety

2. In a most impressive demonstration, Pavarotti sailed through Verdi's "Celeste Aïda," normally a tenor's ——-, with the casual enthusiasm of a folk singer performing one of his favorite ——.

   (A) pitfall. .recitals (B) glory. .chorales
   (C) nightmare. .ballads (D) delight. .chanteys
   (E) routine. .composers

3. Dependence on foreign sources of heavy metals, though ——, remains —— for United States foreign policy.

   (A) deepening. .a challenge
   (B) diminishing. .a problem
   (C) excessive. .a dilemma
   (D) debilitating. .an embarrassment
   (E) unavoidable. .a precedent

4. Cynics believe that people who —— compliments do so in order to be praised twice.

   (A) bask in (B) give out (C) despair of
   (D) gloat over (E) shrug off

5. Although nothing could be further from the truth, freight railroads have been —— of —— the nation's shift from oil to coal by charging exorbitant fees to transport coal.

   (A) accused. .impeding
   (B) proud. .accelerating
   (C) guilty. .delaying
   (D) conscious. .contributing to
   (E) wary. .interfering with

6. Although the revelation that one of the contestants was a friend left the judge open to charges of lack of ——, the judge remained adamant in her assertion that acquaintance did not necessarily imply ——.

   (A) prudence. .tolerance
   (B) detachment. .foreknowledge
   (C) exoneration. .impropriety
   (D) prejudice. .preference
   (E) disinterestedness. .partiality

7. Within the next decade, sophisticated telescopes now orbiting the Earth will determine whether the continents really are moving, —— the incipient —— among geologists about the validity of the theory of continental drift.

   (A) obviating. .consensus
   (B) forestalling. .rift
   (C) escalating. .debates
   (D) engendering. .speculation
   (E) resolving. .rumors

GO ON TO THE NEXT PAGE.

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Directions: In each of the following questions, a related pair of words or phrases is followed by five lettered pairs of words or phrases. Select the lettered pair that best expresses a relationship similar to that expressed in the original pair.

8. PEDIATRICS : CHILDREN ::
   (A) dermatology : skin
   (B) pathology : medicine
   (C) meteorology : forecasts
   (D) neurology : psychologists
   (E) ecology : environmentalists

9. CREASE : FOLDING :: (A) serration : braiding
   (B) hole : perforating (C) dent : weakening
   (D) break : setting (E) gouge : cracking

10. DAGGER : SCABBARD ::
    (A) bow : quiver
    (B) pistol : holster
    (C) lasso : saddle
    (D) rifle : sight
    (E) spear : shaft

11. SUBPOENA : WITNESS ::
    (A) suborn : judge
    (B) tax : worker
    (C) elect : officer
    (D) conscript : soldier
    (E) hire : laborer

12. LUBRICATE : ABRASION ::
    (A) burnish : decomposition
    (B) vent : distillation
    (C) tamp : adhesion
    (D) seal : leakage
    (E) irrigate : drainage

13. ASTROLOGY : ASTRONOMY ::
    (A) alchemy : chemistry
    (B) homeopathy : zoology
    (C) mythology : classics
    (D) pedagogy : philosophy
    (E) phenomenology : linguistics

14. MALAPROPISM : VERBAL ::
    (A) heresy : moral (B) hoax : cognitive
    (C) gaffe : social (D) feint : martial
    (E) perjury : legislative

15. PLUCK : QUIT :: (A) verve : flinch
    (B) gall : skimp (C) pride : grovel
    (D) charm : smile (E) poise : waver

16. PARENTHESIS : EXPLANATION ::
    (A) synopsis : affectation
    (B) apostrophe : annotation
    (C) synthesis : interpolation
    (D) ellipsis : omission
    (E) asterisk : exaggeration

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2 2 2 2 2 2 2 2 2 2 2

Directions: Each passage in this group is followed by questions based on its content. After reading a passage, choose the best answer to each question. Answer all questions following a passage on the basis of what is stated or implied in that passage.

The use of heat pumps has been held back largely by skepticism about advertisers' claims that heat pumps can provide as many as two units of thermal energy for each unit of electrical energy used, thus apparently contradicting the principle of energy conservation.

Heat pumps circulate a fluid refrigerant that cycles alternatively from its liquid phase to its vapor phase in a closed loop. The refrigerant, starting as a low-temperature, low-pressure vapor, enters a compressor driven by an electric motor. The refrigerant leaves the compressor as a hot, dense vapor and flows through a heat exchanger called the condenser, which transfers heat from the refrigerant to a body of air. Now the refrigerant, as a high-pressure, cooled liquid, confronts a flow restriction which causes the pressure to drop. As the pressure falls, the refrigerant expands and partially vaporizes, becoming chilled. It then passes through a second heat exchanger, the evaporator, which transfers heat from the air to the refrigerant, reducing the temperature of this second body of air. Of the two heat exchangers, one is located inside, and the other one outside the house, so each is in contact with a different body of air: room air and outside air, respectively.

The flow direction of refrigerant through a heat pump is controlled by valves. When the refrigerant flow is reversed, the heat exchangers switch function. This flow-reversal capability allows heat pumps either to heat or cool room air.

Now, if under certain conditions a heat pump puts out more thermal energy than it consumes in electrical energy, has the law of energy conservation been challenged? No, not even remotely: the additional input of thermal energy into the circulating refrigerant via the evaporator accounts for the difference in the energy equation.

Unfortunately, there is one real problem. The heating capacity of a heat pump decreases as the outdoor temperature falls. The drop in capacity is caused by the lessening amount of refrigerant mass moved through the compressor at one time. The heating capacity is proportional to this mass flow rate: the less the mass of refrigerant being compressed, the less the thermal load it can transfer through the heat-pump cycle. The volume flow rate of refrigerant vapor through the single-speed rotary compressor used in heat pumps is approximately constant. But cold refrigerant vapor entering a compressor is at lower pressure than warmer vapor. Therefore, the mass of cold refrigerant—and thus the thermal energy it carries—is less than if the refrigerant vapor were warmer before compression.

Here, then, lies a genuine drawback of heat pumps: in extremely cold climates—where the most heat is needed—heat pumps are least able to supply enough heat.

17. The primary purpose of the passage is to

(A) explain the differences in the working of a heat pump when the outdoor temperature changes
(B) contrast the heating and the cooling modes of heat pumps
(C) describe heat pumps, their use, and factors affecting their use
(D) advocate the more widespread use of heat pumps
(E) expose extravagant claims about heat pumps as false

18. The author resolves the question of whether heat pumps run counter to the principle of energy conservation by

(A) carefully qualifying the meaning of that principle
(B) pointing out a factual error in the statement that gives rise to this question
(C) supplying additional relevant facts
(D) denying the relevance of that principle to heat pumps
(E) explaining that heat pumps can cool, as well as heat, room air

GO ON TO THE NEXT PAGE.

2 2 2 2 2 2

19. It can be inferred from the passage that, in the course of a heating season, the heating capacity of a heat pump is greatest when

(A) heating is least essential
(B) electricity rates are lowest
(C) its compressor runs the fastest
(D) outdoor temperatures hold steady
(E) the heating demand surges

20. If the author's assessment of the use of heat pumps (lines 1-6) is correct, which of the following best expresses the lesson that advertisers should learn from this case?

(A) Do not make exaggerated claims about the products you are trying to promote.
(B) Focus your advertising campaign on vague analogies and veiled implications instead of on facts.
(C) Do not use facts in your advertising that will strain the prospective client's ability to believe.
(D) Do not assume in your advertising that the prospective clients know even the most elementary scientific principles.
(E) Concentrate your advertising firmly on financially relevant issues such as price discounts and efficiency of operation.

21. The passage suggests that heat pumps would be used more widely if

(A) they could also be used as air conditioners
(B) they could be moved around to supply heat where it is most needed
(C) their heat output could be thermostatically controlled
(D) models with truly superior cooling capacity were advertised more effectively
(E) people appreciated the role of the evaporator in the energy equation

22. According to the passage, the role of the flow restriction (lines 16-17) in a heat pump is to

(A) measure accurately the flow rate of the refrigerant mass at that point
(B) compress and heat the refrigerant vapor
(C) bring about the evaporation and cooling of refrigerant
(D) exchange heat between the refrigerant and the air at that point
(E) reverse the direction of refrigerant flow when needed

23. The author regards the notion that heat pumps have a genuine drawback as a

(A) cause for regret
(B) sign of premature defeatism
(C) welcome challenge
(D) case of sloppy thinking
(E) focus for an educational campaign

GO ON TO THE NEXT PAGE.

2 2 2 2 2 2 2 2 2 2 2

All of Françoise Duparc's surviving paintings blend portraiture and genre. Her subjects appear to be acquaintances whom she has asked to pose; she has captured both their self-consciousness and the spontaneity of their everyday activities, the depiction of which characterizes genre painting. But genre painting, especially when it portrayed members of the humblest classes, was never popular in eighteenth-century France. The Le Nain brothers and Georges de La Tour, who also chose such themes, were largely ignored. Their present high standing is due to a different, more democratic political climate and to different aesthetic values: we no longer require artists to provide ideal images of humanity for our moral edification but rather regard such idealization as a falsification of the truth. Duparc gives no improving message and discreetly refrains from judging her subjects. In brief, her works neither elevate nor instruct. This restraint largely explains her lack of popular success during her lifetime, even if her talent did not go completely unrecognized by her eighteenth-century French contemporaries.

24. According to the passage, modern viewers are not likely to value which of the following qualities in a painting?

(A) The technical elements of the painting
(B) The spontaneity of the painting
(C) The moral lesson imparted by the painting
(D) The degree to which the painting realistically depicts its subject
(E) The degree to which the artist's personality is revealed in the painting

25. If the history of Duparc's artistic reputation were to follow that of the Le Nain brothers and Georges de La Tour, present-day assessments of her work would be likely to contain which of the following?

(A) An evaluation that accords high status to her work
(B) Acknowledgement of her technical expertise but dismissal of her subject matter as trivial
(C) Agreement with assessments made in her own time but acknowledgements of the exceptional quality of a few of her paintings
(D) Placement of her among the foremost artists of her century
(E) A reclassification of her work as portraiture rather than genre painting

26. It can be inferred from the passage that the term "genre painting" would most likely apply to which of the following?

(A) A painting depicting a glorious moment of victory following a battle
(B) A painting illustrating a narrative from the Bible
(C) A portrayal of a mythological Greek goddess
(D) A portrayal of a servant engaged in his work
(E) A formal portrait of an eighteenth-century king

27. The argument of the passage best supports which of the following contentions concerning judgments of artistic work?

(A) Aesthetic judgments can be influenced by the political beliefs of those making the judgment.
(B) Judgments of the value of an artist's work made by his or her contemporaries must be discounted before a true judgment can be made.
(C) Modern aesthetic taste is once again moving in the direction of regarding idealistic painting as the most desirable form of painting.
(D) In order to be highly regarded, an artist cannot be solely identified with one particular kind of painting.
(E) Spontaneity is the most valuable quality a portrait painter can have.

GO ON TO THE NEXT PAGE.

2 ■ 2 ■ 2 ■ 2 ■ 2 ■ 2

Directions: Each question below consists of a word printed in capital letters, followed by five lettered words or phrases. Choose the lettered 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, be sure to consider all the choices before deciding which one is best.

28. TURBULENCE: (A) moderation (B) tranquillity (C) immunity (D) correlation (E) meditation

29. DEHYDRATE:
(A) make soluble
(B) separate electrolytically
(C) combine with oxygen
(D) saturate with water
(E) expose to hydrogen

30. LOLL: (A) comply readily (B) move vigorously (C) describe exactly (D) notice incidentally (E) insist strongly

31. INTREPID: (A) morbid (B) forbearing (C) temperate (D) apprehensive (E) abundant

32. PRECURSORY: (A) derivative (B) ephemeral (C) original (D) essential (E) solid

33. PERENNIAL: (A) predictable (B) latent (C) engrossing (D) infertile (E) fleeting

34. DISPARATE: (A) homogeneous (B) cumulative (C) invariable (D) cooperative (E) cogent

35. FULMINATION: (A) repetition (B) addition (C) ratification (D) praise (E) escape

36. EBULLIENCE: (A) confusion (B) pretension (C) introspection (D) absentmindedness (E) impassiveness

37. PREDILECTION: (A) unwillingness to choose (B) desire to please (C) ambiguity (D) stereotype (E) propensity to dislike

38. BANAL: (A) faithful (B) arresting (C) inclined (D) forced (E) elaborate

STOP

IF YOU FINISH BEFORE TIME IS CALLED, YOU MAY CHECK YOUR WORK ON THIS SECTION ONLY.
DO NOT T[illegible] TEST.

Prepared for 1991-92 Project 1000 Workshops
GRE Verbal Sections
Test Taking Strategies

Sydell T. Carlton
Educational Testing Service
Princeton, NJ 08541

Each of the two Verbal sections of the GRE General Test contains 38 questions administered in 30 minutes. Four question types appear in each section: 7 Sentence Completions, 9 Analogies, 11 Antonyms, and 2 Reading Comprehension Passages with a total of 11 questions. The first three kinds of Verbal questions are designed to measure your knowledge of words and your ability to reason verbally, that is, to see, understand, and analyze relationships among words, among groups of words, and within sentences. The last kind, Reading Comprehension, measures your ability to read and to understand what you read. This understanding includes recognizing purpose and main idea, recognizing specific points made, making inferences, and identifying style and tone. Each reading passage contains all of the information you will need to answer the questions that follow it.

In general, within each question type the questions are arranged from easy to hard. Although questions are spread over several academic fields, specific subject-matter knowledge is not required. Therefore, you should attempt every question, even if the subject matter is not familiar to you. Use your knowledge of word parts, words, and concepts as you attempt to answer questions. Become familiar with the directions and of what is required of you. Since Verbal questions often deal with fine shades of meaning, read every answer choice before choosing an answer. Mark up your test book in any way that helps you figure out correct answers to the questions.

The following discussion deals with the questions in Section 2 of the last Practice Test and is found on pages 126-131 of Book Number 6. Section 4, along with the Verbal sections in the rest of the book, contains similar questions, which you may want to practice on later.

After the discussion, there is a list of common relationships in Analogies. Becoming familiar with these relationships will help you with the Analogy question type. Also included are several lists of word parts that should help with all Verbal material, most particularly the Antonym question type. Becoming familiar with common word parts and analyzing words for the meaning of their component parts will help you with vocabulary and will also make you more sensitive to Verbal constructions, meanings, and relationships.

Sentence Completions: Questions 1-7

Read each sentence to get the overall meaning, mentally provide your own answer for the blank or blanks, and find the answer choice that comes closest to your answer. If there are two blanks, the correct answer must have the best answer for both blanks. Remember that there is almost always a part of the sentence that obviously controls the blank or blanks. Use clues in the sentence (words like and, but, although, therefore) to help you figure out the relationships. In working through the sentence, you may find it helpful to remove "extra" words or phrases that do not contribute to the structure; this kind of reduction sometimes makes it easier to see how the parts of a sentence relate to each other. After making an answer choice, reread the whole sentence to be sure it makes sense.

1. This is a simple sentence that makes a statement about the value of "heavily perfumed white flowers." The answer must agree with a characteristic of such flowers. Therefore, Choice A, scent, is the correct answer.

2. The sentence tells us that the tenor Pavarotti "sailed through" (that is, easily performed) an aria with "casual enthusiasm"; other tenors obviously found the aria very difficult. Choice A, pitfall, and Choice C, nightmare, are both possible for the first blank. In looking at the second blank, you can see that ballads fits very well, thus making C the best answer.

3. The "though" in line two tells us that the two parts of the sentence will contrast with each other. You must find an answer choice that expresses such a contrast. Only Choice B expresses the opposition implied by "though."

4. This sentence tells us that some people do something in order to be praised twice. Of the choices given, only shrugging off compliments is likely to bring a repeat of praise. Therefore, E, is the correct answer.

5. In this sentence, it might be easier to work with the second blank first. Since charging very high fees to transport coal could have only a negative effect on shifting from oil to coal, only Choices A, C, or E could fit the second blank, because they are the only choices with negative second terms. Since the beginning of the sentence tells us that something that seems to be true is not true, only Choice A (accused but not necessarily guilty) makes sense for the first blank.

6. The first half of the sentence tells us that the judge might be accused of lack of neutrality; the first terms of only Choices B and E express this idea. The "Although" tells us that something different or opposite will follow; what follows is that the judge refutes the claim of lack of neutrality. That is, although accused of partiality, the judge was not really partial. Only B fits both blanks.

7. The first half of this very long sentence can be reduced to the fact that soon telescopes will tell us the truth about continental drift. This eliminates Choices C and D, since debate and speculation would not increase with the truth, and also Choice A, since the truth will not cause an obviating or an avoidance of consensus or agreement. Of the remaining choices, B and E, the terms in B better fit both blanks.

Analogies: Questions 8-16

Analogy questions test the ability to see a relationship in a pair of words, to understand the ideas expressed in the relationship, and to recognize a similar or parallel relationship in the answer choices. Before you look at the answer choices, clearly and specifically state the precise relationship between the two words in the question. Then, and only then, find that same relationship in one of the answer choices. Remember that you need to compare pairs. Always compare the relationship between the pair of capitalized words to the relationship between the pair of words in each of the choices. And remember to be specific and not be misled by choices that merely suggest a vague association or that come from the same subject-matter field as the words in the question. It is the specific relationship that you must identify and apply. The mental process you should use is: "The first term is to the second term (of the question) as the first term is to the second term (of the answer)."

8. The first term (pediatrics) is the branch or type of medicical practice that treats the second term (children). Therefore, the correct answer is A.

9. The first term (crease) results from or is caused by the second term (folding). Only choice B (a hole is caused by perforating) expresses this same relationship.

10. Just as the weapon (dagger) is carried in the protective case (scabbard), a pistol fits into and is carried in a holster. Here, the relationship is one of purpose: the purpose of the "second term" is to hold the "first term." Therefore, B is correct.

11. To subpoena is to require the appearance or service of a witness. To conscript a soldier is to require him or her to report or serve. Therefore, D is corect.

12. One lubricates in order to prevent or avoid abrasion. Similarly, one seals to avoid leakage, as in D.

13. Astrology is an early and nonscientific form of astronomy, just as alchemy is an early and nonscientific form of chemistry, as in A.

14. A malapropism is a mistake with words; therefore, it is a verbal mistake. A gaffe is a social mistake, as expressed in C. Note that although A may seem close, a heresy is intentional and is far more serious than a light, often humorous mistake and is therefore not as good an answer.

15. People who have pluck by definition do not characteristically quit. The same relationship is seen in C, since people with pride do not grovel.

16. A parenthesis by definition is an explanation; or, it can be used as punctuation to indicate an explanation. Both of these relationships are expressed in D.

Reading Comprehension: Questions 17-27

Read each passage and get a sense of the overall meaning and purpose. Mark up the passages in the test book so that the meanings and purposes and interrelationships of the different parts become clear to you. Underline key words and phrases, and use the margins to clarify what is being expressed.

Passage 1

17. This question asks about the purpose of the passage as a whole. Although some of the other answer choices do appear in parts of the passage, only Choice C captures the entire passage.

18. The issue of the principle of energy conservation appears at the beginning of the passage and then again in lines 32-35. In the lines immediately following (lines 35-38), the author supplies some additional facts that resolve the issue and answer the question. Therefore, C is correct.

19. Lines 39-41 and also 57-59 mention that the heating capacity of a heat pump decreases in the winter, when heat is most needed. By implication, the heating capacity is greatest in warm weather, when heat is least needed. This fact is expressed in Choice A.

20. If the use of heat pumps is held back by the public's refusal to believe advertisers' claims, the lesson to be learned is not to strain people's ability to believe, as expressed in C. Note that although Choice A is close, it talks about exaggerated claims and is therefore not as good as C.

21. This question is closely related to the preceding question. Lines 35-38 resolve the issue of the energy equation by describing the role of the evaporator. Thus, the passage suggests that if people understood the role of the evaporator, they would also understand the energy equation and therefore not be so skeptical about advertisers' claims. This in turn would likely lead them to buy more heat pumps. Choice B expresses this idea.

22. The wording of the question ("According to the passage") indicates that the answer will be found in the passage and, moreover, that it will be found in lines 16-17. Lines 16-17, as well as the next two lines, tell us specifically that flow restriction causes a drop in pressure and therefore a vaporization and cooling of the refrigerant. Choice C states this fact.

23. In line 39, we find the word "unfortunately" in describing a problem or drawback of the heat pump. This attitude appears too in the last paragraph. Choice A best expresses this attitude of the author.

Reading Comprehension: Questions 17-27 (cont.)

Passage 2

24. The phrase "According to the passage" in the question indicates that the answer is specifically given. Lines 12-15 of the passage specifically tell us that modern viewers no longer require moral lessons from painters. Therefore, the answer is C.

25. Lines 8-10 state that the Le Nain brothers and Georges de LaTour, who were like Françoise Duparc in their choice of themes, were largely ignored in their own time but now enjoy a greater reputation. Choice A expresses the best answer.

26. Lines 5-6 tell us that genre painting depicts everyday activities, usually of ordinary people (and, further, line 7 refers to "members of the humblest classes"). Only Choice D gives an example of an everyday activity.

27. The entire passage talks about the effect of contemporary beliefs on judgments about art. More specifically, lines 11-15 make it clear that aesthetic judgments are affected by political beliefs. Choice A, therefore, is the best answer.

Antonyms: Questions 28-38

Each antonym question requires you to find the answer choice with the word or phrase that is most nearly opposite the word in the question. Some questions may require you to make fine distinctions between words. Some questions may require you to find second meanings of words; therefore, if you cannot at first find an answer choice that appears opposite to the given word, examine all of the choices for possible second meanings. If you are not exactly sure of the meaning of the words in the question and the answer, use your knowledge of word parts to help you figure out probable meanings.

28. Even if you do not recognize turbulance, you may recognize the first part of the word in disturb, to confuse or throw into disorder. The best opposite of turbulence (unrest) is therefore tranquillity, Choice B.

29. To dehydrate is to make dry or to remove the water from; its opposite, therefore, is D, to saturate with water.

30. To lolll is to droop or to move in a slow or lazy way. The opposite is B, to move vigorously.

31. One who is intrepid has no fear (or no trepidation); its opposite, therefore, is fearful or apprehensive, D.

32. If your do not know what precursory means, you may recognize pre (before) and curs, similar to course and cursive. What is precursory runs before or comes before; and its closest opposite is A, derivative, that which is not original and therefore comes after.

33. Note that the -ennial part of perennial is similar to annual; both mean year or years. Since per means through, perennial means through the years, or lasting. The closest opposite word is E, fleeting.

34. Items that are disparate are different (from dis, opposite, plus par, prepare). Its best opposite is A, homogeneous (from homo, similar, plus genos, kind).

35. A fulmination is a loud, explosive denunciation of someone or something. The opposite is praise, D.

36. Ebullience (from bullire, to bubble, as seen in the word boil) refers to liveliness and enthusiasm. Although some of the other answer choices seem close, the best opposite is E, impassiveness, which refers to a lack of feeling or emotion.

37. A predilection (from pre, before, and dilect, love) is an attitude that makes one like or favor someone or something even before fully knowing that person or thing. The opposite is a propensity (or previous tendency) to dislike, Choice E.

38. Something that is banal is ordinary or boring or lacking in originality. The opposite, arresting, Choice B, refers to something that is striking and that catches the imagination. To answer this difficult question correctly, you have to go to an uncommon meaning of a form of the word arrest.

