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Graduate Record Examinations Board.

GRE[®]

Graduate Record Examinations[®]

COMPUTER SCIENCE TEST

PRACTICE BOOK

This practice book contains

- one actual full-length GRE
Computer Science Test
- test-taking strategies

Become familiar with

- test structure and content
- test instructions and
answering procedures

Compare your practice
test results with the
performance of those
who took the test at a
GRE administration.



*Educational
Testing Service*

Visit GRE Online at www.gre.org

Note to Test Takers: Keep this practice book until you receive your score report.
The book contains important information about content specifications and scoring.

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Purpose of the GRE Subject Tests

The GRE Subject Tests are designed to help graduate school admission committees and fellowship sponsors assess the qualifications of applicants in specific fields of study. The tests also provide you with an assessment of your own qualifications.

Scores on the tests are intended to indicate knowledge of the subject matter emphasized in many undergraduate programs as preparation for graduate study. Because past achievement is usually a good indicator of future performance, the scores are helpful in predicting success in graduate study. Because the tests are standardized, the test scores permit comparison of students from different institutions with different undergraduate programs. For some Subject Tests, subscores are provided in addition to the total score; these subscores indicate the strengths and weaknesses of your preparation, and they may help you plan future studies.

The GRE Board recommends that scores on the Subject Tests be considered in conjunction with other relevant information about applicants. Because numerous factors influence success in graduate school, reliance on a single measure to predict success is not advisable. Other indicators of competence typically include undergraduate transcripts showing courses taken and grades earned, letters of recommendation, the GRE Writing Assessment score, and GRE General Test scores. For information about the appropriate use of GRE scores, write to GRE Program, Educational Testing Service, Mail Stop 57-L, Princeton, NJ 08541, or visit our Web site at www.gre.org/codelst.html.

Development of the Subject Tests

Each new edition of a Subject Test is developed by a committee of examiners composed of professors in the subject who are on undergraduate and graduate faculties in different types of institutions and in different regions of the United States and Canada. In selecting members for each committee, the GRE Program seeks the advice of the appropriate professional associations in the subject.

The content and scope of each test are specified and reviewed periodically by the committee of examiners. Test questions are written by the committee and by other faculty who are also subject-matter specialists and by subject-matter specialists at ETS. All questions proposed for the test are reviewed by the committee and revised as necessary. The accepted questions are assembled into a test in accordance with the content specifications developed by the committee to ensure adequate coverage of the various aspects of the field and, at the same time, to prevent overemphasis on any single topic. The entire test is then reviewed and approved by the committee.

Subject-matter and measurement specialists on the ETS staff assist the committee, providing information and advice about methods of test construction and helping to prepare the questions and assemble the test. In addition, each test question is reviewed to eliminate language, symbols, or content considered potentially offensive, inappropriate for major subgroups of the test-taking population, or likely to perpetuate any negative attitude that may be conveyed to these subgroups. The test as a whole is also reviewed to ensure that the test questions, where applicable, include an appropriate balance of people in different groups and different roles.

Because of the diversity of undergraduate curricula, it is not possible for a single test to cover all the material you may have studied. The examiners, therefore, select questions that test the basic knowledge and skills most important for successful graduate study in the particular field. The committee keeps the test up-to-date by regularly developing new editions and revising existing editions. In this way, the test content changes steadily but gradually, much like most curricula. In addition, curriculum surveys are conducted periodically to ensure that the content of a test reflects what is currently being taught in the undergraduate curriculum.

After a new edition of a Subject Test is first administered, examinees' responses to each test question are analyzed in a variety of ways to determine whether each question functioned as expected. These analyses may reveal that a question is ambiguous, requires knowledge beyond the scope of the test, or is inappropriate for the total group or a particular subgroup of examinees taking the test. Answers to such questions are not used in computing scores.

Following this analysis, the new test edition is equated to an existing test edition. In the equating process, statistical methods are used to assess the difficulty of the new test. Then scores are adjusted so that examinees who took a difficult edition of the test are not penalized, and examinees who took an easier edition of the test do not have an advantage. Variations in the number of questions in the different editions of the test are also taken into account in this process.

Scores on the Subject Tests are reported as three-digit scaled scores with the third digit always zero. The maximum possible range for all Subject Test total scores is from 200 to 990. The actual range of scores for a particular Subject Test, however, may be smaller. The maximum possible range of Subject Test subscores is 20 to 99; however, the actual range of subscores for any test or test edition may be smaller than 20 to 99. Subject Test score interpretive information is provided in *Interpreting Your GRE Scores*, which you will receive with your GRE score report, and on the GRE Web site at www.gre.org/codelst.html.

Content of the Computer Science Subject Test

The test consists of about 70 multiple-choice questions, some of which are grouped in sets and based on such materials as diagrams, graphs, and program fragments.

The approximate distribution of questions in each edition of the test according to content categories is indicated by the following outline. The percentages given are approximate; actual percentages will vary slightly from one edition of the test to another.

- I. SOFTWARE SYSTEMS AND METHODOLOGY — 35%
 - A. Data organization
 1. Data types
 2. Data structures and implementation techniques
 3. File organization (e.g., sequential, indexed, multilevel)
 - B. Program control
 1. Iteration and recursion
 2. Functions, procedures, and exception handlers
 3. Communication and synchronization
 - C. Programming languages and notation
 1. Constructs for data organization and program control
 2. Scope, binding, and parameter passing
 3. Expression evaluation

- D. Systems
 1. Compilers and interpreters
 2. Operating systems, including resource management and protection/security
 3. Networking and distributed systems
 4. System development tools
 5. System performance
- II. COMPUTER ORGANIZATION AND ARCHITECTURE — 20%
- A. Logic design
 1. Implementation of combinational and sequential circuits
 2. Functional properties of digital integrated circuits
 - B