Some Common Relationships in Analogies

General Classification	Examples	Specific Relationship
Class Inclusion	(fruit:apple::tree:maple)	2nd (term) is a kind of 1st (term)
	(tree:forest::teachers:faculty)	2nd is made up of 1st
	(puppy:dog::kitten:cat)	1st is a young 2nd
Part-Whole	(engine:car::heart:body)	1st is part of 2nd (or 1st runs 2nd)
Attribute or Characteristic	(aesthete:beauty::patriot:country)	1st loves 2nd
	(artist:paint::writer:pen)	1st does 2nd
	(submissive:led::volatile:aroused)	if one is 1st, one is easily 2nd
Nonattribute or Contrast	(loyal:betrayal::honesty:deception)	1st does not do 2nd
	(vacuum:air::tundra:trees)	1st lacks 2nd
Degree or Intensity	(like:love::dislike:despise)	2nd is extreme 1st
Excessive Degree	(eating:gluttony::frugality:stinginess)	2nd is too much (excessive) 1st
Cause (or Purpose) or Effect	(axe:split::knife:cut)	1st is used in order to 2nd
	(refine:petroleum::smelt:ore)	to 1st is to purify 2nd
Place or Time	(sculptor:studio::actor:stage)	1st works in or on 2nd
Symbol or Representation	(applause:enjoyment::frown:annoyance)	1st is a sign of 2nd
Recipient	(scholarship:student::bequest:heir)	1st is given to 2nd (or 2nd receives 1st)
Agent or Doer	(playwright:tragedy::composer:symphony)	2nd is one of the products created by 1st

Some Common Prefixes

Prefix	Meaning	Examples
in	in	(internal)
in, im, il, ir, un, non, a	not	(inconsistent, immobile, illogical, irregular, unsafe, nonconformist, atheist)
ex, e	out, from,	(external, exit, emit)
ex-	former	(ex-senator)
con, com, col	with, together	(confer, committee, collaborate)
sym, syn	with, together	(sympathy, synthesis)
inter	between	(international)
intra	within	(intramural)
sub	under	(submarine, subversive)
super, supra	over, above	(superintendant, supreme)
contra, anti	against	(contradict, antiwar, antagonize)
pro	for, forward	(propose)
de, mis	poorly, bad, away	(detract, mistake)
dis, dif	apart, opposite	(disappear, disable, disagree, differ)
homeo, homo	same, similar	(homogenize)
bene, eu	good	(beneficial, eulogy)
mal	bad	(maladjustment)
micro	small	(microscope)
magni	large	(magnify)
tele	far off, distant	(telescope, television, telegram)
circum, peri	around	(circumference, perimeter)
multi, poly	many	(multiply, polygamy)
para	beside, beyond	(parallel, parapsychology)
per	through, thoroughly	(perfect)
pre, ante	before	(previous, antebellum)
post	after	(postpone)
ab	away, from	(absent)
ad	toward	(advance)
trans, tra	over, across	(transport, transatlantic, traverse)
re	back or again	(retract or reevaluate)
equi	equal	(equilibrium)
auto	self	(autobiography, automobile)
alti, altus	high	(altitude, alto)
bio	life	(biology)
cosmos	universe	(cosmic, cosmopolitan)
geo	earth	(geography)
semi, hemi, semi	half, partial	(semifinal, hemisphere, demitasse)
omni	all	(omnivorous)
ortho	straight, true	(orthodontist, orthodox)
neo	new	(neonatal, neo-Fascist)
mono	single, one	(monopoly, monorail)
ob, op	against	(obscure, opposite)

Number Prefixes

uni	one	(unity)
bi, di, dou, duo	two	(bisect, double,
tri, tre	three	(triangle, treble)
quad	four	(quadrangle)
quint, pent	five	(quintuplet, pentagon)
sex, hex	six	(sextet, hexagon)
sept, hept	seven	(September; formerly the seventh month)
oct	eight	(October, octet)
nov, non	nine	(November, novena)
deca, deci	ten	(December, decade, decimal)
cent	hundred	
milli	thousand	

Other Word Parts

alter	other, change	(alternate, alteration)
chron	time	(chronology)
missi, mit	send	(missile, mission, emit)
ven	come	(convention, prevention)
tract	pull	(extract, tractor)
fer	move, take	(transfer)
ject	throw	(eject)
ten	hold	(retention, maintain)
poli	city, state	(metropolitan, cosmopolitan, politics)
phon	sound	(phonograph)
audi	hear	(audible, audience)
graph	write, image	(autograph)
posi, pon	put, place	(position, postpone)
voc	voice	(vocal)
dict, dic, loqui	speak	(dictate, abdicate, eloquent)
fac, fic	make	(factory, beneficiary)
curr, curs	run, flow	(current, occur, course)
spect	see, look	(spectator)
vis	see, sight	(vision, visual)
script	write	(manuscript)
lum, luc	light, clear	(luminous, illuminate, translucent)
log, -logue	thought, speech, word	(logic, dialogue)
mobi, mori	move	(automobile, motion)
sequi	follow	(sequence, sequel)
passi, pathi	feel	(passion, sympathy)
port	carry	(portable)
pori	power, ability	(potion, omnipotent)
rect	straight, right	(rectangle, correct, erect)
loc	place	(locate)
therm	heat	(thermometer, thermos)
hydra, hydro	water, liquid	(hydrant)
anni, enni	year	(anniversary)
pare	produce	(prepare)
turb	confusion, disorder	(disturb, turbulence)
latus	wide, side	(latitude, dilate, equilateral)
long	long	(longitude, longevity)
util	use	(utility)
bio	life, living	(biography, biology)
meter	measure	(metric, perimeter)
vers, vert	turn	(universal, inadvertent)
dur	hard, lasting	(duration, durable, endure)

Examples: ject – throw

- eject = throw out
- reject – throw back
- trajectory = the path of something thrown across
- subject = throw under (control)
- conjecture = something (an idea) thrown together
- interject – throw between
- dejection = thrown down (in spirit)
- inject = throw into
- projection = thrown forward
- object = throw against
- interject = throw between

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GRE Verbal Sections
Test Taking Strategies

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Each of the two Verbal sections of the GRE General Test contains 38 questions administered in 30 minutes. Four question types appear in each section: 7 Sentence Completions, 9 Analogies, 11 Antonyms, and 2 Reading Comprehension Passages with a total of 11 questions. The first three kinds of Verbal questions are designed to measure your knowledge of words and your ability to reason verbally, that is, to see, understand, and analyze relationships among words, among groups of words, and within sentences. The last kind, Reading Comprehension, measures your ability to read and to understand what you read. This understanding includes recognizing purpose and main idea, recognizing specific points made, making inferences, and identifying style and tone. Each reading passage contains all of the information you will need to answer the questions that follow it.

In general, within each question type the questions are arranged from easy to hard. Although questions are spread over several academic fields, specific subject-matter knowledge is not required. Therefore, you should attempt every question, even if the subject matter is not familiar to you. Use your knowledge of word parts, words, and concepts as you attempt to answer questions. Become familiar with the directions and of what is required of you. Since Verbal questions often deal with fine shades of meaning, read every answer choice before choosing an answer. Mark up your test book in any way that helps you figure out correct answers to the questions.

SAMPLE ANTONYM QUESTIONS

For each question in this section, choose the best answer and fill in the corresponding oval on the answer sheet.

DIRECTIONS:

Each question below 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

[A] [B] [C] [D] [E]

Strategies for antonyms

a. Read all of the choices since you are looking for the *most nearly* opposite response.

b. Some words have more than one meaning. If you can't find an opposite word among the choices, try to come up with a different meaning for the given word or for the choices.

c. Sometimes you may not know the dictionary meaning of a word, but you have a general sense of how it is used. Try to make up a sentence or a phrase with the word. Try out the answer choices in the sentence or phrase and see which works best at reversing the meaning of the sentence.

d. Remember you are looking for a word that means the *opposite* of the given word. In some other tests that you have taken you may have been expected to find synonyms of words. On this test you are expected to find the antonyms. Be careful that you don't slip into looking for synonyms.

e. Watch for prefixes like **"in"** (inadequate), **"im"** (impersonal), **"un"** (unrelated), **"de"** (demilitarized), **"dis"** (disconnected) or suffixes like **"less"** (careless) that change the word to the opposite or negative meaning.

f. Use knowledge of prefixes, suffixes, and word roots to figure out the meaning of words you don't know.

Here are some examples of antonym questions from previous PSAT/NMSQTs. See if you can figure out the answer on your own. Look up any words you don't know in the dictionary.

1. COMBINE: (A) identify (B) divide (C) select
(D) impair (E) disclose

COMBINE means to bring things together, to unite. The opposite of bringing things together is to separate, or **divide** them. Choice (B) is the word *most nearly* opposite in meaning to **COMBINE.**

2. RETAIN: (A) move toward (B) let go (C) make clearer (D) ascend (E) accomplish

RETAIN means to keep possession of (as in "retain control") or to hold fixed (as in "retaining wall"). **Move toward** and **ascend** have movement as opposed to staying fixed, but **let go** is the response *most nearly* opposite to **RETAIN** because it represents the opposite action that I might take: I might retain control or let go of it.

3. POSTERITY: (A) vanguard (B) forebears (C) shyness (D) credibility (E) efficiency

POSTERITY is a noun meaning "descendants" or "future generations." With this definition, only responses (A) **vanguard** and (B) **forebears** make sense. **Vanguard** means "the front part of a group or movement," or "the leaders of a movement," while **POSTERITY** comes from "post," which means "following after," or "behind." However, **POSTERITY** specifically means the generations coming after, and (B) **forebears**, means "ancestors," or "the generations who came before." Because **forebears** has this same sense of generations it is the *best* answer.

Did you notice that some of these words are very similar to Spanish words? For example, in question 1, **"combine"** and **"combinar," "identify"** and **"identificar," "divide"** and **"dividir," "select"** and **"seleccionar"**. Look at questions 2 and 3 and see if you can find some other examples of words that are similar to Spanish words.

These pairs of words, which have common roots because they both came from Latin, are called cognates. You can use your knowledge of Spanish to help figure out the meaning of words like these. Sometimes the English word is not used very often or is not commonly known, while the Spanish word is used frequently. Can you find an example of this in the questions in this exercise?

Handout 4.2 is a list of prefixes, suffixes, and word roots. These come mostly from Latin, so many of them mean the same in Spanish. Knowing these word parts can help you figure out the meaning of words that you don't know. Use a dictionary to look up the unfamiliar words on the list and find out how they were made from prefixes, suffixes, and roots. Identify the word parts that mean the same in Spanish as in English.

Using your knowledge of Spanish to guess at the meaning of words is another strategy for dealing with antonyms and other question types as well.

HO 4.2

PREFIXES, SUFFIXES, AND ROOTS

Prefix	Meaning	Examples
a	not	atypical, asexual
ab	from	abduct, abstract
ad	to, toward	administer, advocate
ambi	both	ambidextrous, ambivalent
ante	before, in front of	antecedent, antedate
anti	against, opposite	antifreeze, antidote
auto	self	automated, autograph
bi	having two	bivalve, bilingual
bio	life, of living things	biography, biology
co (col, con, com)	with, together	contact, compatriot, collate
contra (counter)	against	contradiction, counter-productive
cosmo	universe	cosmos, cosmopolitan
de	away from, reverse the action of	detour, detach, deplete, defrost, defoliate
dis (di)	not, apart	disconnect, diverge
ex	out, former	extract, export, expatriate
extra	outside, beyond, more than	extrasensory, extracurricular, extraordinary
hyper	overly	hyperactive, hyperbole
in (im, il, ir)	in, not	independent, impossible, illogical, irreverent
inter	between	interstate, interview
intro (intra)	within, inside of	introduce, introspection, intramural
mal	bad, badly, wrong	malpractice, malfunction, malformed
micro	small	microbe, microscope
mis	error, wrongness, lack of	misread, misunderstand, mistake
mono	one, alone	monogamous, monotonous, monopoly, monologue
multi	many	multistory, multicolor
non	not	nonsense, nonconformist

Prefix	Meaning	Examples
omni	all	omnipotent, omnibus
per	fully, through	pervade, perceive
peri	around, about	periscope, periphery, perimeter
philo	love	philosophy, philharmonic, philanthrophy
poly	many	polygamy, polynomial
post	after	postdate, postgraduate
pre	before in time, place or rank	predate, preschool, preview, prehistoric
pro	for, favoring, before	propose, prologue, pronoun
re	again, back	return, regain, reinforce
retro	backward, back, behind	retrospect, retrorocket
semi	half, partially	semifinal, semiprecious
sub	beneath	subway, substandard
super	over, more than	superstar, superstitious
syn	together, with	synonym, synthesis
tele	far off, distant	telescope, telegram
tri	three	trilogy, tricycle
trans	beyond, across	transform, transgress, transmit
ultra	beyond, very much	ultramodern, ultraviolet
un	not, removal from	unsettled, unhappy, undo

Suffix	Meaning	Examples
able (ible)	capable of being	usable, remarkable, deductible
an (ian)	one who, belonging to	artisan, American, dietitian
ance	state of being	endurance, importance
ary	pertaining to	literary, military
ative (ive)	like, pertaining to	argumentative, creative
ee	one who is	payee, employee
er (eer)	one who does	writer, volunteer
ence	state or quality	intelligence, reverence
ful	full of	helpful, colorful

Suffix	Meaning	Examples
ic	like, made of	synthetic, scientific
ier	one who does	carrier
ism	action, practice, state	communism, favoritism
less	without	wordless, restless
ology	study of	geology, pathology
ose (ous)	full of	verbose, joyous
tion (ation)	condition or quality	reception, hesitation,
tude (itude)	condition, state of being	attitude, rectitude

Root	Meaning	Examples
amor	love	amiable, amorous
anthro	human	anthropology
aqua	water	aquatic, aquarium, Aquarian
audio	to hear	audience, auditorium
bene	good or well	benediction, benevolent, benefit
brevis	short	brief, brevity
chrom	color	chromatic, monochrome
cide	kill	homicide, suicide
cycle	circle, wheel	cyclical, bicycle
dominus	master	domineering, dominion
duo	two	dual, duet
ego	I, self	egotist, egocentricity
fact	to make	factory
finis	end	finish, final
frater	brother	fraternize, fraternity
graph (gram)	write, record	cardiograph, phonograph telegraph, telegram
liber	free	liberty, liberate
locus	place	relocate, locality
magni	great, large	magnify, magnificent
mal	bad	malign, malicious
mater	mother	maternity, matriarch

Root	Meaning	Examples
mobile	movable	mobility, automobile
mors	death	mortal, morgue, morbid
navis	ship	navigation, navy
novus	new	novice, novel
nox (noctis)	night	nocturnal, equinox
pater	father	paternity
pes (pedis)	foot	pedestrian
plex, plic	fold, tangle	perplex, complicate
scend	go	descend, ascend, transcend
solus	alone	soliloquy, solo
spect	look	inspect, retrospect, spectacle
terra	earth or land	terrain, terrace, terrarium
uni	one	unique, unit, unity
view	look	review
visio	to see	visible, visual, television

Some Common Prefixes

Prefix	Meaning	Examples
in	in	(internal)
in, im, il, ir, un, non, a	not	(inconsistent, immobile, illogical, irregular, unsafe, nonconformist, atheist)
ex, e	out, from,	(external, exit, emit)
ex-	former	(ex-senator)
con, com, col	with, together	(confer, committee, collaborate)
sym, syn	with, together	(sympathy, synthesis)
inter	between	(international)
intra	within	(intramural)
sub	under	(submarine, subversive)
super, supra	over, above	(superintendant, supreme)
contra, anti	against	(contradict, antiwar, antagonize)
pro	for, forward	(propose)
de, mis	poorly, bad, away	(detract, mistake)
dis, dif	apart, opposite	(disappear, disable, disagree, differ)
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mal	bad	(maladjustment)
micro	small	(microscope)
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circum, peri	around	(circumference, perimeter)
multi, poly	many	(multiply, polygamy)
para	beside, beyond	(parallel, parapsychology)
per	through, thoroughly	(perfect)
pre, ante	before	(previous, antebellum)
post	after	(postpone)
ab	away, from	(absent)
ad	toward	(advance)
trans, tra	over, across	(transport, transatlantic, traverse)
re	back or again	(retract or reevaluate)
equi	equal	(equilibrium)
auto	self	(autobiography, automobile)
alti, altus	high	(altitude, alto)
bio	life	(biology)
cosmos	universe	(cosmic, cosmopolitan)
geo	earth	(geography)
semi, hemi, semi	half, partial	(semifinal, hemisphere, demitasse)
omni	all	(omnivorous)
ortho	straight, true	(orthodontist, orthodox)
neo	new	(neonatal, neo-Fascist)
mono	single, one	(monopoly, monorail)
ob, op	against	(obscure, opposite)

Number Prefixes

uni	one	(unity)
bi, di, dou, duo	two	(bisect, double,
tri, tre	three	(triangle, treble)
quad	four	(quadrangle)
quint, pent	five	(quintuplet, pentagon)
sex, hex	six	(sextet, hexagon)
sept, hept	seven	(September; formerly the seventh month)
oct	eight	(October, octet)
nov, non	nine	(November, novena)
deca, deci	ten	(December, decade, decimal)
cent	hundred	
milli	thousand	

Other Word Parts

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ven	come	(convention, prevention)
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fer	move, take	(transfer)
ject	throw	(eject)
ten	hold	(retention, maintain)
poli	city, state	(metropolitan, cosmopolitan, politics)
phon	sound	(phonograph)
audi	hear	(audible, audience)
graph	write, image	(autograph)
posi, pon	put, place	(position, postpone)
voc	voice	(vocal)
dict, dic, loqui	speak	(dictate, abdicate, eloquent)
fac, fic	make	(factory, beneficiary)
curr, curs	run, flow	(current, occur, course)
spect	see, look	(spectator)
vis	see, sight	(vision, visual)
script	write	(manuscript)
lum, luc	light, clear	(luminous, illuminate, translucent)
log, -logue	thought, speech, word	(logic, dialogue)
mobi, mori	move	(automobile, motion)
sequi	follow	(sequence, sequel)
passi, pathi	feel	(passion, sympathy)
port	carry	(portable)
pori	power, ability	(potion, omnipotent)
rect	straight, right	(rectangle, correct, erect)
loc	place	(locate)
therm	heat	(thermometer, thermos)
hydra, hydro	water, liquid	(hydrant)
anni, enni	year	(anniversary)
pare	produce	(prepare)
turb	confusion, disorder	(disturb, turbulence)
latus	wide, side	(latitude, dilate, equilateral)
long	long	(longitude, longevity)
util	use	(utility)
bio	life, living	(biography, biology)
meter	measure	(metric, perimeter)
vers, vert	turn	(universal, inadvertent)
dur	hard, lasting	(duration, durable, endure)

Examples: ject – throw

- eject = throw out
- reject – throw back
- trajectory = the path of something thrown across
- subject = throw under (control)
- conjecture = something (an idea) thrown together
- interject – throw between
- dejection = thrown down (in spirit)
- inject = throw into
- projection = thrown forward
- object = throw against
- interject = throw between

COGNATES—PART B

Because the Spanish language and many English words are derived from Latin, there are thousands of cognates—words that are similar in meaning and spelling—in the two languages. If you know Spanish, this fact often can help in identifying a word in English that may not be immediately recognizable.

Many of the cognates are called **exact** cognates, that is, they are written exactly the same (except for accent marks or other diacritical marks). They may be pronounced differently. For example:

Exact cognates

actor, animal, bonanza, bronco, central, chinchilla, chocolate, collar, corral, coyote, crisis, cruel, director, editor, error, etcetera, factor, favorable, flamenco, grave, guerrilla, honor, hospital, hotel, idea, industrial, inevitable, jaguar, junta, liberal, local, mantilla, me, moral, mosquito, natural, panorama, patio, personal, plaza, probable, radio, real, regular, rival, rodeo, social, tango, terrible, tortilla, vigor, and many others

In addition to the exact cognates, there are **close** cognates, words that are so similar that their meanings can be readily identified. For example:

Close cognates

bank/banco
dialog/diálogo
energy/energia
Europe/Europa
exclusive/exclusivo
feminine/femenino
football/fútbol
form/formar
humanity/humanidad
invasion/invasión
liberty/libertad
literature/literatura
masculine/masculino
mayonnaise/mayonesa
model/modelo
objective/objetivo
opportunity/oportunidad
pass/pasar
photograph/fotografía
product/producto
special/especial
silence/silencio
student/estudiante
television/televisión
time/tiempo
tradition/tradición
vacation/vacaciones
vitamins/vitaminas

There are useful grammatical patterns or relationships between Spanish and English that can help a Spanish speaker. Knowing these relationships can help a bilingual student approach and decode an unfamiliar English word. For example:

1. Spanish infinitives have endings (either **-ar**, **-er**, or **-ir**) that English verbs do not have. Remove the ending and you can arrive at the meaning of many verbs.

admirar	admire
convertir	convert
costar	cost
estudiar	study
explorar	explore
formar	form
mover	move
pasar	pass
resolver	resolve
servir	serve

2. Many Spanish words do not have the double consonants of their English counterparts.

apetito	appetite
comercial	commercial
posesión	possession
recomendar	recommend
posible	possible

3. Most Spanish nouns that end in **-ción** translate into **-tion** in English.

la combinación	combination
la composición	composition
la nación	nation
la relación	relation
la solución	solution

4. In Spanish, **-dad** and **-tad** equal the English **-ty**.

actividad	activity
fraternidad	fraternity (brotherhood)
igualdad	equality
libertad	liberty
variedad	variety

5. The Spanish **-mente** is equivalent to the English **-ly**.

especialmente	especially
humanamente	humanly
realmente	really
simplemente	simply
tradicionalmente	traditionally

NOTE: There are some **false** cognates. They may be the result of coincidences in spelling between the two languages or the evolution of different meanings over time. Some examples of **false** cognates are:

English	Spanish (false cognate)	Spanish Meaning
assist	asistir	attend
exit	éxito	success
firm	firma	signature
large	largo	long
periodical	periódico	newspaper
realize	realizar	accomplish (In Spanish the word is also used as "to amass." In English the word can be used in the same way—"he realized a profit"—but usually means "to understand.")
soap	sopa	soup (not soap)
embarrassed	Ella está embarazada.	She is pregnant.

SAMPLE SENTENCE COMPLETION QUESTIONS

Sentence completion questions consist of a sentence in which one word or two words are missing. You select the word or words to complete the sentence. The answer must be logical, in keeping with the style and tone of the rest of the sentence, and grammatically correct.

DIRECTIONS:

Each sentence below has one or two blanks, each blank indicating that something has been omitted. Beneath the sentence are five lettered words or sets of words. Choose the word or set of words that, when inserted in the sentence, best fits the meaning of the sentence as a whole.

Example:

Although its publicity has been ---- the film itself is intelligent, well-acted, handsomely produced, and altogether ----.

(A) tasteless..respectable (B) extensive..moderate
(C) sophisticated..amateur (D) risqué..crude
(E) perfect..spectacular

[A] [B] [C] [D] [E]

The word **"Although"** suggests that the publicity has given the wrong impression of the movie so look for two words that are somewhat opposite in meaning. Also, look for a second word that fits with **"intelligent, well-acted, handsomely produced."** You can eliminate choices (B), (C), and (D) by looking at the second word because they don't fit with the rest of the second part of the sentence. You can eliminate choice (E) because the words are not opposites. This leaves choice (A). Read the whole sentence again to see if it makes sense with choice (A).

Strategies for sentence completion questions

a. Read the entire sentence carefully to understand the ideas being expressed.

b. Look for words that provide clues or signals to the logic of the sentence:

Some words connect ideas that are similar: *and, also, besides, for example, in other words, likewise, another, in addition, moreover, furthermore.*

Some words connect ideas that are in opposition or contrast: *but, or, nor, not, instead, however, in contrast, on the other hand, although, despite, in spite of, yet, even while, except, nevertheless, notwithstanding, regardless.*

Some words connect ideas in cause and effect relationships: *because, consequently, therefore, thus, hence, as a result, in order to.*

Some words mean that a certain condition must be considered: *if, when.*

c. Consider all answer choices since you are looking for the word or set of words that *best* fits the meaning of the sentence as a whole.

d. Try out the sentence with each word or set of words to be sure they fit logically.

e. When you have chosen an answer, read the complete sentence through to be sure that the meaning is logical and that the words fit with the tone of the sentence.

Here are some examples of sentence completion questions. See if you can figure out the answers on your own before reading the explanation. Try out each answer in the sentence to see which one fits the best.

1. If your garden plot is small, it will not pay to grow crops that require a large amount of —— in order to develop.

   (A) sun (B) rain (C) fertilizer (D) space (E) care

In this sentence the important words are **"If"** and **"small."** **If** the garden is **small,** then the crops cannot require a lot of room in which to grow. The answer must be a word that suggests area. Only the word **space**, choice (D), does this, so (D) is the correct answer. Without the condition **"If your garden plot is small,"** you would not know which choice makes the most sense in this sentence. Make up some conditions under which the other answers would be the best choice. For example, "If your garden is in the desert, it will not pay to grow crops that require a large amount of **rain** in order to develop." (This is an exercise to help you understand sentence logic: you would not want to waste actual testing time making up different conditions!)

2. Although a few contemporaries —— the book, most either ignored or mocked it.

   (A) degraded (B) disregarded (C) ridiculed (D) slighted
   (E) appreciated

"Although" indicates that the correct answer must be a word that is not like **"ignore"** or **"mock."** **"Although"** is used to set **"a few contemporaries"** apart from the **"most"** who **"ignored or mocked"** the book. If the contemporaries **degraded, disregarded, ridiculed,** or **slighted the book**, they would be doing the same thing as the **"most who ignored or mocked it."** **"Although"** indicates they did something different. Only **appreciated** provides a contrast; therefore (E) is correct.

3. Despite her —— nature, DeMott was capable of tactful negotiation and even won praise for her patient efforts toward —— when a local squabble developed.

   (A) diplomatic..amity (B) congenial..concord
   (C) altruistic..dissension (D) rebellious..insurrection
   (E) tempestuous..reconciliation

Sometimes it is helpful to look at the second word first. Here, in trying out all the second words of the pairs, we read **"even won praise for her patient efforts toward ——."** **"Patient efforts toward" dissension** and **insurrection** makes no sense, so we can eliminate choices (C) and (D). Cross them out so you won't mistakenly choose them. Now we look at the first word of the pair. **"Despite"** means that the word describing **"nature"** will be opposite to or unlike **"tactful negotiation"** because her nature would lead us to believe that she was not capable of such tact. **Diplomatic** and **congenial** would lead us to expect tact, so we can eliminate choices (A) and (B). The correct answer is (E) **tempestuous..reconciliation.**

4. Many famous scientific inventions have been ----, the by-products of research whose goals were quite unrelated.

   (A) fortuitous (B) neglected (C) inoperable
   (D) lucrative (E) unfeasible

If you just looked at the first part of the sentence, **"Many famous scientific inventions have been ----,"** any of the answer choices would fit. Try each of the choices in the first part of the sentence. (Look up in the dictionary any words that you don't know.) To choose the right answer, you must also look at the second part of the sentence and see how it affects the meaning of the first part. Saying that the inventions were **"by-products of research whose goals were unrelated"** means that they were lucky breaks or unexpected. Which of the answer choices means "lucky" or "unexpected"?

5. The excitement does not ---- but ---- his senses, giving him a keener perception of a thousand details.

   (A) slow..diverts (B) blur..sharpens
   (C) overrule..constricts (D) heighten..aggravates
   (E) forewarn..quickens

The word **"but"** means that the answer will involve two words that are somewhat opposite in meaning. If you keep this in mind, all of the choices except for (B) **blur.. sharpens** can be eliminated. Only the words in choice (B) are opposites. Also, **"sharpens his senses"** fits with the phrase **"giving him a keener perception of a thousand details."** Note that the words **heighten** and **quickens** are words that are often found with the word **"senses,"** and therefore might tempt the careless test taker.

6. In many Latin American countries, work performed by women is often conducted outside the commercial sector and is, therefore, unfortunately —- by economists compiling national statistics.

   (A) monopolized (B) approved (C) overlooked
   (D) subdued (E) analyzed

The word **"therefore"** connects the second part of the sentence to the first part. That means that the situation described in the first part is the reason for what happens in the second part. To answer this question you must also consider the word **"unfortunately,"** which is a clue that the idea expressed by the words to follow will be something negative. Choice (B), **approved**, is positive, and choice (E), **analyzed**, is neutral so we can eliminate them. Choice (A), **monopolized**, does not fit with the sense of the economist's role in compiling statistics. Choice (D), **subdued**, makes some sense in terms of its meaning of reducing the force of something, but it does not fit with the rest of the sentence as well as (C), **overlooked**.

HO 7.1

READING COMPREHENSION QUESTIONS

Each PSAT/NMSQT contains about five reading comprehension passages. The passages are taken from different fields including the humanities, social studies, biological sciences and physical sciences. Passages vary in style and can be narrative, argumentative, or expository.

Each reading passage has a set of questions, usually about three to five. Following is an explanation of the kinds of questions that may be asked about a passage, and examples of different ways in which these questions can be written.

A. **Main Idea**—You are asked to select the choice that best describes the content of the passage as a whole or best describes the author's purpose in writing the passage.

1. The passage is concerned primarily with . . . .
2. Which of the following statements best summarizes the content of the passage?
3. Which of the following is the best title for the passage?
4. The main point of the passage is to . . . .

B. **Supporting Detail**—You are asked about information stated in the passage.

1. According to the passage a . . . may best be described as . . . .
2. According to the passage . . . is explained by . . . .
3. The author mentions . . . and . . . as examples of . . . .
4. Which of the following statements best describes the position (situation) of the X's?
5. According to the passage, which of the following statements are true of both X and Y?
6. The author mentions all of the following as advantages of... EXCEPT....

C. **Intended Inference**—You need to recognize suggestions or implications inherent in the passage even though they are not directly stated.

1. The author implies that X is . . . .
2. The author would probably have the least sympathy for . . . .
3. Which of the following statements about . . . can be inferred from the passage?

D. **Application and Logic**—There may be a few questions that ask you to recognize the logic and reasoning used in the passage. Some questions ask you to apply the logic to situations not mentioned in the passage; others may ask you to recognize the methods the author used to present his or her point of view.

1. Which of the following statements is most clearly an example of . . . ?
2. On the basis of the information in the passage, which of the following would be most likely to help solve . . . ?
3. The author provides information that would answer which of the following questions?
4. The author's argument is weakened by the fact that he . . . .

E. **Style and Tone**—These questions ask about the attitude underlying the author's presentation and approach to the subject.

1. The author's attitude toward X is one of . . . .
2. The style of this passage is primarily . . . .

Main idea, evaluation of logic, and style and tone questions usually require you to consider the entire passage in order to obtain an overall sense of what it is about and how the author approached the subject matter. Supporting detail, inference, and application questions will most likely require you to find specific information in the passage and to read it carefully to determine the correct response.

Look at the example questions above and think about whether you would need to read the passage for an overall sense of what it is about, or whether you would have to focus on a sentence or two in order to answer that kind of question.

What are you being asked to do? The following are examples of tasks that test questions may expect of you:

To look for facts
who? what? when? where? how much?

To put events in chronological order
first, after, later, meanwhile

To deny, contradict, negate
not true, would not expect to happen, is not an option

To summarize
the main idea, the central thought, the best title, this is (primarily, mostly, mainly) about

To compare and contrast
like/unlike, similar/different, analogous

To go beyond the information given
conclude, expect to happen, assume, could be, infer, is possible, is probable

KEY WORDS

The following words are frequently used in reading passage questions. Learn to look for them and be sure you understand their meaning when you are answering test questions.

according to the author	You must answer the question in terms of the statements, assumptions, or inferences that the author is making, even if you disagree with what the author has stated. The test is designed to see if you understand what the author has written.
according to the passage	Again, you must use the written material and not your own knowledge or opinion to answer this question.
always	This is an absolute statement, so you should be cautious when you see it. Very few statements are *always* true or *always* false.
best	This is an important word in test questions because it usually asks you to find the *best* of the answers or responses provided. This means that even though you find a response that seems to fit, you still need to look at all the responses in order to be sure that you have the *best* one. Sometimes you may think none of the answers is particularly good, but you must pick the *best* one.
chiefly	This means "above the rest." "mostly," "mainly, but not exclusively." Unlike *always*, this term leaves room for other possibilities. When you see this word, you will probably be looking for the most important explanation of something.
(one may) **conclude that**	Here you are asked to come to a conclusion that is suggested by the information in the passage. You must be careful that your conclusion is indeed based on the material in the passage and not on your own ideas.
highest	Like *chiefly*.
(the author) **implies** (it may be) **inferred** (the author) **suggests**	See (one may) *conclude that* above.
least	Opposite of *most, chiefly*.
(the) **main idea** (is)	*Main idea* questions ask you to identify the statement that best describes the content of the passage. A *main idea* statement should not be too broad (covering more than is written in the passage) or too narrow (covering only a few ideas that are in the passage).

mainly	Most important or *chiefly*.
maximum	The most, the top, the "max."
minimum	The least, the smallest.
most	Frequently used as a qualifier, as in *most* likely, *most* frequently, *most* reasonable. A qualifier is the opposite of an absolute statement, in the sense that it recognizes that there are exceptions to *most* situations and tries to leave room for those exceptions.
nearly	*Nearly* means "very close to." This is another qualifier. *Nearly always* describes situations in which there would be very few exceptions, but the possibility of an exception does exist.
never	Another absolute! *Never* is the opposite of *always*, so be just as careful when you see this word. There are no exceptions to *never!* (That *no* is an example of an appropriate use of an absolute.)
only	*Only* means "just the one." "This is the *only* . . . for me." It also can indicate a restriction, as in "You can go *only* after you wash the car."
sometimes	This is another qualifier. Instead of *always*, *sometimes* occurs less often than *always* or *frequently*. The following list decreases in the number of times that something might happen: always > frequently > sometimes > infrequently > never Think of some other words that describe how often something happens, and compare them with the list.

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STRATEGY FOR READING COMPREHENSION QUESTIONS

Should you read the passage or the questions first?

Try both approaches and see what works best for you. The following strategy is sort of an in-between one that works for many people. As you work with the reading passages in this lesson, try the different approaches until you feel sure that you know which method is best for you.

First, *skim* the reading passage. Try to get a sense of what the passage is all about.

Second, *read the questions*. Remember that some kinds of questions require you to read the whole passage for an overall sense of what it is about, while other questions require you to locate specific information in the passage.

Now *go back to the first question*. If it is a main idea question, now is the time to read the whole passage. READ FOR THE SENSE OF THE PASSAGE. Don't read to memorize or to puzzle out details that you may not understand right away. Each paragraph (if there is more than one) will be about a different aspect of the subject matter. Get a sense of what is being said about the subject. Quickly mark important points or ideas as you read through the passage.

Now look at the responses for the main idea question. Some will be too narrow and will deal with only one or two of the ideas expressed in the passage. Another response may be too broad, dealing with a bigger subject of which the passage might be just a part. Find the response that summarizes all the material contained in the paragraphs of the passage.

For supporting detail questions, you can use skimming to help you find the information needed. Skimming is a quick way of locating information. When you skim material, you have a word or a phrase in mind that you are looking for, and you read through the material quickly, looking for that word or phrase. You don't need to read every word; just let your eyes run over the sentences and keep the word you are looking for in mind.

For all reading comprehension questions, consider how well each response answers the question and whether it is supported in the reading passage. Also, read each question very carefully, paying attention to words such as EXCEPT or NOT. These words are very important in understanding how you are to answer the question.

Try this approach on the sample passage that follows.

Tips for reading comprehension questions

1. Become familiar with the different kinds of reading comprehension questions.
2. Try to get a sense of the principal ideas, facts, and organization of the passage. Mark important facts and ideas but don't waste time underlining or making notes in the margin.
3. A passage with a subject that is familiar to you or in which you are interested may be easier for you. If you find a passage that seems too difficult for you, you might want to skip it and go on to the next passage if it seems easier. You can always return to the passage if you finish before time is up for that section of the test.
4. Answer questions on the basis of what is *stated* or *implied* in the passage. Don't answer questions on the basis of your personal opinion or knowledge.
5. Read all of the choices before you choose your answer. Cross out the choices as you eliminate them.
6. Answer the question that is asked. Don't pick one of the choices simply because you know it's a true statement.
7. Make sure the answer you choose is the *best* among the choices given. Don't be misled by choices that are partially true.
8. In answering main idea questions, don't be distracted by statements that are true according to the passage but that are secondary to the central point.
9. The best way to improve your reading comprehension is to read, read, read. Read newspapers, magazines, fiction, and biography. The more you read, the easier it will be to answer reading comprehension questions (and antonyms, sentence completions, and analogies, too).

FACTS, ASSUMPTIONS, INFERENCES

FACTS are statements that are known to be true, that are real, and that can be demonstrated to be true. For example:

There are 12 inches in a foot.
It is against the law to drive above the speed limit.

ASSUMPTIONS are suppositions or propositions that authors draw on in reaching their conclusions. Often they are not explicitly stated. To read critically you must be able to recognize unstated assumptions the author has made because these assumptions may be accurate or inaccurate, at least from your viewpoint. Identify the underlying assumptions in the following examples:

The principal has promised a big victory dance after the championship game next week.
Let's have a picnic tomorrow.
Reducing the work force will increase the profits.

INFERENCES are conclusions that you reach based on what has been stated in the reading passage. To infer is to arrive at a conclusion through reasoning, to understand what is implied by statements that are made.

Example:

The problem of junk mail has grown to epidemic proportions. I've counted no fewer than 616 pieces of junk mail in my mail box in a given year! Not only is the sheer magnitude appalling, but the antics of these "post-office pirates" are equally
Line disturbing. For example, one enterprising salesman promised me prizes ranging
(5) from a car to a transistor radio if I would drive 200 miles to look at a piece of property. I wrote this con artist and told him I'd come if he paid for the gas, but I never heard from him.

The author's description of junk mail is probably based on

(A) personal experience
(B) research and statistics
(C) hearsay
(D) interviews

The author never explicitly states the source of the information, but because all the examples are taken from the author's own life, it is strongly implied that "personal experience" is the source of information. Phrases such as "I've counted . . . my mail box," "promised me prizes," "I wrote this con artist," "I never heard from him," all support the inference that the author is basing his or her opinions on personal experience.

Test-Taking Tip Sheet

Reading

This is one of a series of test-taking tip sheets developed to provide Latino and other Hispanic students with important information about preparing for standardized tests. All of the tip sheets have been written by Educational Testing Service (ETS) staff members experienced in the development of tests, in collaboration with representatives of the ASPIRA Association, Inc. Other separate tip sheets provide information on analytical, verbal, writing, and quantitative questions, and on general test-taking skills.■

Increasing Your Reading Competence

The best preparation for a reading test is to read often, from a variety of materials. Following are some suggestions for ways to increase your reading competence.

Read a major metropolitan newspaper every day. The *Atlanta Constitution*, *St. Louis Post-Dispatch*, *San Francisco Chronicle*, and the *New York Times* are some examples of newspapers that offer comprehensive coverage of news and issues. In addition to reading the newspaper to keep up with current issues, select one controversial topic discussed in the newspaper and follow the topic closely over a period of time. Read every article that appears about the topic for several months and get to know various writers' opinions as well as the facts.

Read magazines that present opinions as well as information. Try *Harper's*, the *Atlantic Monthly*, *Commentary*, and *National Review*.

Go to the library at least once a week. Choose a topic and read two or three books about it. The subject does not have to be dry and boring. Choose something that interests you (astrology? weapons? movie stars?) and read what various authors think about the topic. Compare their points of view. Then, perhaps you will want to go on to read about related topics (medieval medicine? Revolutionary War strategies? the influence of movies on advertising?). Let your questions and interests carry you into new fields.

Get to know your librarian. If you have questions you cannot find answers for, your librarian can be a good resource. Ask those questions, or just ask him or her to recommend a book that might be interesting. If you have been a regular borrower, your librarian may know something about your interests and preferences and may be able to make excellent recommendations.

Try totally new areas. After you have tried pursuing several topics in depth, branch out. Take a book out of the library that is about something or someone you have never read about. Do not choose anything that is written for experts (a look at the first few pages will tell you if the author assumes that the reader knows special terms or has extensive knowledge) but do promise yourself that you will read at least half of the book. Find out about the history of computers, or pre-Columbian art, or Langston Hughes' early years.

Read with a friend. It can be lonely reading alone, so find a friend who will read the same things that you do and then talk about what you read. At first, choose articles, editorials, or chapters of books—especially materials that present a strong point of view. Talk about whether you agree or disagree and why. Discuss whether you think that the writer could have been more convincing and how he or she could have written more convincingly. Ask each other questions that are based on the relationships between ideas in this material and other things you have read, and talk about your answers.■

Types of Material You Will Find in Reading Tests

When you take a standardized reading test, you usually have to read passages and answer questions about those passages. The passages may be quite short, only a sentence or two, or quite long, as many as 750 words. A test may include passages of different lengths or just one length. You should read the test bulletin of information to find out what to expect.

The content of the passages will vary. Most reading tests have passages from a variety of subject areas: the humanities, the biological and physical sciences, and the social sciences. Tests designed for specific purposes, such as the NTE Test of Communication Skills or the Law School Admission Test, include topics that are related to those purposes. However, all of the information that you need to answer the questions is usually contained in the passage. Again, consult the bulletin of information to learn what content areas are represented in the test you plan to take.

The questions in a reading test typically fall into one of three categories. The *first* kind can be answered by searching through the passage for information or by spotting the information you need in a summary, a rewording, or a paraphrase of information that appears elsewhere *in the passage*. The *second* type of question requires you to think about what you have read and to go *beyond the passage*. For instance, you may have to apply information or ideas gathered from the passage to a new situation or make a prediction or interpret what you have read. The *third* kind of question requires that you recognize the style or tone of the passage or identify the reason the author included a particular phrase and understand something *about the passage*. Following are the types of questions you might be asked about a passage. The list is organized on the basis of the three categories of questions described above.

Question Type I

Concerning what is in the text, you might be asked:

Which of the following questions can be answered based on information provided in the passage?

The author asserts which of the following about...?

Which of the following words can be best substituted for...in line...of the passage?

The passage is primarily concerned with which of the following?

Which of the following best states the primary purpose of the passage?

Which of the following is the best title for the passage?

Which of the following best summarizes...?

Question Type II

Questions going beyond the text might be:

The author's argument assumes which of the following about...?

Which of the following is an unstated assumption underlying...?

If...in the passage is true, which of the following is also true?

Which of the following arguments contradict the author's position about...?

With which of the following conclusions would the author most likely agree?

With which of the following conclusions would the author most likely disagree?

Which of the following is an example of...as described in the passage?

...is similar to... in which of the following ways?

...is different from...in which of the following ways?

Can it be inferred from the passage that...resulted in...?

Which of the following would be the most logical next sentence to be added to the passage?

Question Type III

Questions about the text could be:

Which of the following best describes the style of the passage?

Which of the following best describes the tone of the passage?

Which of the following is the most likely source of the passage?

The author presents his/her argument by... . The author mentions...in order to... .

The author's attitude toward...can best be described as... .

Strategies for Taking Reading Tests

No matter what reading you do, whether for a test or for a course or for pleasure, you are making sense out of the words on the page. While you read, your mind creates meaning from the words the author has written. What you are doing as you read is not just seeing words and understanding them; you are making connections between the ideas on the page and what you already know, you are questioning what the author has written, and you are noticing whether you are making sense of what you are reading. You are actively involved in the process of reading.■

Reading the Passages

Whenever you take a reading test, the processes described above are involved. As you read each passage, you should ask questions of yourself such as:

What is this about?

What is important about what I am reading?

How does the idea I am reading about now relate to other ideas in the passage?

The last point is an especially important one because many reading comprehension questions are based on relationships between ideas. Examples of these relationships, the content of the text, and words that indicate the relationships are given in the chart that follows.

Relationship	Content	Words Used
similarities	information about ideas or objects that are the same or nearly the same or about ideas or objects that have something in common	similarly, as well as, like, as if, just as, moreover, indeed
differences	information about ideas or objects that are different	however, but, in contrast, although, despite, on the contrary, while, rather, on the other hand, surprisingly, admittedly, yet, nevertheless
consequences	information about how one activity or idea leads to another	therefore, thus, since, so, as a consequence, because
sequences	information about the order in which events occur or ideas are presented	next, then, first, second, previously, finally, in turn
elaborations	additional information about an idea or object	an instance, in other words, that is, in fact, for example
generalizations	broad statements about a topic	typically, in many cases, generally

You will note that many of the words that indicate relationships signal differences between ideas. Since many of the passages in reading tests present contrasting points of view or commentaries on ideas in which differences are highlighted, you should pay particular attention to these words.

One way to give attention to relationships between ideas, whether they be differences, similarities, or other relationships, is to circle the words that indicate relationships as you read. You can also go back and forth between ideas as you read to be sure that you understand the way they work together. To understand relationships, you will often have to reread parts of the passage before going ahead.

Another kind of relationship that is important to notice is the relationship between a pronoun or a general term and the idea or object it stands for. When the sentences in a passage are long and when the ideas being presented are unfamiliar, you must pay special attention to what the pronouns or general terms mean. For example, if a passage refers to "the latter point," you could draw an arrow from the phrase "the latter point" to the idea that is being referred to. Or if a passage says "these symptoms" or "this result," you can reread the sentence and mentally substitute the exact symptoms or result for the more general term.

You should also pay attention to the way the passage is written. Sometimes the organization is obvious; the author may indicate exactly what he or she is doing by using expressions such as "for example" or "in conclusion." On the other hand, you may have to look at the way information is presented and determine the organization pattern for yourself. As you read, you should also look for indications of the author's attitude about the subject or point of view. Notice whether the author has used extremely strong language and whether he or she seems to be presenting only one side of an issue. You should not spend too much time thinking about the way the passage is written, however, unless a question about the author's tone or style appears among the test questions that follow the passage.■

Answering the Questions

No matter what kind of question you are answering about a reading passage, many of the same strategies can be used.

First, you should read the question very carefully. You must be sure of what is being asked before you can select the correct answer. Sometimes test takers answer questions that they *think* are being asked and choose the wrong answer. So read the entire question carefully. Then you may find it helpful to look for the part of the passage the question is asking about, particularly if a specific line or statement is indicated.

You should be careful to notice whether the question you are answering includes a word such as NOT, LEAST, or EXCEPT. These questions require that you select the choice that does not fit; if you do *not* give special attention to words such as this, you are likely to select a wrong answer.

Next, carefully read every answer choice. Even if you are sure that you know the answer, you should read all the choices. There are two ways this approach will help you. First, sometimes one answer choice provides only part of the correct answer, while another is actually better because it gives all of the required information. Second, a test taker's own opinions and ideas can interfere with selecting the correct answer. If an answer matches what you know from other sources, even if it is not supported by what appears in the passage, it may seem to be a very attractive answer. You may be able to avoid choosing such answers if you read all of the choices carefully, keeping in mind what the passage says.

When you are answering questions about something that seems to be in the passage, you should check to be sure that the answer you have selected accurately matches something that is stated in the passage. You will probably not find the exact words in both places, but you should be able to determine that the meanings of the answer choice and what the passage says are the same. Remember, too, that if you are answering a question that asks for a general statement, a title, or a summary, you should check the entire passage to see that nothing in it contradicts the choice you have made. If you are not sure of the best answer to one of these questions, you can check each answer choice against what appears in the passage to see which choice offers the closest match.

Questions that go beyond the passage are often about the relationships that were described on page 3. They require both that you understand relationships that are presented in the passage and that you make links between these ideas and new ideas. To answer these questions correctly, you will often have to reread parts of the passage to see whether the question itself presents something new or whether the choices give new information. If each choice presents, for example, a statement that the author might agree with, be sure to check every choice carefully against what you know from reading the passage.

A question asking you something about the passage may be one that asks you to recognize how the author has written the passage or to identify the probable source of the passage. In the first case, you are really being asked to choose the best description of what you have read. Again, you must be sure to read all the answer choices, but with these questions, you should ask yourself which choice matches what the author is doing in the passage. If you are asked to select the most likely source of a passage, keep in mind what each source is like and look for the closest match between the way the passage is written and the way each source listed as a possible answer choice is written.

Use the following list to get information about some of the major standardized tests that contain reading questions:

Graduate Management Admission Test (GMAT)
P.O.Box 6101
Princeton, NJ 08541-6101
(609) 771-7330

Graduate Record Examinations Program (GRE)
Educational Testing Service
P.O.Box 6000
Princeton, NJ 08541-6000
(609) 771-7670

Law School Admissions Council (LSAT)
Box 2000
Newtown, PA 18940-0998
(215) 968-1001

Teacher Programs and Services (NTE)
Educational Testing Service
Box 6051
Princeton, NJ 08541-6051
(609) 771-7670

This test preparation tip sheet was originally prepared by Kalle Gerritz of Educational Testing Service at the request of the Steering Committee for the HBCU-ETS Collaboration. Inquiries may be addressed to the Office of the Corporate Secretary, Educational Testing Service, Princeton, NJ 08541.

Information about the programs and services provided by ASPIRA can be obtained from the ASPIRA Association, Inc., 1112 16th Street, NW, Suite 340, Washington, DC 20036

Carole D. Slaughter, Series Editor, Ruth Klastow, Production Coordinator, Test-Taking Tip Sheets

HO 11.1

RELATIONSHIPS IN ANALOGIES

Analogy questions test your ability to see a relationship in a pair of words, to understand the ideas expressed in the relationship, and to recognize a similar or parallel relationship.

DIRECTIONS:

> Each question below consists of a related pair of words or phrases, followed by five lettered pairs of words or phrases. Select the lettered pair that best expresses a relationship similar to that expressed in the original pair.
>
> Example:
>
> YAWN:BOREDOM:: (A) dream:sleep (B) anger:madness
> (C) smile:amusement (D) face:expression (E) impatience:rebellion
>
> [A] [B] [C] [D] [E]

The colons (:) and double colon (::) are shorthand for *is related to* and *in the same way as*. This question means "YAWN is related to BOREDOM in the same way as ? is related to ?."

The first step in answering an analogy question is to establish a precise relationship between the original pair of words (the two capitalized words) before you examine the five answer choices. In the example above, the relationship between YAWN and BOREDOM can best be stated as "YAWN is a physical sign of BOREDOM," or "YAWN is a facial expression of BOREDOM." Now look at the answer choices for one with a similar relationship. If you hadn't described the relationship between YAWN and BOREDOM you might be tempted by (D) **face:expression.** This is because you made a quick association between these four words. You might also have chosen (A) **dream:sleep** because you associated the words **dream** and **sleep** with YAWN. But describing the relationship as we did above leads us to choose (C) **smile:amusement**, since **smile** is a physical sign (or facial expression) of **amusement**. None of the other first words of the pairs (**dream, anger, face, impatience**) is a physical (observable) expression.

Obviously it is very important to be able to establish the relationship between the words in the given pair, since you must understand that relationship in order to apply it to the answer choices. In the following list you will find examples of relationships that are sometimes used in analogy questions. You don't need to memorize them, but do try to think of some other examples that express these relationships.

RELATIONSHIP	EXAMPLE
A type of	skyscraper:building
A part of	wheel:car
Parts of something else	hand:foot
An adjective describing	carnivorous:lion
A result of	transgression:punishment
A cause (or effect) of	puncture:blowout
Is used to (or done by)	mop:clean
Is used by	hammer:carpenter
Is created (or made) by	cabinet:carpenter
Is made from	shirt:fabric
Is larger (or smaller) than	lake:pond
Is more (or less) than	careful:meticulous
Is a measure of	mile:distance
Has the purpose of	perspiration:cooling
Is located in (or by, around)	sink:kitchen
Is characterized by	miser:greed
Lacks	somber:light
Lacks	somber:cheer

This list is not a complete list of every possible relationship that might be expressed in an analogy, but it is provided to give you an idea of different kinds of relationships. Try to think of some other relationships that might be expressed by a pair of words.

In establishing the relationship between a pair of words, you may find that there are several possibilities. For example, **alley** may be related to **cat** as *a type of* or the *place where the cat lives*. You have to look at the answer choices to determine which meaning (relationship) should be used. **Siberian:tiger** or **lair:tiger** correspond to these possibilities. In the last relationship listed above, **somber** can mean dark and gloomy, in which case something that is **somber** lacks **light**. **Somber** is also used to describe a depressed or depressing person; a person who is **somber** lacks **cheer**.

SAMPLE ANALOGY QUESTIONS

Strategies for analogies

a. Analogy questions test your understanding of how words relate to each other. They ask you to find the pair of words among the five choices that relate in the same way that the first pair does. The best way to find the right relationship is to make up a sentence that shows how the two words in CAPITAL letters relate to each other. Then see what pair of words among the choices works in your sentence.

b. Remember that you are *not* looking for words that are similar to the words in CAPITAL letters or that mean the same as the words in CAPITAL letters. Don't look for a relationship between the first word in CAPITAL letters and the first word in each of the answer choices. Look for a *pair* of words that has the same relationship between them as the *pair* of words in CAPITAL letters.

c. Keep in mind that many words have more than one meaning and that many pairs of words have more than one relationship between them. You may have to try a few relationships before you find the one that helps you choose the one correct answer.

d. You may find the correct relationship but not refine it quite enough the first time. If you can eliminate two or three answer choices with the first relationship you find, you may be able to get the one correct answer by defining the relationship more precisely rather than by trying an entirely different one. You should practice stating precise, accurate relationships.

e. If you don't know the meaning of either of the words in CAPITAL letters, it probably won't help you to guess at the answer. On the other hand, if you know the words in CAPITAL letters but don't know some of the words in the answer choices, you may still be able to answer the question. Remember, if you can eliminate even one of the answer choices, the odds of improving your score are in your favor if you guess.

Remember the following points about PSAT/NMSQT analogies

1. Always establish the relationship *between* the words in CAPITAL letters and *between* the words in the options. Do not try to work on similarities between the first words in the pairs and then the second words in the pairs. PSAT/NMSQT analogies are written on the basis of the relationship *between the given pair of words*. For example, **bright:autumn** would *not* be an analogy for LEAF:FOLIAGE. While there is a relationship between **bright** and LEAF, and between **autumn** and FOLIAGE, this kind of relationship between the first words of the two pairs and the second words of the two pairs is not used in PSAT/NMSQT analogies.

2. Watch for order. KITTEN:CAT as **puppy:dog**. **Dog:puppy** would be an incorrect response because the order is switched.

3. Be sure to choose the best response on the basis of the *relationship* and not on the basis of simple word association. See Question 4 for an example of this.

Some Common Relationships in Analogies

General Classification	Examples	Specific Relationship
Class Inclusion	(fruit:apple::tree:maple)	2nd (term) is a kind of 1st (term)
	(tree:forest::teachers:faculty)	2nd is made up of 1st
	(puppy:dog::kitten:cat)	1st is a young 2nd
Part-Whole	(engine:car::heart:body)	1st is part of 2nd (or 1st runs 2nd)
Attribute or Characteristic	(aesthete:beauty::patriot:country)	1st loves 2nd
	(artist:paint::writer:pen)	1st does 2nd
	(submissive:led::volatile:aroused)	if one is 1st, one is easily 2nd
Nonattribute or Contrast	(loyal:betrayal::honesty:deception)	1st does not do 2nd
	(vacuum:air::tundra:trees)	1st lacks 2nd
Degree or Intensity	(like:love::dislike:despise)	2nd is extreme 1st
Excessive Degree	(eating:gluttony::frugality:stinginess)	2nd is too much (excessive) 1st
Cause (or Purpose) or Effect	(axe:split::knife:cut)	1st is used in order to 2nd
	(refine:petroleum::smelt:ore)	to 1st is to purify 2nd
Place or Time	(sculptor:studio::actor:stage)	1st works in or on 2nd
Symbol or Representation	(applause:enjoyment::frown:annoyance)	1st is a sign of 2nd
Recipient	(scholarship:student::bequest:heir)	1st is given to 2nd (or 2nd receives 1st)
Agent or Doer	(playwright:tragedy::composer:symphony)	2nd is one of the products created by 1st

FORM GR 88-9

01

THE GRADUATE RECORD EXAMINATIONS

General Test

Do not break the seal until you are told to do so.

The contents of this test are confidential. Disclosure or reproduction of any portion of it is prohibited.

Princeton, N.J. 08541

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SECTION 3

Time—30 minutes

30 Questions

Numbers: All numbers used are real numbers.

Figures: Position of points, angles, regions, etc. can be assumed to be in the order shown, and angle measures can be assumed to be positive.

Lines shown as straight can be assumed to be straight.

Figures can be assumed to lie in a plane unless otherwise indicated.

Figures that accompany questions are intended to provide information useful in answering the questions. However, unless a note states that a figure is drawn to scale, you should solve these problems NOT by estimating sizes by sight or by measurement, but by using your knowledge of mathematics (see Example 2 below).

Directions: Each of the Questions 1-15 consists of two quantities, one in Column A and one in Column B. You are to compare the two quantities and choose

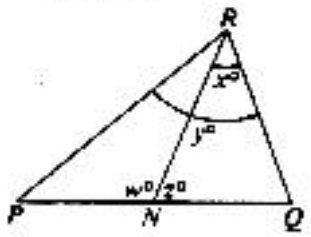
A if the quantity in Column A is greater;
B if the quantity in Column B is greater;
C if the two quantities are equal;
D if the relationship cannot be determined from the information given.

Note: Since there are only four choices, NEVER MARK (E).

Common Information: In a question, information concerning one or both of the quantities to be compared is centered above the two columns. A symbol that appears in both columns represents the same thing in Column A as it does in Column B.

	Column A	Column B	Sample Answers
Example 1:	2×6	$2 \div 6$	(A) ● (C) (D) (E)

Examples 2-4 refer to ΔPQR.



Example 2:	PN	NQ	(A) (B) (C) ● (E)

(since equal measures cannot be assumed, even though PN and NQ appear equal)

Example 3:	x	y	(A) ● (C) (D) (E)

(since N is between P and Q)

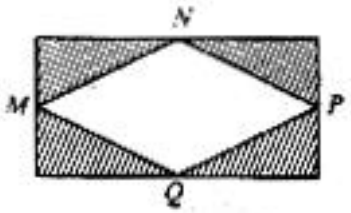
Example 4:	$w + z$	180	(A) (B) ● (D) (E)

(since PQ is a straight line)

3 3 3 3 3 3 3 3 3 3 3 3

A if the quantity in Column A is greater;
B if the quantity in Column B is greater;
C if the two quantities are equal;
D if the relationship cannot be determined from the information given.

Column A	Column B
A man left $\frac{1}{3}$ of his estate to his widow and designated that the remainder be divided equally among his 4 sons.	
1. The fraction of the estate designated for each son	$\frac{1}{12}$

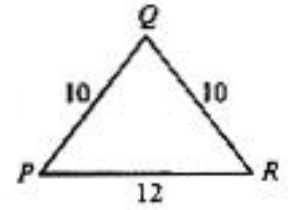


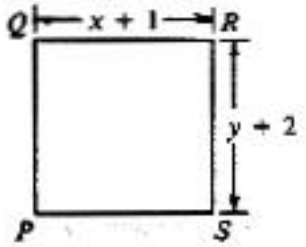
M, N, P, and Q are midpoints of the sides of the rectangle.

2.	The sum of the areas of the shaded regions	The area of the unshaded region $MNPQ$
3.	$\sqrt{38,205}$	200

a, b, and c are negative integers.

4.	abc	$a(b + c)$

Column A	Column B
	
5. The altitude of $\triangle PQR$ from Q	6



$PQRS$ is a square.

6.	x	y

$x > 1$

7.	$(x + 5)(2x + 3)$	$(x + 3)(2x + 5)$

$x > 0$

8.	$\frac{x}{14}$	$\frac{14}{x}$

GO ON TO THE NEXT PAGE.

3 3 3 3 3 3 3 3 3 3 3

A if the quantity in Column A is greater;
B if the quantity in Column B is greater;
C if the two quantities are equal;
D if the relationship cannot be determined from the information given.

	Column A	Column B
	The largest circular tabletop that can be cut from a certain square piece of wood has a circumference of 105π inches.	
9.	The length of a side of the piece of wood before the tabletop is cut from it	105π inches

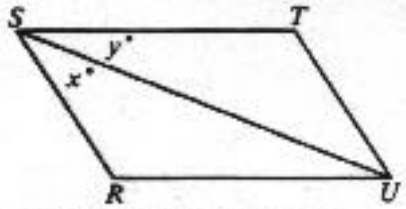
	$10^{20} = \frac{10^{100}}{10^n}$	
10.	n	5

	Maria's weekly net salary of \$585 is 65 percent of her weekly gross salary.	
11.	Maria's weekly gross salary	\$900

12.	The number of different positive divisors of 12	The number of different positive divisors of 50

	Column A	Column B
	$x - y \neq 0$	
13.	$\frac{3x^2 - 3y^2}{x - y}$	$3(x - y)$

	$3 \times 3 \times n = 2 \times 2 \times p$ $np \neq 0$	
14.	$\frac{n}{p}$	$\frac{2}{3}$



RSTU is a parallelogram.

15.	x	y

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3 3 3 3 3 3 3 3 3 3 3 3

Directions: Each of the Questions 16-30 has five answer choices. For each of these questions, select the best of the answer choices given.

16. If $8x - 3y = 24$ and $y = 0$, then $x =$

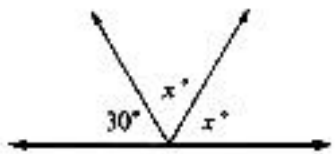
(A) 3 (B) 4 (C) 5 (D) 6 (E) 8

17. If the sum of 3, 7, and x is 18, then the average (arithmetic mean) of 3, 7, and x is

(A) 6 (B) 7 (C) 8 (D) 9 (E) 10

18. If $n = 3$, what is the value of $2^{2n} + 1$?

(A) 9 (B) 13 (C) 17 (D) 33 (E) 65



19. In the figure above, $x =$

(A) 30 (B) 35 (C) 60 (D) 75 (E) 150

20. Three individuals contributed $800 each toward the purchase of a computer. If they bought the computer on sale for $1,950 plus 10 percent sales tax, how much money should be refunded to each individual?

(A) $65
(B) $85
(C) $150
(D) $195
(E) $255

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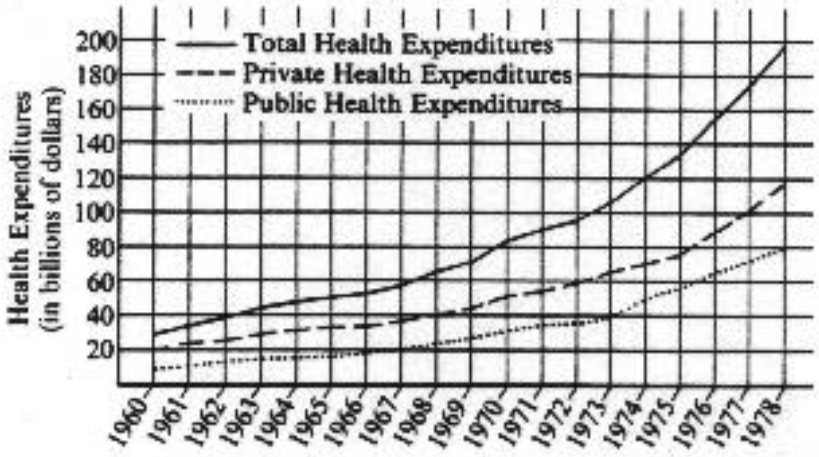
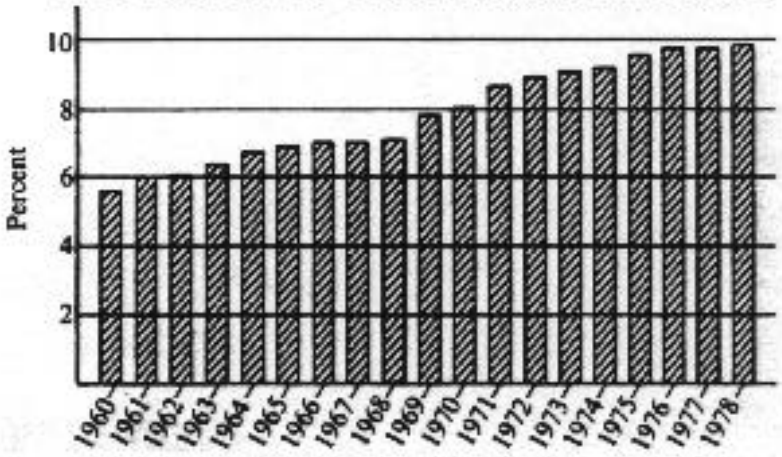
Questions 21-25 refer to the following graphs.

NATIONAL HEALTH EXPENDITURES: 1960 TO 1978



Note: Drawn to scale.

TOTAL NATIONAL HEALTH EXPENDITURES AS A PERCENT OF GROSS NATIONAL PRODUCT



Note: Drawn to scale.

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21. In 1969 approximately what was the amount of private health expenditures?

(A) $25 billion (B) $30 billion (C) $45 billion
(D) $50 billion (E) $70 billion

22. For the years shown, what was the first year in which the amount of public health expenditures was at least $30 billion?

(A) 1960
(B) 1962
(C) 1964
(D) 1968
(E) 1970

23. In 1976 approximately what was the ratio of the amount of private health expenditures to the amount of public health expenditures?

(A) 3:1
(B) 2:1
(C) 3:2
(D) 2:3
(E) 1:3

24. For the year in which public health expenditures were closest to $40 billion, total health expenditures were approximately what percent of the gross national product?

(A) 10%
(B) 9%
(C) 8%
(D) 7%
(E) 6%

25. Approximately what was the amount of the gross national product in 1968?

(A) $600 billion
(B) $750 billion
(C) $800 billion
(D) $950 billion
(E) It cannot be determined from the information given.

GO ON TO THE NEXT PAGE.

3 3 3 3 3 3 3 3 3 3 3

26. If x and y are integers and $x > y > 0$, how many integers are there between, but not including, x and y?

(A) $x - y$
(B) $x + y$
(C) $x - y - 1$
(D) $x + y - 1$
(E) $x - y + 1$

27. For which of the following expressions would the value be less if 350 were replaced by 347?

I. $2{,}500 - 350$

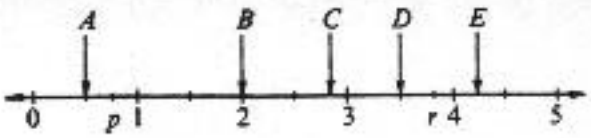
II. $\frac{1}{350}$

III. $\frac{1}{1 + \frac{1}{350}}$

(A) None (B) II only (C) III only
(D) I and III (E) II and III

28. If the circumference of circle P is 15.714 and the circumference of circle Q is 6.28, then the diameter of circle P minus the diameter of circle Q is approximately equal to

(A) 1.5
(B) 3.0
(C) 5.5
(D) 9.0
(E) 9.4



Note: Figure drawn to scale.

29. According to the number line above, which of the following points has a coordinate most nearly equal to $p \times r$?

(A) A (B) B (C) C (D) D (E) E

30. A rectangular rug covers half of a rectangular floor that is 9 feet wide and 12 feet long. If the dimensions of the rug are in the same ratio as those of the floor, how many feet long is the rug?

(A) 6
(B) $\frac{21}{2}$
(C) $2\sqrt{7}$
(D) $6\sqrt{2}$
(E) $4\sqrt{6}$

STOP

IF YOU FINISH BEFORE TIME IS CALLED, YOU MAY CHECK YOUR WORK ON THIS SECTION ONLY.
DO NOT TURN TO ANY OTHER SECTION IN THE TEST.

Prepared for:
1991-92 Project 1,000 Workshops

GRE Quantitative Sections
Test Taking Strategies

James Braswell
Educational Testing Service
Princeton, NJ 08541

The two quantitative sections of the GRE General Test each contain 30 questions administered in 30 minutes. Two types of questions are used: Quantitative Comparison 4-choice questions and Regular 5-choice questions. The following information may be helpful in developing your own approach to achieving your best possible score on the quantitative portion of the test.

- Questions of each type are generally arranged from easy to hard. For example, the Quantitative Comparison questions begin easy and gradually get harder.
- All questions count the same amount toward your score. An easy question is worth just as much as a hard question. Be cautious on the easier questions and avoid careless mistakes.
- Each correct answer is worth about 10-15 points. Your score is reported on the 200-800 scale.
- There is no penalty for guessing, so you should mark an answer to every question.
- If you guess, try to eliminate any choices that you know are wrong before you guess. This will improve your chances of answering such questions correctly.
- Do not hesitate to do scratchwork in the test booklet. Draw sketches that may help you solve a problem. Add information to figures that may aid in the solution of a problem. Cross off any choices in your test booklet that you know are wrong.

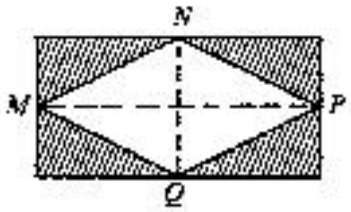
There are several practice quantitative sections in the publication GRE General Test-No. 6. The following discussion considers questions in Section 3 on pages 132-138 and offers suggestions for approaching them. The first 15 questions are in the comparison format. You should become thoroughly familiar with the directions for this type of question before the test date since time spent reading directions during the test is time that could be spent answering questions.

SOLUTIONS AND COMMENTS ON SELECTED QUESTIONS
Pages 132-138, GRE General Test-No. 6

Section 3

1. Since the man left $\frac{1}{3}$ of his estate to his widow, $\frac{2}{3}$ of his estate remained to be divided equally among the 4 sons. Each son would receive $\frac{2}{3} \div 4 = \frac{2}{12}$ of the estate. Since $\frac{2}{12} > \frac{1}{12}$, the quantity in Column A is greater than the quantity in Column B. Therefore, the correct answer is A.

2. In the figure draw segments NQ and MP as follows:

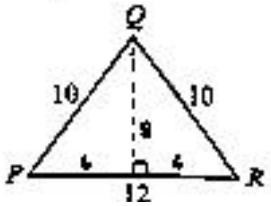


These segments divide the larger rectangle into 4 equal rectangles. In each of the smaller rectangles the shaded and unshaded regions have equal area. Therefore, the sum of the areas of the shaded regions is equal to the area of the unshaded region. The correct answer is C.

3. Rather than attempt to take the square root of the quantity in Column A, square the quantities in each column. The square of the quantity in Column A is 38,205. The square of the quantity in Column B is 40,000. Therefore, the quantity in Column B must be greater than the quantity in Column A.

4. This is an interesting question since at first glance one might be inclined to say the correct answer is D. However, since a, b, and c are negative, the product abc is also negative. (The product of an odd number of negative numbers must be negative.) Now consider the quantity in Column B. Since a is negative and the sum of b and c is negative, the product of these 2 quantities must be positive. Since any positive number is greater than any negative number, the quantity in Column B is greater.

5. Sketch the altitude from vertex Q to side PR as shown below. The altitude divides PR into equal segments of length 6. Using the Pythagorean Theorem, the length of the altitude from Q is 8 (since $6^2 + 8^2 = 10^2$). Therefore, the quantity in Column A is 8, which is greater than the quantity in Column B. If you are rusty on the Pythagorean Theorem, you may want to review this in a geometry textbook.



6. Since *PQRS* is a square, $x + 1 = y + 2$. This is equivalent to $x = y + 1$ which means x is 1 more than y. Therefore, $x > y$.

7. Again, at first glance you may be inclined to say that the correct answer is D because the specific value of x is unknown. However, if you multiply the expressions in Columns A and B, you have $2x^2 + 13x + 15$ in Column A and $2x^2 + 11x + 15$ in Column B. The quantity $2x^2 + 15$ is common to both expressions and can be disregarded. What is left is $13x$ compared to $11x$. Since you are given that x is greater than 1, $13x$ must be greater than $11x$. Note that if you had been given that x was less than 0, the quantity $13x$ would have been less than $11x$. Therefore, it is important to pay close attention to the given information.

8. In questions like this it is helpful to try a few values of x. If you try 7, 14, and 15, you will observe that the quantity in Column A can be less than, equal to, or greater than the quantity in Column B. When this situation exists, the correct answer is D.

9. If the circumference of the tabletop is 105π inches, the diameter of the tabletop must be 105 inches. (Recall that $C = \pi d$.) Since the largest possible tabletop has been cut from the square piece of wood, the situation must be as shown below.

Since the diameter of the tabletop is equal to the length of a side of the square piece of wood, the quantity in Column A is 105 inches. The correct answer is B.

10. Since $\frac{10^{100}}{10^{80}} = 10^{20}$, the value of n must be 80. Another approach is to observe that $\frac{10^{100}}{10^{n}} = 10^{100-n}$. Therefore, $100 - n = 20$ or $n = 80$. The correct answer is A.

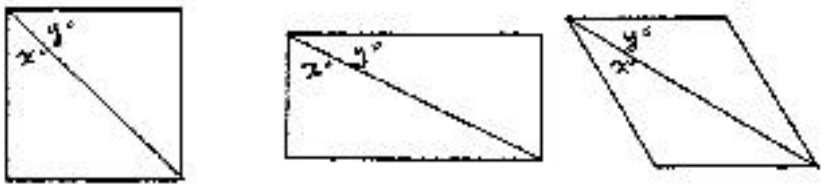
11. If you let G stand for Marie's gross salary, the given information leads to the equation $\$585 = .65 \times G$. So, $G = \frac{585}{.65} = 900$. Therefore, the quantity in Column A is equal to the quantity in Column B and the correct answer is C.

12. The positive divisors of 12 are 1, 2, 3, 4, 6, and 12. The positive divisors of 50 are 1, 2, 5, 10, 25, and 50. Therefore, both 12 and 50 have 6 positive divisors. The correct answer is C.

13. In Column A the numerator can be factored as follows: $3x^2 - 3y^2 = 3(x + y)(x - y)$. If you divide this expression by $x - y$, the quantity in Column A becomes $3(x + y)$. Now you may be inclined to mark the correct answer as A since it seems like $3(x + y)$ should be greater than $3(x - y)$. However, y could be a negative number or zero. If you try both positive and negative values for y you will find that the quantity in Column A is not necessarily greater than the quantity in Column B. Therefore, the correct answer is D.

14. The expression $3 \times 3 \times n = 2 \times 2 \times p$ can be rewritten as $9n = 4p$. Therefore, $\frac{n}{p} = \frac{4}{9}$. Since $\frac{4}{9}$ is less than $\frac{2}{3}$, the correct answer is B.

15. For this question you need to keep in mind that figures are not necessarily drawn to scale (you may want to review the notes on figures near the top of page 132). Based on the appearance of the figure, the $x°$ angle looks slightly larger than the $y°$ angle. However, can we draw this conclusion from what is given in the figure? The answer is no since we do not know the relative lengths of RS and RU. If, for example, $RS = RU$, then $x = y$. If $RS < RU$, then $x > y$. And finally, if $RS > RU$, $y > x$. It may help to keep in mind that each of the following figures is consistent with the given information and the notes about how figures are drawn.



16. Since $y = 0$, $3y = 0$ and the equation becomes $8y = 24$; thus, $y = 3$. The correct answer is A.

17. The average of 3, 7, and x is $\frac{3 + 7 + x}{3} = \frac{18}{3} = 6$. The correct answer is A. Note that you do <u>not</u> have to find the value of x to answer this question.

18. For $n = 3$ the value of $2^{2n} + 1 = 2^6 + 1 = 64 + 1 = 65$. Remember that $2^6 = 2 \times 2 \times 2 \times 2 \times 2 \times 2$. The correct answer is E.

19. Since $30° + x° + x° = 180°$ the value of x must be 75. The correct answer is D.

20. There are several parts to this question and you will need to work on each part separately. The total purchase price is $1,950 + 10% sales tax, or $1,950 + $195 = $2,145. If the total purchase price is $2,145, each of the 3 individuals would have paid 2,145 ÷ 3 or $715. Since each individual contributed $800, an $85 refund is due to each individual. The correct answer is B.

> Note: Each math section of the GRE currently contains one set of five questions related to the graphical presentation of data. This is a good place to pick up points since the mathematics needed to solve these questions usually involves only arithmetic.

21. This question uses the first graph and refers to Private Health Expenditures which is the dashed line. In 1969 the dashed line crosses the vertical line just above the $40 billion mark. Choice C, $45 billion, appears to be the closest approximation.

22. This question also uses the first graph but in this case refers to the dotted line for Public Health Expenditures. $30 billion is the midpoint between $20 billion and $40 billion. If you follow the dotted line across, in 1969 the dotted line appears just below the midpoint whereas in 1970 the dotted line appears to be slightly above the midpoint. Therefore, the correct answer is E.

23. This question again uses the first graph. In 1976 Private Health Expenditures were approximately $90 billion and Public Health Expenditures were approximately $65 billion. The ratio of 90 to 65 (i.e., 90:65) is closest to 3:2, choice C. Notice that choices A and B are clearly too large, whereas choices D and E give ratios that are too small.

24. This question uses <u>both</u> graphs. The year in which Public Health Expenditures were closest to $40 billion was 1973. This is found in the first graph. Now, referring to 1973 in the second graph, you find that Total Health Expenditures for that year were approximately 9% of the Gross National Product. The correct answer is choice B.

25. This is a difficult question because at first glance it appears that the answer cannot be determined from the information given. However, notice that in the first graph Total Health Expenditures in 1968 were approximately $65 billion. Now, using the second graph, observe that in 1968 Total Health Expenditures were approximately 7% of the Gross National Product. This leads to the equation .07G = $65 billion, where G stands for the Gross National Product. Dividing both sides of this equation by .07 gives approximately $930 billion as the value of the Gross National Product. The choice closest in value to $930 billion is choice D. As a rule, questions in a set get more difficult from the first to the last. This is clearly true in this instance since question 25 is considerably more difficult than the earlier questions.

26. For this question a reasonable approach is to consider values of x and y that satisfy the given conditions and determine the pattern. For example, if $x = 2$ and $y = 1$, there is no integer between x and y. If $x = 3$ and $y = 1$, there is one integer between x and y, namely 2. If $x = 4$ and $y = 1$, there are two integers between x and y. The pattern begins to get clear, namely, that there is one fewer integer between x and y than the difference between them. For example, if $x - y = 3$, there are two integers between x and y. Thus, the correct answer is $x - y - 1$.

Another approach to this question is to select values of x and y that satisfy the condition $x > y > 0$. For example, $x = 8$ and $y = 4$. In this case, there are 3 integers between them, namely, 5, 6, and 7. Now evaluate each choice and determine which has value 3. Only choice C has value 3.

27. For questions in this format you must consider each of the Roman numeral statements separately. In Statement I, if you replace 350 by 347, the expression is larger not smaller. Therefore, Statement I is not part of the answer. Similarly, in Statement II $\frac{1}{347}$ is greater than $\frac{1}{350}$. Therefore, Statement II is "out". Suppose at this point you could not decide about Statement III. Then you should guess among the choices provided. Clearly the answer cannot be B, D, or E because we know that Statements I and II are not part of the answer. Therefore, if you guess you should guess either A or C. In this particular case you can verify that Statement III would be less if 350 were replaced by 347. The correct answer is C. Note that when comparing two positive fractions that have the same numerator, the fraction with the smaller denominator is the greater fraction -- e.g., $\frac{2}{3} > \frac{2}{5}$.

28. This question is not as complicated as it might seem at first. The circumference of a circle is equal to πd, where d is the diameter. Since π is a little more than 3, the diameter of circle P is about 5 and the diameter of circle Q is about 2. Thus, the difference is about 3.

29. Since figures involving number lines are generally drawn to scale (see note under figure), you may estimate the values which are given on the number line. In this particular case, p is approximately $\frac{3}{4}$ and r is just less than 4. To make things easy, assume that r is 4. The expression $p \times r$ then becomes $\frac{3}{4} \times 4$ which is 3. Now look at the figure. There is no arrow that points to 3 but notice that the C arrow points just to the left of 3 which is consistent with the fact that r is a little less than 4. The correct answer is choice C.

30. The ratio of the width of the rug to the length must be 9 to 12 or 3 to 4, and the area of the rug must be $\frac{1}{2}(9 \times 12) = 54$ square feet. If L is the length of the rug, the width of the rug must be $\frac{3}{4}L$. Thus, $L \times \frac{3}{4}L = 54$. If you solve this equation, you will find $L = 6\sqrt{2}$. The correct answer is D.

GOOD LUCK WHEN YOU TAKE THE GRE

MATHEMATICS CONCEPTS
Numbers, Percent, Fractions, Decimals, Average, Factoring

Numbers

Definitions of symbols

$=$ is equal to	$\leqq$ is less than or equal to
$\neq$ is unequal to	$\geqq$ is greater than or equal to
$<$ is less than	$\parallel$ is parallel to
$>$ is greater than	$\perp$ is perpendicular to

Words and phrases you should know

When you see	*Think*
positive integers	$1, 2, 3, 4, \ldots$
negative integers	$-1, -2, -3, -4, \ldots$
integers	$\ldots, -4, -3, -2, -1, 0, 1, 2, 3, 4, \ldots$
odd numbers	$\pm 1, \pm 3, \pm 5, \pm 7, \pm 9, \ldots$
even numbers	$0, \pm 2, \pm 4, \pm 6, \pm 8, \ldots$
consecutive integers	$n, n+1, n+2, n+3, n+4, \ldots$ (n = an integer)
consecutive even integers	$2n, 2n+2, 2n+4, 2n+6, \ldots$ (n = an integer)
consecutive odd integers	$2n+1, 2n+3, 2n+5, 2n+7, \ldots$ (n = an integer)
prime numbers	$2, 3, 5, 7, 11, 13, 17, 19, \ldots$

Operations—odd and even numbers

Addition	*Multiplication*
even + even = even	even × even = even
odd + odd = even	odd × odd = odd
even + odd = odd	even × odd = even

Squares, powers, roots

Squares of integers

n	1	2	3	4	5	6	7	8	9	10	11	12
n^2	1	4	9	16	25	36	49	64	81	100	121	144

n	-1	-2	-3	-4	-5	-6	-7	-8	-9	-10	-11	-12
n^2	1	4	9	16	25	36	49	64	81	100	121	144

Powers

$a^m \cdot a^n = a^{m+n}$

$\left(\frac{a}{b}\right)^m = \frac{a^m}{b^m} \quad (b \neq 0)$

$(a^m)^n = a^{mn}$

$(\sqrt{a})^m = \sqrt{a^m} \quad (a \geq 0)$

Roots

If $a > 0$, $\sqrt{a}$ is the positive square root of a, e.g., $\sqrt{9} = 3$

$\sqrt{ab} = \sqrt{a}\sqrt{b}$ where a and b are ≥ 0

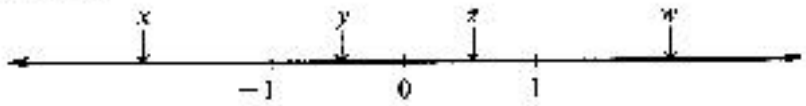
Signed number properties

positive × positive = positive
negative × negative = positive
negative × positive = negative

$-(a - b) = b - a$

$(-x)^2 = x^2$

If $x < 0$, $x^2 > 0$



On the number line above:

$x < y$	For example, $-2 < -\frac{1}{2}$
$y^2 > 0$	
$z^2 < z$	For example, $(\frac{1}{2})^2 < \frac{1}{2}$
$z^2 > z$	For example, $(-2)^2 > \frac{1}{2}$
$z^2 < w$	
$x - z < 0$	
$y - x > 0$	For example, $-\frac{1}{2} - (-2) = -\frac{1}{2} + 2 > 0$

Percent, Fractions, and Decimals

Percent means hundredths or number out of 100, so that $\frac{40}{100}$ = 40 percent and 3 is 75 percent of 4 (because $\frac{3}{4} = \frac{75}{100}$ = 75 percent).

Some percent equivalents

$\frac{1}{10} = 0.1 = 10\%$

$\frac{1}{5} = 0.2 = 20\%$

$\frac{1}{2} = 0.5 = 50\%$

$\frac{1}{1} = 1.0 = 100\%$

$\frac{2}{1} = 2.0 = 200\%$

Note: To convert a fraction or decimal to percent, multiply by 100.

General method of converting a fraction $\frac{a}{b}$ to a percent

$\frac{a}{b} = \frac{x}{100}$

$x = 100\left(\frac{a}{b}\right)$

Example: $\frac{3}{4} = \frac{x}{100}$

Therefore, $x = 100\left(\frac{3}{4}\right) = 75$

$\frac{3}{4} = \frac{75}{100} = 75\%$

Percents greater than 100

Problem: 5 is what percent of 2?

Solution: $5 = \frac{x}{100} \cdot 2 = \frac{2x}{100}$

$500 = 2x$

$x = 250$

This solution translates the problem into an algebraic statement as follows:

5 is what percent of 2?

$5 = \frac{x}{100} \cdot 2$

Note that saying 5 is 250 percent of 2 is equivalent to saying that 5 is $2\frac{1}{2}$ times 2.

Problem: Sue earned \$10 on Monday and \$12 on Tuesday. The amount earned on Tuesday is what percent of the amount earned on Monday?

An equivalent question is "\$12 is what percent of \$10?"

Solution: $\frac{12}{10} = \frac{x}{100}$

$x = \frac{1,200}{10} = 120$

So, $\frac{12}{10} = \frac{120}{100} = 120\%$

Percents less than 1

Problem: 3 is what percent of 1,000?

Solution: $\frac{3}{1,000} = 0.003 = 0.3\%$ or $\frac{3}{10}$ of 1 percent

Problem: Socks are \$1.00 a pair or 2 pairs for \$1.99. The savings in buying 2 pairs is what percent of the total cost at the single pair rate?

Solution: At the single pair rate, 2 pairs would cost \$2.00, so the savings is only \$0.01. The question is "\$0.01 is what percent of \$2.00?"

Because $\frac{0.01}{2.00} = \frac{0.5}{100}$, the savings is 0.5% or $\frac{1}{2}$ of 1 percent.

Average

The average (arithmetic mean) of a set of n numbers is the sum of the numbers divided by n. For example, the average of 10, 20, and 27 is

$$\frac{10 + 20 + 27}{3} = \frac{57}{3} = 19$$

Finding the average of algebraic expressions

Problem: Find the average of $(3x + 1)$ and $(x - 3)$.

Solution: $\frac{(3x + 1) + (x - 3)}{2} = \frac{4x - 2}{2} = 2x - 1$

Finding a missing number if certain averages are known

Problem: The average of a set of 10 numbers is 15. If one of these numbers is removed from the set, the average of the remaining numbers is 14. What is the value of the number removed?

Solution: The sum of the original 10 numbers is $10 \cdot 15 = 150$. The sum of the remaining 9 numbers is $9 \cdot 14 = 126$. Therefore, the value of the number removed must be $150 - 126 = 24$.

Finding a weighted average

Problem: In a group of 10 students, 7 are 13 years old and 3 are 17 years old. What is the average of the ages of these 10 students?

Solution: The solution is NOT the average of 13 and 17, which is 15. In this case the average is:

$$\frac{7(13) + 3(17)}{10} = \frac{91 + 51}{10} = 14.2 \text{ years}$$

The expression "weighted average" comes from the fact that 13 gets a weight factor of 7 (because there are 7 students who are 13) while 17 gets a weight factor of 3.

Finding the average speed in distance-rate-time problems

Problem: Jane traveled for 2 hours at a rate of 70 kilometers per hour and for 5 hours at a rate of 60 kilometers per hour. What was her average speed for the 7-hour period?

Solution: In this situation, the average speed is:

$$\frac{\text{total distance}}{\text{total time}}$$

The total distance is $2\,(70) + 5\,(60) = 440$ km. The total time is 7 hours. Therefore, the average speed was $\frac{440}{7} = 62\frac{6}{7}$ kilometers per hour. Note that in this example the average speed, $62\,\frac{6}{7}$, *is not the average* of the two separate speeds, which would be 65.

Factoring

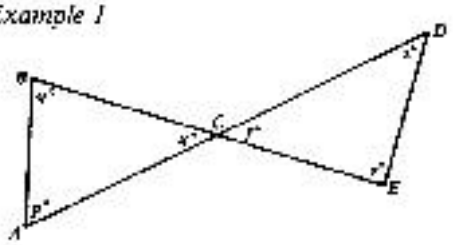
$x^2 + 2x = x\,(x + 2)$
$x^2 - 1 = (x + 1)\,(x - 1)$
$x^2 + 2x + 1 = (x + 1)\,(x + 1) = (x + 1)^2$
$x^2 - 3x - 4 = (x - 4)\,(x + 1)$

MATHEMATICS CONCEPTS
Geometry

Geometric Figures

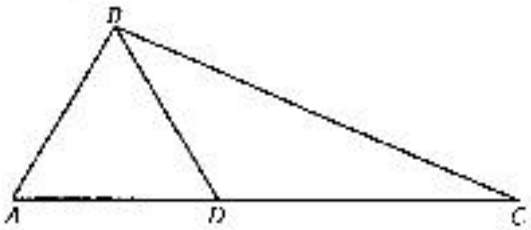
Figures that accompany problems on the test are intended to provide information useful in solving the problems. They are drawn as accurately as possible EXCEPT when it is stated in a particular problem that the figure is not drawn to scale. The following examples illustrate the way figures can be interpreted.

Example 1



Since AD and BE are line segments, ACB and DCE are vertical angles, and you can conclude that $x = y$. You should NOT assume that $AC = CD$, that $p = 60$, or that the angle at vertex E is a right angle even though they might appear that way.

Example 2



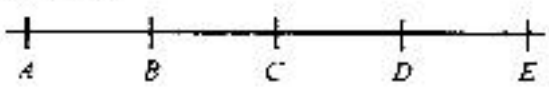
Note: Figure not drawn to scale.

Although the note indicates that $\triangle ABC$ is not drawn to scale, you may assume that:
(1) ABD and DBC are triangles.
(2) D is between A and C.
(3) ADC is a straight line.
(4) Length $AD <$ length AC
(5) Measure $\angle ABD <$ measure $\angle ABC$

You may not assume the following:

(1) Length $AD <$ length DC
(2) Measure $\angle BAD =$ measure $\angle BDA$
(3) Measure $\angle DBC <$ measure $\angle ABD$
(4) $\angle ABC$ is a right angle.

Example 3



Note: Figure not drawn to scale.

Given: $AC = 10$, $AE = 18$, $BC = 6$

The figure above is not drawn to scale. However, the lengths of three of the line segments are given, and these lengths can be used to determine the lengths of certain other segments. For example,

$$AB = AC - BC = 10 - 6 = 4$$

$$CE = AE - AC = 18 - 10 = 8$$

However, from the information given, it is not possible to determine the length of either CD or DE.

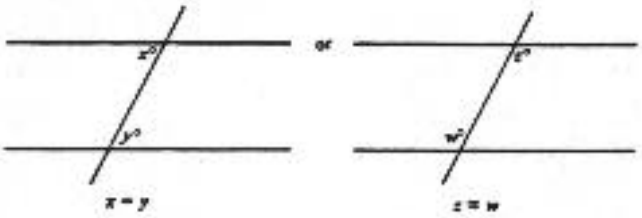
In general, even when figures are not drawn to scale, the relative positions of points and angles may be assumed to be in the order shown. Also, line segments that extend through points and appear to lie on the same line may be assumed to be on the same line, as illustrated in the three figures above. The note that a figure is not drawn to scale is used when specific lengths and degree measures may not be accurately shown.

Geometric Skills and Concepts

Properties of Parallel Lines

1. If two parallel lines are cut by a third line, the alternate interior angles are equal.

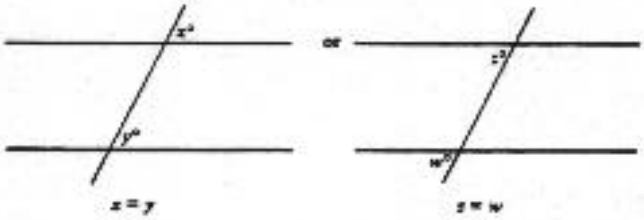
   For example:



$x = y$ $\quad z = w$

2. If two parallel lines are cut by a third line, the corresponding angles are equal.

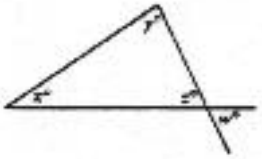
   For example:



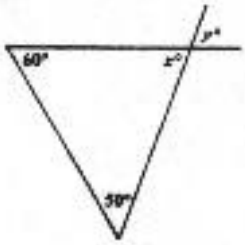
$x = y$ $\quad z = w$

Note: Words like "alternate interior" or "corresponding" are generally not used on the test, but you do need to know which angles are equal.

Angle Relationships

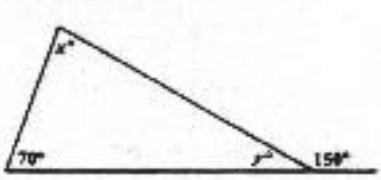


$x + y + z = 180$
(Because the sum of the interior angles of a triangle is 180°)



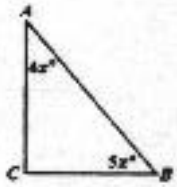
$y = 70$
(Because x is equal to y and $60 + 50 + x = 180$)

$z = w$
(When two straight lines intersect, vertical angles are equal.)

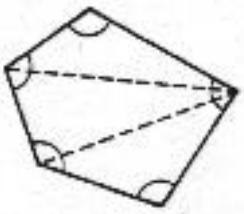


$y = 30$
(Because a straight angle is 180°, $y = 180 - 150$)

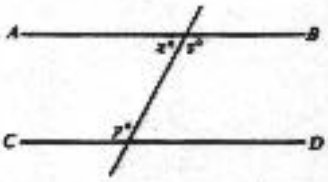
$x = 80$
(Because $70 + 30 + x = 180$)



$x = 10$
(Because $4x + 5x = 90°$) Also, the length of side AC is greater than the length of side BC (Because $\angle B$ is greater than $\angle A$)

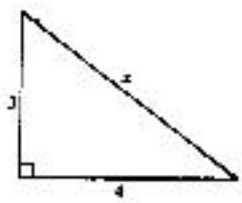


The sum of all angles of the polygon above is $3(180°) = 540°$ because it can be divided into 3 triangles, each containing 180°.

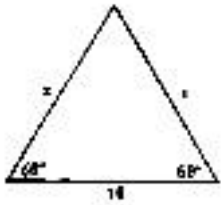


If AB is parallel to CD, then $x + y = 180$ (Because $x + z = 180$ and $y = z$)

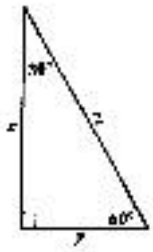
Side Relationships



$x = 5$
(By the Pythagorean Theorem,
$x^2 = 3^2 + 4^2$
$x^2 = 9 + 16$
$x^2 = 25$
$x = \sqrt{25} = 5$)

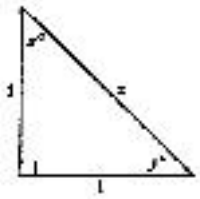


$x = y = 10$
(Because the unmarked angle is 60°, all angles of the triangle are equal, and, therefore, all sides of the triangle are equal.)



$y = 1$
(Because the length of the side opposite the 30° angle in a right triangle is half the length of the hypotenuse)

$x = \sqrt{3}$
(By the Pythagorean Theorem,
$x^2 + 1^2 = 2^2$
$x^2 = 3$
$x = \sqrt{3}$)



$x = y = 45°$
(Because two sides are equal, the right triangle is isosceles and angles x and y are equal. Also, $x + y = 90$ which makes both angles 45°)

$z = \sqrt{2}$
(Because $1^2 + 1^2 = z^2$)

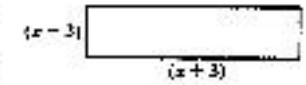
Area and Perimeter Formulas

Area of a rectangle = length × width
$= L \times W$
Perimeter of a rectangle $= 2(L + W)$

Examples:

Area = 12

Perimeter = 14



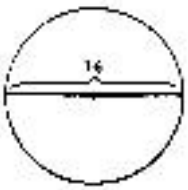
Area $= (x - 3)(x + 3) = x^2 - 9$

Perimeter $= 2[(x + 3) + (x - 3)] = 2(2x) = 4x$

Area of a circle $= \pi r^2$ (where r is the radius)
Circumference of a circle $= 2\pi r = \pi d$ (where d is the diameter)

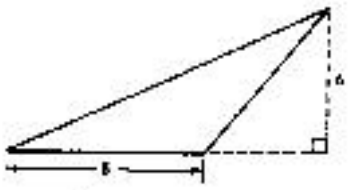
Examples:

Area $= \pi(3^2) = 9\pi$
Circumference $= 2\pi(3) = 6\pi$

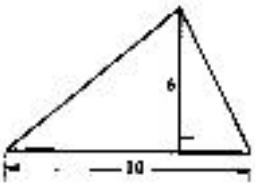


Area $= \pi(8^2) = 64\pi$
Circumference $= \pi(16) = 16\pi$

Area of a triangle $= \frac{1}{2}$(base × altitude)

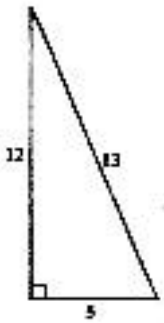


Area $= \frac{1}{2} \cdot 8 \cdot 6 = 24$



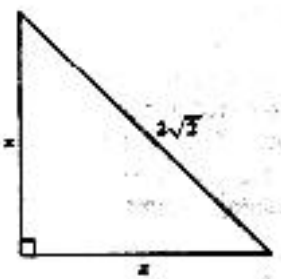
Area $= \frac{1}{2} \cdot 10 \cdot 6 = 30$

Area and Perimeter Formulas (continued)



Area $= \frac{1}{2} \cdot 5 \cdot 12 = 30$

Perimeter $= 12 + 5 + 13$
$= 30$



$x = 2$
(Because $x^2 + x^2 = (2\sqrt{2})^2$
$2x^2 = 4 \cdot 2$
$x^2 = 4$
$x = 2$)

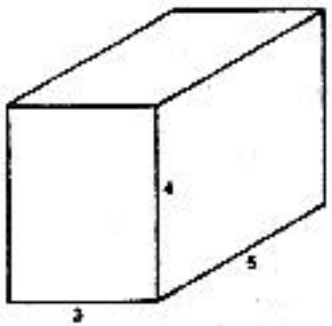
Area $= \frac{1}{2} \cdot 2 \cdot 2 = 2$

Perimeter $= 2 + 2 + 2\sqrt{2}$
$= 4 + 2\sqrt{2}$

Volume of a Rectangular Solid (box)

Volume of a box = length × width × height
$= L \cdot W \cdot H$

Examples:



Volume $= 5 \cdot 3 \cdot 4 = 60$

Volume $= (3k)(2k)(2k) = 12k^3$

STRATEGIES AND SAMPLE QUESTIONS
Regular Math

Information

1. The math section of the PSAT/NMSQT has 50 questions. The first 15 questions are regular math multiple-choice questions, questions 16-32 are quantitative comparison questions (more about these later), and questions 33-50 are also regular math questions. You need to answer about half the questions correctly to get an average score, so don't worry if you can't answer every question on the test.

2. Remember that each question is worth the same number of points. Don't waste time on questions that you find very hard, but spend your time on the questions that you know you can do. Come back to the difficult questions later if you have time. Remember that the questions generally tend to get more difficult as you go through the test. Also, the regular math questions numbered 33-50 are more difficult, and most students get fewer of these correct. This doesn't mean that you won't be able to answer questions further on, but if you find that you can't do several in a row, read through the rest of the questions quickly, looking for any you can answer, and then return to earlier questions that you omitted and try them again. You might find that you can come up with a way to solve them. Later you may want to eliminate unreasonable answer choices in those questions you have been unable to solve and then guess from among the remaining choices.

Problem Solving

3. Be flexible in solving the problem. It may not be what it seems. The following points may help in coming up with an approach to the problem.

   A. Orient yourself to the problem—get into it. Read it carefully, and note key words that tell you what the problem calls for. Underline these key words in your test book. Consider all of the information given, and avoid making quick assumptions. Check the answer choices to see what kind of an answer is expected; otherwise, you may waste time putting the answer in a form that is not given and then need to make another calculation to put it in the given form.

   B. Determine whether you must (1) compute the answer and then select the answer choice or (2) look at the answers before you compute. For example, look at the following problems where the key words are underlined.

Example: The greatest integer x such that $9x + 5 < 100$ is

(A) 7 (B) 8 (C) 9 (D) 10 (E) 11

To solve this problem, you would first subtract 5 from both sides. This gives $9x < 95$. Nine times 11 is 99, so 11 is too large. Nine times 10 is 90, so (D) is the answer. You can also solve this problem by substituting each answer choice for x.

Example: If n is an odd integer, which of the following is even?

(A) $2n + 1$ (B) $n(n + 2)$ (C) $n + (n - 1)$

(D) $(n - 2)(n + 2)$ (E) $2(n + 1)$

To solve this problem, you must look at the answer choices. If you look at all of them before beginning to plug in numbers and compute results, you will see that (E) $2(n + 1)$ must always be even because the number resulting from $n + 1$ is multiplied by 2.

C. Think about the steps required to translate the information in the problem into an equation. Ask yourself if it is a one-step or a two-step (or more) problem, and then don't forget to do all the steps. If the problem seems too difficult, think of an easier one like it that you can solve, figure out how you did it, and then solve the harder one the same way. Or try to restate it by substituting smaller numbers for the ones given. This may clarify the problem so that selecting the operation needed to solve it is easier.

Example: 9 eggs = _____ percent of a dozen

If you cannot work this problem, perhaps you can substitute simpler numbers. Six eggs are half a dozen; half a dozen is 50 percent. How do you get 50 percent from $\frac{1}{2}$? By dividing the top of the fraction by the bottom. So, by going back to the harder problem, and dividing the top of the fraction by the bottom ($\frac{9}{12}$ or $\frac{3}{4}$), you figure out the correct answer (75 percent).

Even if the problem seems simple to you, take the time to understand *exactly* what it calls for, and then go over in your mind the steps by which you'll reach the solution. Many people who are good in math have trouble with tests because they jump to conclusions about solving problems before they understand what is required.

D. Look to see what units the answer calls for. This will help to set up the calculation.

Example: It took Chris 200 seconds to solve a puzzle. If it took Kim 160 seconds to solve the same puzzle, by what fraction of a minute was Chris's time longer than Kim's?

(A) $\frac{1}{5}$ (B) $\frac{1}{4}$ (C) $\frac{2}{5}$ (D) $\frac{1}{2}$ (E) $\frac{2}{3}$

The key words here are *what fraction of a minute*. Don't waste time setting up a complicated ratio or equation. Chris took 40 seconds longer than Kim. 40 seconds is $\frac{2}{3}$ of a minute. Answer (E)

E. If you can't figure out how to do problems requiring a creative solution in a minute or so, try to eliminate some of the answers, guess among the remaining responses, mark the question in your test book, and go on to the next problem. If you have time later, return to the question and try again.

Calculation

4. You won't need to perform long calculations, and if you find yourself doing so, you should recheck your approach to the problem. Because of the limited time available for each problem, the test does not include problems requiring complicated computations. Approach problems that involve large numbers by looking for relationships that will enable you to solve such problems quickly. Here is an example of a problem that looks much more complicated than it really is:

Example: Bill buys x items at $3 each, y items at $5 each, and z items at $6 each. If x, y, and z are multiples of 5 and the total price of the items costing $3 and $5 is $55, which of the following could be the total price of all $x + y + z$ items?

(A) $66 (B) $80 (C) $95 (D) $145 (E) $150

This looks like you need to set up a complicated equation. In fact, the question writer has given you part of an equation, so you might be tempted to do that. But if you really read it carefully, you see that the price of the x and y items is given at $55, and you have to figure out which of the answers might be a total price for all the items. Since you already know the price of the x and y items, you need only to add a figure for the z items. What do we know about the z items? z is a multiple of 5, and each item costs $6. We can figure a couple of multiples and add them to $55.

z could equal 5, 10, 15, 20, etc.
$z \times \$6$ could equal $30, $60, $90
$\$55 + \$30 = \$85$
$\$55 + \$60 = \$115$
$\$55 + \$90 = \$145$ Answer (D)

Another approach would be to subtract $55 from each of the answer choices and then see which is a multiple of $30.

---

5. Sometimes working the problem backward is helpful. Working backward means using each answer choice to check against information provided in the problem. This procedure is especially effective when you think you know how to solve the problem but cannot get one of the answers listed in the responses.

Example: $3\frac{1}{2}$ divided by 0.25 =

(A) 0.875 (B) 1.4 (C) 14 (D) 87.5 (E) 140

In working backward you would reason that multiplying 0.25 by each of the response choices would identify one that resulted in $3\frac{1}{2}$. The answer is (C).

6. Some problems can be analyzed by using simple numbers. For example, plug in 1 for a variable. Sometimes you will need to plug in another number to check that the result is the same for all numbers. When you are substituting simple numbers for variables, remember to consider if fractions or negative numbers would have a different effect.

7. If you don't know how to set up the problem for calculation, estimate a reasonable answer. Estimating helps eliminate incorrect options and may contribute to better educated guessing. Often the person writing a test question examines possible wrong answers to a question that result from using the wrong processes or from computation errors, and includes them among the answer choices. A student who estimates an answer may be able to reduce the number of possible options or even locate the correct answer.

   Memorize estimates for π (3.14) and $\sqrt{2}$ (1.4), and use them when estimating an answer.

8. Some problems require you to consider the answer choices. An example of such a problem is given below.

Example: Which of the following is 1 more than the square of an integer?

(A) 24 (B) 37 (C) 49 (D) 63 (E) 64

There is no way this question can be answered without considering the choices. You are looking for a number that is 1 *more* than the square of an integer. One way to approach the solution is to subtract 1 from the various numbers and see if the result is the square of an integer. In choice (A) you find that 23 is not the square of an integer. In choice (B) you identify the correct answer since 36 is the square of 6. There is no point in considering the other choices. However, notice that choices (C) and (E) are squares of integers and choices (A) and (D) are each 1 *less* than the square of an integer.

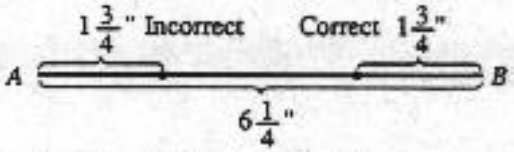
---

9. With some problems, especially those that describe one object in relation to another, it may be useful to draw a sketch or a diagram of the given information.

Example: The correct location for a mark on line segment AB is at a point $1\frac{3}{4}$ inches from B. If AB is $6\frac{1}{4}$ inches long and if the mark is incorrectly placed $1\frac{3}{4}$ inches from A on AB, how many inches from the correct location is the mark placed?

(A) $5\frac{1}{2}$ (B) $4\frac{1}{2}$ (C) $3\frac{1}{2}$ (D) $2\frac{3}{4}$ (E) 0

Draw a line and mark all the information on it. (Note that the information about the location of the mark says that it is *on* line segment AB. If the problem said only that it is $1\frac{3}{4}$ inches from B, it could be in either direction from B.)



Here it may be easier to work with decimals than fractions, so convert.

$1.75 + 1.75 = 3.50$ $\quad 6.25 - 3.50 = 2.75$ $\quad 2.75 = 2\frac{3}{4}$ Answer (D)

10. Avoid careless errors. Compute carefully, and use your test book for calculations. Don't try to do calculations in your head, and don't do them on your answer sheet. Watch out for the position of decimal points, and be sure you haven't omitted zeros.

    AFTER YOU COMPUTE THE ANSWER, RECHECK WHAT THE QUESTION CALLS FOR, AND BE SURE YOU HAVEN'T FORGOTTEN A STEP OR FIGURED THE ANSWER IN THE WRONG UNITS.

Strategies for regular math questions

a. Memorize the rules for operations with zero, estimates of π and the square root of 2, and the first 10 prime numbers.

b. When using squares and other powers, remember the effect of negative numbers.

c. When working with negative numbers, remember -8 is less than -4 and -1 is less than $-\frac{1}{2}$.

d. When working with fractions, remember that $\frac{1}{8}$ is less than $\frac{1}{4}$.

e. When working with decimals, rewrite the problem in vertical form with the decimals lined up before you add or subtract.

f. Use the sum or product in the ones' column to help you eliminate answer choices.

$64 + 43 =$ ___7	$64^2 =$ ____6
$64 \times 43 =$ ____2	$69^2 =$ ____1

g. Don't try to do all the work in your head. Use the test book for scratchwork. DO NOT USE THE ANSWER SHEET FOR SCRATCHWORK.

STRATEGIES AND SAMPLE QUESTIONS
Quantitative Comparison

1. Quantitative comparison questions are a different kind of question in which the answer choices are always the same. They usually involve less reading, take less time to answer, and require less computation than regular math questions. Two quantities are compared and the answer choice is (A) if the quantity in column A is greater, (B) if the quantity in Column B is greater, (C) if the two quantities are equal, and (D) if the relationship cannot be determined from the information given. You should memorize these choices so you do not have to refer to them for each question.

Quantitative comparison questions each consist of two quantities, one in Column A and one in Column B. You are to compare the two quantities and on the answer sheet fill in oval

A if the quantity in Column A is greater;
B if the quantity in Column B is greater;
C if the two quantities are equal;
D if the relationship cannot be determined from the information given.

Notes:

1. In certain questions, information concerning one or both of the quantities to be compared is centered above the two columns.
2. In a given question, a symbol that appears in both columns represents the same thing in Column A as it does in Column B.
3. Letters such as x, n, and k stand for real numbers.

Column A	Column B
2×6	$2 + 6$

(A) since 12 is greater than 8

$x + 3$	$x + 5$

(B) since $x + 5$ is 2 more than $x + 3$

2. Some of the questions involve only numbers, and some have variables where a letter stands for an unknown quantity. If both quantities being compared involve only computations with actual numbers, then the correct answer cannot be (D), which says that the relationship cannot be determined. One or the other must be greater, (A) or (B), or they must be the same, (C), and computing will identify the correct answer.

3. Don't waste time on unnecessary computing in order to compare two numbers. Simplify or transform one or both of the quantities as much as necessary to decide which is greater or whether they are equal. Eliminate common numbers from both quantities. You don't have to find the exact size of the quantities, only which one is greater than the other. Remember that this test will not require you to perform lengthy computations, so if you find yourself doing them, rethink your approach to the problem.

Column A	**Column B**
$\frac{6 \times 6 \times 6 \times 6}{2 \times 2 \times 2 \times 2}$	$\frac{12 \times 12 \times 12 \times 12}{4 \times 4 \times 4 \times 4}$

You don't have to compute these quantities; simply cancel them and you will quickly see that they are equal.

$$\frac{6 \times 6 \times 6 \times \cancel{6}^{3}}{2 \times 2 \times 2 \times \cancel{2}} \qquad \frac{12 \times 12 \times 12 \times \cancel{12}^{3}}{4 \times 4 \times 4 \times \cancel{4}}$$

(C)

Let $\#x$ be defined by the equation $\#x = (x + 1)(x + 2) \ldots (2x)$ *for all positive integers* x. For example, $\#5 = 6 \times 7 \times 8 \times 9 \times 10$

$\frac{\#4}{\#2}$	140

Read this carefully, then write the quantity, using the definition. It would look like this:

$$\frac{\#4}{\#2} = \frac{5 \times \cancel{6}^{2} \times 7 \times \cancel{8}^{2}}{\cancel{3} \times \cancel{4}} = 5 \times 2 \times 7 \times 2 = 10 \times 14 = 140$$

(C)

---

4. When the quantities involve variables, think about all kinds of numbers before you make a decision on an answer. Plug in simple numbers such as 1 or 2, and compute the quantity. Don't forget about fractions, negative numbers, and zero. If the answer depends on the particular numbers you plug in (if Quantity A is larger with one number and Quantity B is larger with another), choose answer (D) immediately and move on to the next question.

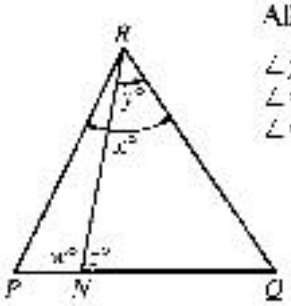
Column A		**Column B**
	$0 < a < 1$	
1		$5a$

Here we have a restriction $0 < a < 1$ that applies to Column A and Column B. The restriction means that a is greater than zero and less than 1.

The answer is (D) because for some a when $0 < a < 1$, $5a > 1$, for other values of a when $0 < a < 1$ the quantity $5a < 1$, and for $a = \frac{1}{5}$, $5a = 1$. (D)

5. Geometric figures are not always drawn to scale, so you can't determine relative sizes by looking at them. You can use only the information that is given. Try to determine which parts of the figure are fixed by the information and which are changeable. If a figure can change into other shapes and sizes while still fitting the information, the answer is probably (D). Use the test book to draw figures to help visualize these changes.

The following three examples refer to $\triangle PQR$ which is not drawn to scale.



Allowable assumptions:

$\angle y < \angle x < 180°$
$\angle w + \angle z = 180°$
$\angle w < 180°$ and $\angle z < 180°$

Note: Figure not drawn to scale.

Column A	Column B
PN	NQ

(D)

Nothing can be assumed about the relative lengths of these line segments from the figure.

y	x

(B)

Since N is between P and Q, $\angle PRQ$ is greater than $\angle NRQ$ so $x > y$.

$w + z$	$180°$

(C)

Since w and z are supplementary, $w + z = 180°$.

---

6. Remember that each question is worth the same number of points. Don't waste time on questions that you find very hard, but spend your time on the questions that you know you can do. Come back to the difficult questions later if you have time. Remember that the questions get more difficult as you go through the test. This doesn't mean that you won't be able to answer questions further on, but if you find that you can't do several in a row, return to earlier questions that you omitted and try them again. You might discover that you can find a way to solve them.

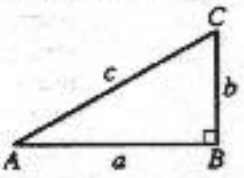
Basic Facts—Lines, Angles, and Triangles

Lines and Angles

1. A line segment is the shortest distance between two points.
2. The perpendicular is the shortest line segment that can be drawn to a given line from a point not on the line.
3. The degree measure of a straight angle is 180.
4. The degree measure of a right angle is 90.
5. The sum of the degree measures of two supplementary angles is 180.
6. Vertical angles are equal.
7. Complements and supplements of the same angle are equal.
8. If two parallel lines are cut by a transversal,
   a) the alternate interior angles are equal,
   b) the corresponding angles are equal, and
   c) the interior angles on the same side of the transversal are supplementary (equal 180 degrees).
9. If two lines are cut by a transversal, they are parallel if
   a) the alternate interior angles are equal,
   b) the corresponding angles are equal, or
   c) the interior angles on the same side of the transversal are supplementary.
10. If two lines are perpendicular to the same line, they are parallel.

Triangles

1. The sum of the degree measures of the angles of a triangle is 180.
2. The area of a triangle $= \frac{1}{2}$ (base)(height).
3. The perimeter of Triangle $ABC = AB + AC + BC$.
4. Right triangles have a 90 degree angle. The Pythagorean Theorem states that for Triangle ABC where Angle $B = 90$ degrees,
   $AB^2 + BC^2 = AC^2$, or
   $a^2 + b^2 = c^2$



5. Isosceles triangles have two angles that are equal.
6. Equilateral triangles have three equal sides and three equal angles.
7. The side opposite the largest angle of a triangle is the longest, the side opposite the smallest angle is the shortest.
8. An exterior angle of a triangle is equal to the sum of the two remote interior angles.
9. In triangle ABC, $AB + BC > AC$, and $AB - BC < AC$.

ANALYTICAL SECTION

FORM GR86-1

01

THE GRADUATE RECORD EXAMINATIONS

General Test
(with explanations)

SECTION 3
25 Questions

Directions: Each question or group of questions is based on a passage or set of conditions. In answering some of the questions, it may be useful to draw a rough diagram. For each question, select the best answer choice given.

Questions 1-7

A certain code uses only the letters K, L, M, N, and O. Words in the code are written from left to right. Code words are only those words that conform to the following conditions:

The minimum length for code words is two letters, not necessarily different from each other.
K cannot be the first letter in a word.
L must occur more than once in a word, if it occurs at all.
M cannot be the last letter in a word, nor the next-to-the-last letter.
N must occur in a word if K occurs in the word.
O cannot be the last letter in a word unless L occurs in the word.

1. Which of the following letters could be placed after O in L O to form a code word exactly three letters long?

(A) K (B) L (C) M (D) N (E) O

Ⓐ Ⓑ Ⓒ Ⓓ Ⓔ

Since L must occur more than once in a word, if it occurs at all, a three-letter code word beginning LO must have L as its third letter. Therefore, (B) is the correct answer.

2. If the only kinds of letters that are available are K, L, and M, then the total number of different code words, each exactly two letters long, that it is possible to make is

(A) 1
(B) 3
(C) 6
(D) 9
(E) 12

Ⓐ Ⓑ Ⓒ Ⓓ Ⓔ

Since N must occur in a word if K occurs in the word, but N is not available, K cannot be used. M cannot be used in any two-letter code word since M cannot be the last letter in a word, nor the next-to-last letter. L can be used, but only if it is used twice. Thus, the only two-letter code word that can be made under the stated conditions is LL, and the correct answer is (A).

3. Which of the following is a code word?

(A) K L L N
(B) L O M L
(C) M L L O
(D) N M K O
(E) O N K M

Ⓐ Ⓑ Ⓒ Ⓓ Ⓔ

(A) is incorrect because K appears as the first letter.
(B) is incorrect because M appears as the next-to-last letter.
(C) is the correct answer because it violates none of the conditions.
(D) is incorrect because O appears last, but L does not occur.
(E) is incorrect because M appears as the last letter.

4. What is the total number of different code words exactly three identical letters long that it is possible to make?

(A) 1 (B) 2 (C) 3 (D) 4 (E) 5

Ⓐ Ⓑ Ⓒ Ⓓ Ⓔ

KKK is impossible: it has K as the first letter and does not include N.
LLL is possible: no rules prohibit it.
MMM is impossible: it has M both as the last and next-to-last letter.
NNN is possible: no rules prohibit it.
OOO is impossible: it has O as the last letter but does not include L.

The correct answer is therefore (B).

5. The code word M M L L O K N can be turned into another code word by carrying out any one of the following changes EXCEPT

(A) replacing every L with an N
(B) replacing the first M with an O
(C) replacing the N with an O
(D) moving the O to the immediate right of the N
(E) moving the second L to the immediate left of the K

Ⓐ Ⓑ Ⓒ Ⓓ Ⓔ

The change that cannot be carried out is (C), for if the N were replaced with an O, the resulting sequence MMLLOKO would violate the condition that N must occur in a word if K occurs in the word. The changes described in (A), (B), (D), and (E), when carried out, each result in sequences that conform to all the conditions on code words.

6. **Which of the following is not a code word but could be turned into one by changing the order of the letters within the word?**

(A) K L M N O
(B) L L L K N
(C) M K N O N
(D) N K L M L
(E) O M M L L

Ⓐ Ⓑ Ⓒ Ⓓ Ⓔ

(A) cannot be a code word in any order because it contains a single L. (B), (C), and (E) are all acceptable code words as they stand, so they do not satisfy the first part of the question under consideration.

(D) is not a code word as it stands, but only because it has M as the next-to-last letter. Any shift of M to the left will place M in an acceptable position, and a code word will result from this kind of change of order. Therefore, (D) is the correct answer.

7. **Which of the following could be turned into a code word by replacing the "X" with a letter used in the code?**

(A) M K X N O
(B) M X K M N
(C) X M M K O
(D) X M O L K
(E) X O K L L

Ⓐ Ⓑ Ⓒ Ⓓ Ⓔ

(E) is a sequence that could be turned into a code word by replacing the X with the letter N. This makes (E) the correct answer.

For explanations of the other answer choices, see below:

(A), (C): If O is to be the last letter of a code word, L must occur in that word, too. An L can be introduced by replacing the X with the letter L. But L, if it occurs at all, must occur more than once. Since there are no further X's, no further L's can be created, and thus no code word can be made by means of replacements for X.

(B): M is the next-to-last letter. This fact will not change regardless of how X is replaced. Therefore, no code word can result from any such replacement.

(D): Since K is present and N is not, the replacement of X by N appears necessary if a code word is to be made. Since a single L is present, the replacement of X by L appears necessary. But since X cannot be replaced by both N and L at the same time, no code word can be made by replacing X.

Questions 8-9

"On the whole," Ms. Dennis remarked, "engineering students are lazier now than they used to be. I know because fewer and fewer of my students regularly do the work they are assigned."

8. The conclusion drawn above depends on which of the following assumptions?

(A) Engineering students are working less because, in a booming market, they are spending more and more time investigating different job opportunities.

(B) Whether or not students do the work they are assigned is a good indication of how lazy they are.

(C) Engineering students should work harder than students in less demanding fields.

(D) Ms. Dennis' students are doing less work because Ms. Dennis is not as effective a teacher as she once was.

(E) Laziness is something most people do not outgrow.

Ⓐ Ⓑ Ⓒ Ⓓ Ⓔ

The conclusion that engineering students are lazier now than they used to be does not follow from the stated observation that fewer and fewer of Ms. Dennis' students regularly do the work they are assigned. In fact, the conclusion is not in any way supported by the reported observation unless failure to do the assigned work suggests laziness. That latter proposition must therefore be one of the tacit assumptions underlying the conclusion. (B) best expresses this assumption and is thus the correct answer.

For explanations of the other answer choices, see below:

(A): Ms. Dennis concludes that her students are lazy on the basis of what she sees as a consequence of that laziness. (A) suggests a cause of that laziness. But Ms. Dennis does not have to make any assumptions about the causes of that laziness in order to draw her conclusion.

(C): This comparison between the work demands on engineering students and those on other students is irrelevant to the question of whether the work habits of engineering students have changed over time.

(D): If Ms. Dennis believed that the reason for her own students' decreasing performance was her own declining effectiveness, she would not think of her students as exemplifying trends among engineering students in general.

(E): Since there is no reason to think that the engineering students Ms. Dennis is referring to now are significantly different in maturity from the engineering students she had in the past, it is irrelevant whether or not she believes laziness is usually outgrown.

9. Which of the following identifies a flaw in Ms. Dennis' reasoning?

(A) Plenty of people besides engineering students do not work as hard as they should.

(B) Ms. Dennis does not consider the excuses her students may have for being lazy.

(C) The argument does not propose any constructive solutions to the problem it identifies.

(D) The argument assumes that Ms. Dennis' students are representative of engineering students in general.

(E) **Ms. Dennis does not seem sympathetic to the problems of her students.**

Ⓐ Ⓑ Ⓒ Ⓓ Ⓔ

Since the constantly decreasing work output of Ms. Dennis' students could stem from causes specific to those students, Ms. Dennis is not logically justified in extending her judgment about her own students to engineering students in general. (D) is a concise statement of the logically flawed assumption Ms. Dennis must be making in so extending her judgment. (D) is thus the correct answer.

For explanations of the other answer choices, see below:

(A): Whether or not other groups resemble engineering students has no bearing on whether or not certain conclusions about engineering students follow logically from certain observations about some engineering students. Thus, Ms. Dennis' disregard of people who are not engineering students is not a flaw in her reasoning.

(B): Any excuses offered for laziness do not alter it, though they might help us understand it. Ms. Dennis is only concerned with establishing that the laziness of engineering students is a fact; she does not inquire into possible explanations. It is not a flaw of her reasoning as it stands that it addresses the particular concerns it addresses.

(C): Ms. Dennis' reasoning is involved in reaching a conclusion on the basis of certain evidence. It does not go beyond that. (C) concerns itself with matters beyond the ones Ms. Dennis reasons about, and can thus not be a flaw in her reasoning.

(E): The logical merits or flaws of an argument are independent of the emotional attitudes of the person making the argument. Since (E) describes an emotional attitude, it cannot identify a reasoning flaw.

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10. Popular culture in the United States has become Europeanized to an extent unimaginable twenty-five years ago. Not many people then drank wine with meals, and no one drank imported mineral water. No idea would have been more astonishing than that Americans would pay to watch soccer games. Such thoughts arise because of a report that the American Association of State Highway and Transportation Officials has just adopted a proposal to develop the country's first comprehensive interstate system of routes for bicycles.

Which of the following inferences is best supported by the passage?

(A) **Long-distance bicycle routes are used in Europe.**
(B) **Drinking imported mineral water is a greater luxury than drinking imported wine.**
(C) **United States culture has benefited from exposure to foreign ideas.**
(D) **Most Europeans make regular use of bicycles.**
(E) **The influence of the United States on European culture has assumed unprecedented proportions in the last twenty-five years.**

Ⓐ Ⓑ Ⓒ Ⓓ Ⓔ

When the author learns that an interstate system of bicycle routes is being planned, case after case of European customs becoming accepted in the United States comes to his or her mind. This mental association would be a natural one if the system of bicycle routes is itself yet another case of a European phenomenon being brought to the United States. This in turn presupposes that long-distance bicycle routes are indeed a European phenomenon, an idea expressed by (A), the correct answer.

For explanations of the other answer choices, see below:

(B): The passage does not support any inference that the European practices in question are luxuries, let alone which of them are more or less of a luxury than the others.

(C): The passage is completely neutral on whether "Europeanization" has been beneficial, detrimental, or neither.

(D): The passage can be taken to suggest that bicycles are indeed used fairly widely in Europe, but nothing supports the inference that the majority of Europeans are regular users of bicycles.

(E): The passage is concerned solely with the influence of Europe on popular culture in the United States and not at all with any influence going the other way.

Questions 11-16

Six knights — P, Q, R, S, T, and U — assemble for a long journey in two traveling parties. For security, each traveling party consists of at least two knights. The two parties travel by separate routes, northern and southern. After one month, the routes of the northern and southern groups converge for a brief time and at that point the knights can, if they wish, rearrange their traveling parties before continuing, again in two parties along separate northern and southern routes. Throughout the entire trip, the composition of traveling parties must be in accord with the following conditions:

P and R are deadly enemies and, although they may meet briefly, can never travel together.
P must travel in the same party with S.
Q cannot travel by the southern route.
U cannot change routes.

11. If one of the two parties of knights consists of P and U and two other knights and travels by the southern route, the other members of this party besides P and U must be

(A) Q and S
(B) Q and T
(C) R and S
(D) R and T
(E) S and T

Ⓐ Ⓑ Ⓒ Ⓓ Ⓔ

Since P is traveling by the southern route, R cannot be. Q cannot travel by the southern route in any event. That leaves S and T to be the travel companions of P and U. The correct answer is, therefore, (E).

12. If each of the two parties of knights consists of exactly three members, which of the following is NOT a possible traveling party and route?

(A) P, S, Q by the northern route
(B) P, S, T by the northern route
(C) P, S, T by the southern route
(D) P, S, U by the southern route
(E) Q, R, T by the northern route

Ⓐ Ⓑ Ⓒ Ⓓ Ⓔ

If P, S, and T were to travel by the northern route, the party traveling by the southern route would have to be Q, R, and U. This is impossible since Q cannot travel by the southern route. So, P, S, and T cannot be traveling by the northern route. The correct answer is (B).

13. If one of the two parties of knights consists of U and two other knights and travels by the northern route, the other members of this party besides U must be

(A) P and S
(B) P and T
(C) Q and R
(D) Q and T
(E) R and T

Ⓐ Ⓑ Ⓒ Ⓓ Ⓔ

Since Q cannot travel by the southern route, Q must be one of U's travel companions by the northern route. The third member of the party can be neither P nor S since those two must travel together. So they must travel by the southern route. But if P travels by the southern route, R must travel by the northern route. It follows that Q and R must be U's travel companions, and the correct answer is (C).

14. If each of the two parties of knights consists of exactly three members, S and U are members of different parties, and R travels by the northern route, then T must travel by the

(A) southern route with P and S
(B) southern route with Q and R
(C) southern route with R and U
(D) northern route with Q and R
(E) northern route with R and U

Ⓐ Ⓑ Ⓒ Ⓓ Ⓔ

If R travels by the northern route, P must travel by the southern route. That means that S must also travel by the southern route, and U by the northern route. Q must travel by the northern route in any case. That leaves T to join P and S on the southern route. (A) is the correct answer.

15. If, when the two parties of knights encounter one another after a month, exactly one knight changes from one traveling party to the other traveling party, that knight must be

(A) P (B) Q (C) R (D) S (E) T

Ⓐ Ⓑ Ⓒ Ⓓ Ⓔ

If exactly one knight changes from one traveling party to the other, that knight can be neither P nor S because neither of the two could change parties without the other doing so as well. But if P stays put, so must R, since P and R cannot end up traveling in the same party. Q cannot change parties since Q must stay on the northern route. U cannot ever change parties. (E) is thus the correct answer.

16. If one of the changes after a month's traveling is that T changes from a party of two knights traveling by the southern route to a party of four knights traveling by the northern route, then all of the following must be true EXCEPT:

(A) During the first month, U was traveling by the southern route.
(B) During the first month, P was traveling by the northern route.
(C) During the first month, R was traveling with T.
(D) After the first month, R travels with T.
(E) After the first month, S travels by the southern route.

Ⓐ Ⓑ Ⓒ Ⓓ Ⓔ

If T started in a party of two knights traveling by the southern route, R must have been his companion (since P, who always travels with S, could not have been). Consequently, P, Q, S, and U must have been the party of four that started out on the northern route. (A) is thus seen to be a false statement, which makes it the correct answer to this question. (B) and (C) are readily seen from the above to be true statements.

For explanations of the other answer choices, see below:

(D) and (E): If T is to be one of four traveling by the northern route after the first month, at least one of the four traveling by the northern route during the first month must change parties. Neither Q nor U can change parties. So it must be either P or S; but if it is either of them, it must be both. In sum, after the first month, P and S must change to the southern route, and as a consequence, not just T but also R must change to the northern route.

Questions 17-19

A particular auto race involved eight cars — S, T, U, V, W, X, Y, and Z. At the end of every lap, an accurate record was made of the position of the cars, from first (position 1) to last (position 8). For each of the records the following statements are true:

No two cars occupy the same position.
S is in some position ahead of Z.
There is exactly one car between T and X, regardless of whether T or X is ahead of the other.
U is in the position immediately ahead of Y.
Both V and Y are in positions ahead of S.
W is in first position.

17. Which of the following could be noted on one of the records as the positions of the cars from position 1 through position 8?

(A) W, U, S, Y, V, T, Z, X
(B) W, U, Y, S, T, V, Z, X
(C) W, U, Y, V, S, T, Z, X
(D) W, U, Y, Z, V, T, S, X
(E) W, V, S, U, Y, T, Z, X

Ⓐ Ⓑ Ⓒ Ⓓ Ⓔ

(A), (B), and (E) can be eliminated because, according to these options, S is ahead of either V, or Y, or both. (Other reasons for eliminating them can also be found). (D) can be eliminated because it lists Z as being ahead of S. (C) is an order of cars that might appear on the record, and (C) is thus the correct answer.

18. If on one of the records Y and X are in positions 4 and 5, respectively, which of the following must be true of that record?

(A) S is in position 2.
(B) S is in position 7.
(C) T is in position 3.
(D) V is in position 3.
(E) Z is in position 8.

Ⓐ Ⓑ Ⓒ Ⓓ Ⓔ

If Y is fourth, U must be third. That means that T must come after X, in position 7. S must come after Y but before Z: the only way this could be true in these circumstances is for S to be sixth and for Z to be eighth. The only answer choice that correctly states one of these inferences is (E).

19. If on one of the records V is in some position behind T, which car must be in position 7 on that record?

(A) S (B) T (C) V (D) X (E) Z

Ⓐ Ⓑ Ⓒ Ⓓ Ⓔ

If V is somewhere behind T, then S must be behind both V and T. S must also be behind Y, and thus also behind U. Clearly, S must be behind W as well. S must also be behind X even if X is itself behind T, for S could not be directly behind T since S must be behind V, which is to be behind T. This makes six cars ahead of S. There is one car, Z, that must be behind S. So S must be in position 7, and (A) is the correct answer.

Questions 20-22

An airline company is offering a particular group of people two package tours involving eight European cities — London, Madrid, Naples, Oslo, Paris, Rome, Stockholm, and Trieste. While half the group goes on tour number one to visit five of the cities, the other half will go on tour number two to visit the other three cities. The group must select the cities to be included in each tour. The selection must conform to the following restrictions:

Madrid cannot be in the same tour as Oslo.
Naples must be in the same tour as Rome.
If tour number one includes Paris, it must also include London.
If tour number two includes Stockholm, it cannot include Madrid.

20. If tour number two includes Rome, which of the following CANNOT be true?

(A) London is in tour number one.
(B) Oslo is in tour number one.
(C) Trieste is in tour number one.
(D) Madrid is in tour number two.
(E) Stockholm is in tour number two.

Ⓐ Ⓑ Ⓒ Ⓓ Ⓔ

Tour number two includes a total of three cities. Since Rome is one of the three, then Naples must be, too. Further, since Madrid and Oslo cannot both be in tour number one, one of them must be the third city that completes the tour-two package. Consequently, Stockholm cannot be in tour number two. (E) is thus the correct answer.

21. If tour number two includes Paris, which of the following must be true?

(A) London is in tour number one.
(B) Naples is in tour number one.
(C) London is in tour number two.
(D) Oslo is in tour number two.
(E) Trieste is in tour number two.

Ⓐ Ⓑ Ⓒ Ⓓ Ⓔ

Since Madrid and Oslo cannot both be in tour number one, one of them must be in tour number two along with Paris. Since Naples must be in the same tour as Rome, and since there is only one spot left to fill in tour number two, neither Naples nor Rome can be in tour number two; rather, they must both be in tour number one. (B) correctly states a part of this inference, which makes (B) the correct answer. All other answer choices could be, but do not have to be, true.

22. If tour number one includes Paris and tour number two includes Madrid, which of the following must also be included in tour number two?

(A) London
(B) Oslo
(C) Rome
(D) Stockholm
(E) Trieste

Ⓐ Ⓑ Ⓒ Ⓓ Ⓔ

If tour number one includes Paris, it also includes London. Tour number one also includes Oslo, since Madrid is in tour number two. Tour number one must also include Stockholm since Stockholm could not be in tour number two together with Madrid. At this point, tour number one is known to include at least: London, Oslo, Paris, and Stockholm. Since Naples must be in the same tour as Rome, and since there is only one spot left to fill in tour number one, neither Naples nor Rome can be in tour number one; rather, they must both be in tour number two. Therefore, (C) is the correct answer.

23. In the 1980 United States census, marital status was described under one of five categories: single, now married (but not separated), separated, divorced, widowed. In the category "separated," including both those who were legally separated and those who were estranged and living apart from their spouses, one million more women than men were counted.

Which of the following, if true, provide(s) or contribute(s) to an explanation for this result?

I. There are more women of marriageable age than men of marriageable age in the United States.
II. More of the separated men than separated women in the United States could not be found by the census takers during the census.
III. Many more separated men than separated women left the United States for residence in another country.

(A) I only
(B) II only
(C) III only
(D) I and II only
(E) II and III only

Ⓐ Ⓑ Ⓒ Ⓓ Ⓔ

Proposition I is completely irrelevant to the particular imbalance: the imbalance concerns people who married each other and who are now separated. There ought to be as many men as women in this category. What proposition I suggests is a different imbalance: one among people of marriageable age who do not marry. Proposition II, on the other hand, does help explain the imbalance, as does proposition III: in both cases, a reason is given for why census takers did not count as many separated men as they did separated women. Therefore (E), "II and III only," is the correct answer.

24. In recent years shrimp harvests of commercial fishermen in the South Atlantic have declined dramatically in total weight. The decline is due primarily to competition from a growing number of recreational fishermen, who are able to net young shrimp in the estuaries where they mature.

Which of the following regulatory actions would be most likely to help increase the shrimp harvests of commercial fishermen?

(A) Requiring commercial fishermen to fish in estuaries
(B) Limiting the total number of excursions per season for commercial fishermen
(C) Requiring recreational fishermen to use large-mesh nets in their fishing
(D) Putting an upper limit on the size of the shrimp recreational fishermen are allowed to catch
(E) Allowing recreational fishermen to move out of estuaries into the South Atlantic

Ⓐ Ⓑ Ⓒ Ⓓ Ⓔ

If recreational fishermen were required to use large-mesh nets in their fishing, fewer young shrimp would be trapped in those nets (assuming, of course, that young, immature shrimp are smaller than mature shrimp and that by "large-mesh nets" is meant nets with spaces big enough for young shrimp to pass through them). Thus, there is a strong likelihood that such a requirement will help increase commercial shrimp harvests. This makes (C) the best, and thus the correct, answer.

For explanations of the other answer choices, see below:

(A): This requirement is most unlikely to bring relief; if anything, it will exacerbate the problem if commercial fishermen, too, start netting young shrimp.

(B): This requirement would presumably make sense if the problem were caused by commercial fishermen catching too many mature shrimp. But the passage clearly indicates that the main problem is that too many young shrimp are netted before they reach maturity.

(D): Since the problem lies mainly in the numbers of immature, and thus presumably small, shrimp that recreational fishermen catch, preventing those fishermen from catching large shrimp above a certain size is unlikely to provide a solution.

(E): Nothing in the passage suggests that recreational fishermen are not already free to move into the open ocean if they own ocean-going craft. And if they are not already free to move into the open ocean, there is still nothing to suggest that they are interested in doing so in large enough numbers to relieve the overfishing of young shrimp in estuaries.

25. **The 38 corporations that filed United States income tax returns showing a net income of more than $100 million accounted for 53 percent of the total taxable income from foreign sources reported on all tax returns. Sixty percent of the total taxable income from foreign sources came from the 200 returns reporting income from 10 or more countries.**

If the statements above are true, which of the following must also be true?

(A) Most of the total taxable income earned by corporations with net income above $100 million was earned from foreign sources.
(B) Wealthy individuals with large personal incomes reported 47 percent of the total taxable income from foreign sources.
(C) Income from foreign sources amounted to between 53 and 60 percent of all reported taxable income.
(D) Some of the corporations with net income above $100 million reported income from 10 or more countries.
(E) Most of the tax returns showing income from 10 or more countries reported net income of more than $100 million.

Ⓐ Ⓑ Ⓒ Ⓓ Ⓔ

If 38 tax returns in one category account for 53 percent of the total taxable income from foreign sources, and if 200 tax returns in another category account for 60 percent of the same amount, then the two categories must overlap to some extent. Only if the two percentages, added together, amounted to 100 percent or less is there not necessarily any overlap. Here, the two percentages add up to 113 percent. The answer choice that expresses an overlap between the category of corporations with a net income of above $100 million and that of corporations with income from 10 or more countries is (D).

For explanations of the other answer choices, see below:

(A): While corporations with net incomes of above $100 million account for more than half of the total taxable income from foreign sources, we cannot tell from the information given what proportion of their own total incomes from all sources is derived from incomes from foreign sources.

(B): All we can infer is that 47 percent was reported by taxpayers other than corporations with net incomes above $100 million. These taxpayers could be other corporations with somewhat lower incomes.

(C): The figures of 53 and 60 percent refer to percentages of total taxable income from foreign sources. Neither these nor any other figures in the passage refer to or imply any percentages of all reported taxable income.

(E): Since there are only 38 corporations with reported net incomes of more than $100 million, but 200 taxpayers with income from 10 or more countries, at the very most somewhat less than 20 percent of those 200 taxpayers could report net incomes of more than $100 million.

Reasoning Section: Key Words

I. Analytical Reasoning

- "adjacent"--immediately next to, nothing in between
- "consecutive"--immediately following, nothing in between
- "could" (or "can" or "is possible")--what may or may not be true, but doesn't have to be true
- "exactly"--this and nothing else: no more, no less
- "If . . ."--accept what follows as true
- "immediately after" or "immediately before"--consecutive, nothing in between. NOTE: "before" and "after" do not mean "consecutive."
- "must"--what has to be true
- negative words (e.g., "except," "cannot," "least," etc.)--look for what is not true or possible or likely. Negative words are usually underlined or capitalized in the test.
- "only"--this and nothing else: no more, no less
- "respectively"--in that order and no other

II. Logical Reasoning

- "assumption"--what someone must believe in order to make the statement in the passage: "Anyone who says this must believe [assumption]."
- "conclusion"--what follows logically from the passage: "If what's stated above is true, it must also be true that [conclusion]."
- "directly addresses/answers/questions," etc.--deals with the particular issues raised in the passage
- "explanation"--what shows why something is or is not the case
- "if true"--accept what follows as true, whether you believe it or not
- "implied" or "can be inferred"--not stated in the passage, but follows logically from what is said there
- "strengthen"--helps to prove something or make it more likely
- "support"--helps to prove something or make it more likely
- "weaken"--helps to disprove something or make it less likely

Test-Taking Tip Sheet
ANALYTICAL

This is one of a series of test-taking tip sheets developed to provide students from Historically Black Colleges with important information about preparing for standardized tests. All of the tip sheets have been written by Educational Testing Service (ETS) staff members experienced in the development of tests. Other separate tip sheets provide information on reading, verbal, quantitative, and writing questions, on general test-taking skills, and on taking achievement tests.■

Some examinations, such as the Graduate Management Admission Test (GMAT), the Graduate Record Examinations (GRE) General Test, and the Law School Admission Test (LSAT), include one or more sections that test analytical skills. These questions are included in order to broaden the range of skills and abilities on which students are compared; they attempt to tap something other than your ability to read with comprehension, apply mathematics skills, or write clearly. In particular, you will be asked to think logically and analytically in considering arguments or working out solutions to nonmathematical problems. This tip sheet is designed to help you understand the nature of the tasks so that you can do well on questions that may be called analytical reasoning, critical reasoning, or logical reasoning, or that may not be identified specifically by those names but require the use of those skills.

Although these kinds of questions are not typically harder than those that test reading, writing, or quantitative skills — i.e., they do not produce consistently lower test scores than those kinds of questions — some students may find them the most unfamiliar and problematic and feel unsure of what they are being asked. If you will be taking a test that requires you to answer reasoning questions, it is important that you both understand and practice the sample questions provided by the test maker before you take the test.

Building Your Confidence

Research suggests that practicing unfamiliar question types can build your confidence and thereby increase your chances of doing well on the test. Also, you will not need to waste time figuring out what a given type of question is asking you to do. In practicing and seeking help with the questions if you need to, you can develop and perfect strategies for approaching certain types of questions. It is to your advantage to work on the sample Reasoning sections in the information bulletins, guides, and practice tests that are published to help you prepare for the examination. At the end of this tip sheet, you will find the addresses and telephone numbers of some testing programs that currently include a Reasoning section. When working on the sample questions, try to determine why you missed the questions you did and what you can do to avoid making similar mistakes in the future.

Do not worry that because the questions often come in sets of three or more you will miss all of the questions in a set if you are unable to answer the first one. This worry is understandable, but unwarranted. Each question is independent of the others; that is, your chance of answering a question correctly will rarely, if ever, depend on whether you have answered another question correctly. To be sure of this, read the directions carefully.

On first glance at questions designed to test some of your reasoning skills, you may feel that you need courses in philosophy or formal logic to do well. Don't panic! Since the purpose of the section is to measure reasoning ability rather than mastery of course work, the questions are designed to require no special training or background. You are not expected to know special procedures, methods, or technical terms. You will not be asked to identify the names of logical fallacies, but you may be asked to recognize a flaw in a claim or argument: a person who rubs Dr. Pomeroy's Snake Oil on some warts, notices the next week that the warts are gone, and concludes that the snake oil caused the cure may be guilty of the *post hoc ergo propter hoc* fallacy, but you will be asked only to see that there may be another explanation for the disappearance of the warts.

You may also wonder, particularly when confronted with a very complex question, whether it has been designed to be unfairly "tricky." The truth is that it has not been designed to mislead you, and you should not spend your time trying to find the "trick" that isn't there. As with other types of questions, the primary aim is to give you a chance to demonstrate acquired skills; luring you into cleverly hidden traps undermines the very purpose of the test. If the language of the questions sometimes seems stilted or strained, it is not because the test maker is trying to embed a trick; it is because it is important to rule out any possible misreading that may confuse the issue. Every attempt is made to use words so that they really mean what you think they mean. To eliminate ambiguities and prevent unintended readings, the question writers must use language very precisely.

Finally, it is important for you to understand exactly what is meant by a number of key words and phrases that appear often in questions of analytical, critical, and logical reasoning. An explanation of these words and phrases follows a description of some of the question types that you may find in a test of analytical ability.

Description of Question Types

There are, in general, two main types of questions you may find it useful to understand: one type, known as Logical Reasoning or Critical Reasoning, is found in tests like the GMAT, the GRE General Test, and the LSAT; the second type, Analytical Reasoning, is included in the GRE General Test.

Logical/Critical Reasoning

The Nature of the Questions: Logical Reasoning and Critical Reasoning questions ask you to understand, analyze, and critique arguments — i.e., conclusions backed up by reasons and evidence. The questions focus not so much on what the author says, as in Reading Comprehension, but on what kind of thinking lies behind the author's stated views or beliefs. Here is a list of things you may be asked to do, along with examples of how the questions might be worded:

1. Recognize the point or issue of an argument —

   "The statements above, if true, support the view that . . ."

   "The author of the passage above is arguing that . . ."

2. Perceive the assumptions underlying an argument —

   "The argument above is not logically sound unless it is true that . . ."

   "The conclusion in the argument above depends on which of the following assumptions?"

3. Draw conclusions from given evidence or statements —

   "If the statements above are true, which of the following must on the basis of them also be true?"

   "If the information above is correct, which of the following conclusions can properly be drawn on the basis of it?"

4. Choose a reasonable explanation for events —

   "Which of the following best explains the evidence presented above?"

   "The evidence above, if true, best supports which of the following hypotheses?"

5. Apply principles governing one argument to another —

   "In terms of its logic, the argument above is most like which of the following?"

   "Which of the following most closely parallels the logical features of the argument above?"

6. Identify methods of argument and persuasion —

   "The argument above is developed by . . ."

   "Which of the following identifies a flaw in the argument above?"

7. Evaluate arguments —

   "Which of the following, if true, most seriously weakens the argument above?"

   "Each of the following, if true, supports the author's position EXCEPT"

8. Analyze evidence —

   "Which of the following would it be most important to know in evaluating the accuracy of the statement above?"

   "Which of the following issues is most relevant to answering the question posed above?"

In addition, Critical Reasoning questions may require you to analyze and critique plans of action, assess the relationship between ends and the means proposed for achieving them, or consider the merits of alternative methods. Here are examples of some typical questions:

1. Unlike other forms of narrative art, a play, to be successful, must give pleasure to its immediate audience by reflecting the concerns and values of that audience. A novel can achieve success over months or even years, but a play must be a hit or perish. Successful drama of the Restoration period, therefore, is a good index to the typical tastes and attitudes of its time.

The author of the passage above assumes that

(A) plays written for Restoration audiences do not appeal to modern audiences
(B) plays are superior to novels as a form of narrative art
(C) Restoration audiences were representative of the whole population of their time
(D) playgoers and novel readers are typically distinct and exclusive groups
(E) Restoration drama achieved popular success at the expense of critical success

A question about what the author *assumes* requires you to recognize what the author must believe in order to make the argument in the passage. A good way to find the assumption is to ask of each answer choice, "Could someone *disagree* with this statement and still logically make the argument?" If not, then it is a logical assumption. For example, you could disagree with (A) — that is, you could say that Restoration plays are still popular today — and also maintain that they give a good index to the typical tastes and attitudes of their time. You could also disagree with (B), (D), or (E) and reasonably make the same claim. You could not, however, disagree with (C) and logically make the argument in the passage: if Restoration audiences were *not* representative of the whole population of their time, then their reactions cannot serve as an index to the tastes and attitudes of the rest of the society.

2. Earthquakes, volcanic eruptions, and unusual weather have caused many more natural disasters adversely affecting people in the past decade than in previous decades. We can conclude that the planet Earth as a natural environment has become more inhospitable and dangerous, and we should employ the weather and earth sciences to look for causes of this trend.

The conclusion drawn above is most seriously weakened if which of the following is true?

(A) The weather and earth sciences have provided better early warning systems for natural disasters in the past decade than in previous decades.
(B) International relief efforts for victims of natural disasters have been better organized in the past decade than in previous decades.

(C) There are records of major earthquakes, volcanic eruptions, droughts, landslides, and floods occurring in the distant past, as well as in the recent past.
(D) Population pressures and poverty have forced increasing numbers of people to live in areas prone to natural disasters.
(E) There have been no changes in the past decade in people's land-use practices that could have affected the climate.

This question asks you to recognize what could *weaken* the conclusion, or show that it does not necessarily follow from the stated facts. In answering the question, you should first identify the conclusion. The phrase "we can conclude" signals you that it is the second sentence in the passage: the speaker concludes that the Earth has recently become a more dangerous environment because more people have recently been affected by natural disasters. This conclusion is weakened by any statement that shows that an increase in the number of people affected by natural disasters does not necessarily mean an increase in the number or violence of such disasters. (A), (B), (C), and (E) address other issues; even if they are true, nothing in them challenges the causal explanation presented in the conclusion. (D), however, weakens this causal link by showing that there is another possible explanation for the facts: even if natural disasters are no more frequent or terrible than before, more people are affected by them because more are living in dangerous areas.

Key Terms in Logical/Critical Reasoning: The passages used in Logical Reasoning and Critical Reasoning questions can be based on political speeches, advertisements, matters of public interest, and informal discussions or dialogues. Some passages are drawn from material in the humanities, the social sciences, and the natural sciences. Critical Reasoning questions may also come from the world of business, management, and economics. None of the questions, though, requires any familiarity with a subject area or its terminology, and, as noted earlier, none presupposes knowledge of terms from formal logic.

Nonetheless, certain key words or phrases are often used to define the task posed by a Logical Reasoning or Critical Reasoning question, and it is important for you to understand just what they mean. Perhaps you noticed how regularly "if true" appeared in the list of examples given earlier. You may find it helpful to study the following list of key words and phrases, adding others that you see as you work through the practice materials. When you encounter these words in a test question, you could underline or circle them in the booklet to help you keep in mind what you are being asked.

- "assumption"— what someone must believe in order to make the statement in the passage:

  "Anyone who says this must also believe (assumption)."

  "Anyone who denies that this (assumption) is true could not make this argument."

- "conclusion"— what follows logically from the passage, whether it's true or not:

  "If what's stated in the passage is true, it must also be true that (conclusion)."

  "If what's stated in the passage is false, it must also be false that (conclusion)."

- "directly addresses/answers/questions," etc.— deals with the particular issues raised in the passage and doesn't raise other ones
- "explanation"— what tries to show *why* something is or is not the case; what accounts for the situation or events described
- "hypothesis"— a proposed but unproved explanation
- "if true"— for the sake of argument, accept what follows as true, whether you believe it or not
- "implied" or "can be inferred"— not stated in the passage, but follows logically from what is said there
- negative words (e.g., "EXCEPT," "CANNOT," "LEAST," etc.) — requires looking for what is NOT true or possible or likely (Negative words are usually underlined or capitalized in the test to get your attention.)
- "strengthen"— helps to prove something or make it more likely to be true
- "weaken"— helps to *disprove* something or make it *less* likely to be true

Strategies for Answering Logical/Critical Reasoning Questions: Always keep in mind that you are being asked to understand, analyze, and evaluate arguments or plans, not to determine the truth or accuracy of statements. As a reminder, the phrase "if true" repeatedly asks you to put aside any doubts you have about the truth of a statement and look at the logic behind it. Do not reject or accept a possible answer simply because what you believe holds true in the "real world." A right answer to a question may be a statement or assumption with which you disagree but that fits logically with the given argument, and a wrong answer could be a statement with which you agree but that is not logically related to the argument.

With any Logical Reasoning or Critical Reasoning question, you should make certain that your answer bears directly on the issues raised in the passage and satisfies the demands of the question as phrased. If you aren't sure of the answer to a question, reject the choices that seem to raise unrelated or only partially related issues. You will thereby increase your chances of choosing, or even guessing, correctly among the remaining options.■

Analytical Reasoning

Analytical Reasoning questions are based on a fictional situation described by a group of rules, or "conditions," that establish relationships among persons, places, things, or events. The questions come in sets of three or more; about half ask you to determine what *must* be true, given the conditions, and the other half ask you to recognize what, on that basis, is or is not *possible*.

Most Analytical Reasoning sets pose questions about *order* (what sequence or spatial arrangement things go in), *inclusion* (what must go with what), or *causation* (what makes something happen, or keeps it from happening). Here are examples of the conditions for each type of set:

Order

A sales representative plans to visit each of six companies — M, N, P, Q, R, and S — exactly once during the course of one day. She is setting up her schedule for the day according to the following conditions:

She must visit M before N and before R.
She must visit N before Q.
The third company she visits must be P.

As mentioned earlier, it is important to understand that the language is typically used very precisely in order to prevent misconceptions or unintended loopholes. For example, the sales representative plans to visit each company "exactly once"; without the "exactly," you might think that she plans to visit each company "at least once" and could choose to make several visits to each. Working on this basis, you would probably not be able to answer the questions correctly.

Note, too, that "She must visit N before Q" does *not* mean that she must visit N *immediately* before Q: other visits could come between those to N and Q. The question writer will say "immediately" if that is what is meant. In the same way, the sales representative must visit M sometime before N and sometime before R; we cannot say from this that she must visit N before R, just because N is mentioned before R in the condition.

It is often possible, though, to see other relationships that are not explicitly mentioned in the conditions. If M comes before N and N comes before Q, then M must also come before Q. You might want to note this in your booklet next to the other conditions: it may give you the answer to one of the questions in the set, or at least help you.

Below are three sample questions from the *order* set that illustrate important points about Analytical Reasoning:

1. Which of the following could be the order in which the sales representative visits the six companies?

   (A) M, R, N, Q, P, S
   (B) M, S, P, N, R, Q
   (C) P, R, M, N, Q, S
   (D) P, S, M, R, Q, N
   (E) Q, N, P, R, S, M

Notice that the question asks for what *could* be true. Don't try to find a schedule that the sales representative *has* to follow, but rather try to see which of the answer choices fits the rules. The easiest condition to check is probably "The third company she visits must be P." You can reject (A), (C), and (D) because P isn't third. That means the answer must be (B) or (E). You can rule out (E) because N should come *before* Q, and so (B) is your answer.

2. Which of the following must be true of the sales representative's schedule for the day?

   (A) She visits M before Q.
   (B) She visits N before R.
   (C) She visits P before M.
   (D) She visits P before S.
   (E) She visits Q before R.

This question asks you to say what *must* be true. Therefore, (B), (D), and (E) — which *can* be true of the schedule but don't *have* to be true — are wrong answers. If you noticed in reading the conditions that the sales representative must visit M before Q, you can answer (A) and go on to the next question. If you didn't notice this before, you should see whether (A) "must be true" by trying to make an acceptable schedule in which the sales representative visits M *after* Q. If she can, then (A) isn't the answer. You will find, though, that you cannot put M after Q if M comes before N, which comes before Q. If you can see clearly that (A) must be true, don't spend time checking out all of the other answer choices, but go on to the next question.

3. If the sales representative visits Q immediately before R and immediately after S, she must visit Q

   (A) first
   (B) second
   (C) fourth
   (D) fifth
   (E) sixth

The general directions for Analytical Reasoning will tell you that in answering some of the questions, it may be useful to draw a rough diagram. This could be one such question. The diagram might look like this,

__ __ P __ __ __,

with P third. You can fill in other parts of the diagram with information given in the question. Note the uses of the word "immediately": part of the order of visits must be S-Q-R, with no other companies coming in between them. You can see from the diagram that S-Q-R must go in spots 4-5-6, or P will break up their sequence. Consequently, __ __ P S Q R is your diagram, and (D) is your answer: she must visit Q fifth. You could, if you wanted to, complete the diagram: since M comes before N, M would be first and N second. To save time, though, you can complete only as much of the diagram as you need to get the answer.

Another point is especially important: the conditions given at the beginning of the set apply to *all* the questions in it (e.g., N always comes before Q, and P is always third), but the information given in the "If . . ." clause of a question applies to *that question only*. For example, if you were to go on to other questions in the set, you should not think that the sales representative still "visits Q immediately before R and immediately after S."

Inclusion

Two collectors, Frank and Gloria, are each selecting a group of three wildlife prints from a group of seven prints —T, U, V, W, X, Y, and Z. No print can be in both groups. The selections made by Frank and Gloria are subject to the following restrictions:

If U is in Frank's group, W must be in Gloria's group.

If X is in Frank's group, Z must be in Gloria's group.

T and Z cannot be in the same group.

W and Y cannot be in the same group.

It is important for you to understand how the "If . . ." conditions work here, for they are common in Analytical Reasoning sets. "If U is in Frank's group, W must be in Gloria's group" does *not* mean that if W is in Gloria's group, U must be in Frank's. Gloria can have W without Frank having U, and, in fact, Gloria can have both W and U. However, the condition means that if Gloria doesn't have W, Frank doesn't have U: if he did, Gloria would have to have W. This point may seem hard to grasp at first, but consider a related example: "If Frank lives in Atlanta, then he must live in Georgia." You cannot logically turn this around and say that "if Frank lives in Georgia, then he must live in Atlanta"; you *can*, though, logically say that "if Frank doesn't live in Georgia, then he doesn't live in Atlanta." The same reasoning applies in the next condition: Gloria can have Z without Frank having X, but if Gloria does not have Z, Frank does not have X. Here is a sample question in the *inclusion* set:

If X is in Frank's group, any of the following could be in Gloria's group EXCEPT

(A) T (B) U (C) V (D) W (E) Z

Note that the EXCEPT asks you to find what *cannot* be the case, according to the conditions. A simple diagram for the question might look like this:

Frank	Gloria
X	Z

You should put Z in Gloria's group according to the condition discussed above. In checking answer choice (A), you notice that T can't go in Gloria's group now because T and Z cannot be in the same group. (A) is your answer, and if you see that it must be true, save time by going on the next question without trying to prove that the other answer choices are wrong. You might, however, see that by the same logic, if U is in Frank's group, Y cannot be in Gloria's group. If you do, make a note of this by the other conditions; the note could help you on a later question.

Causation

A scientist is conducting experiments with seven substances — F, G, M, N, O, R, and X.

O destroys R if either X or M is present.
G and F together produce R.
M produces N.
X is destroyed by F if N is present.

A sample question from this set is:

If F, O, R, and X are present, which of the following must happen?

(A) F destroys X
(B) F produces R
(C) O destroys R
(D) O produces M
(E) X destroys N

It is probably easier to answer a question like this by checking the conditions rather than by attempting to draw a diagram, since the conditions don't suggest any arrangement of things in time or space. (A) need not be true because N is not present: it's *possible* that F will destroy X, but you don't know that this will happen unless N is present. Again, (B) might be true, but need not be true, because G is not present, and "G and F together produce R." (C) must be true: since X is present, O destroys R. Note that O destroys R "if either X or M is present"; both don't have to be present, as G and F must be to produce R. (D) and (E) are wrong because the conditions say nothing about what, if anything, O produces and X destroys.

Key Terms in Analytical Reasoning: Below is a list of words or phrases that are important in Analytical Reasoning sets. You probably know the meaning of many of them already, but it would be a good idea to circle them when you encounter them on a test because they are being used to define your task very precisely.

- "adjacent"— immediately next to, with nothing in between
- "complete and accurate list"— includes everything that fits the conditions, and nothing that does not fit
- "consecutive"— one immediately following the other, with nothing in between
- "could" (or "can" or "is possible") — what may or may not be true, but doesn't *have* to be true
- "exactly"— this and nothing else: no more, no less
- "If . . ."— a signal to accept what follows as true
- "immediately after" or "immediately before"— consecutive, with nothing in between (NOTE: "before" and "after" do *not* necessarily mean consecutive.)
- "must"— what has to be true
- negative words (e.g., "EXCEPT," "CANNOT," "LEAST," etc.) — requires looking for what is NOT true or possible or likely (Negative words are usually underlined or capitalized in the test to get your attention.)
- "only"— this and nothing else; no more, no less
- "respectively"— in that order and no other

Strategies for Answering Analytical Reasoning Questions: Because Analytical Reasoning questions are probably unlike anything you have done in school, before you take the test it is very important for you to become familiar with the directions, know the meaning of key words, and have some experience with helpful problem-solving techniques. The best way to do all of this is to practice on materials that you can get from the testing programs listed at the end of the tip sheet. Many of the materials will include questions and explanations for answering them. Through practice, you will discover that the Analytical Reasoning sets are doable, however strange or forbidding they may seem at first.

Since Analytical Reasoning questions come in sets of three to seven, you might want to work on them first if there are other types of questions in the test section because you get three to seven answers for the work of understanding one set of conditions, whereas you typically get only one answer for the work of understanding, for example, a Logical Reasoning argument. This is only a suggestion for you to consider: if it doesn't suit you, don't use it.

You should decide how much time you have to devote to each of the sets. For example, if a set has 5 of the 25 questions in the Reasoning section, you should plan to spend about one fifth of your time working on that set.

Analytical Reasoning sets are usually ordered from easiest to hardest in a section. Therefore, it's best to start with the first set in a section and work on the questions that seem simplest to you; then answer as many of the others as you can in the time that you've decided to devote to the set. That is, you should probably use all the time you plan to spend on a set before you go on to another. If you leave a set before you've finished with it, you will waste time when you return later and have to become familiar with the conditions all over again.

When working through a set, write down by the conditions any new ones you find that weren't explicitly stated. Although every question can be answered independently — that is, without reference to any other question — you can learn something in answering one of them that will make others easier to answer.

Pay special attention to the key words in a question as well as to words such as "always" and "never," which limit the situation described. Circle them in your booklet to keep them in mind.

Drawing diagrams in your booklet may help you answer some questions, especially those that involve an arrangement of things in time or space. You do not have to draw diagrams, however. In fact, some questions, such as the one in the *causation* set, don't lend themselves easily to graphic solutions. Some people find diagrams helpful, while others rarely use them. Also, there is no such thing as "the one way to diagram a problem" or approach a question. Any number of approaches can be used to get the right answer.

Remember that the conditions presented before the first question in a set apply to all the questions there, but that an "If . . ." statement in a question holds true only for that question.

Especially if you are pressed for time, don't go on to check all of the other choices for a question when you are certain that you have the answer. If you do have the time, checking the other choices and coming up with two answers that look right should tell you that you've missed something in the phrasing of the question or the conditions.

Use the following list to get information about some of the major standardized tests that contain reasoning questions:

Graduate Management Admission Test (GMAT)
P.O. Box 6103
Princeton, NJ 08541-6103
(609) 771-7330

Graduate Record Examinations Program (GRE)
Educational Testing Service
P.O. Box 6000
Princeton, NJ 08541-6000
(609) 771-7670

Law School Admissions Council (LSAT)
Box 2000
Newtown, PA 18940-1001
(215) 968-1001

This test preparation tip sheet was prepared by Peter L. Cooper of Educational Testing Service at the request of the HBC/ETS Collaboration Steering Committee. Inquiries may be addressed to the HBC/ETS Steering Committee, P.O. Box 6790, Princeton, N.J. 08541-6790.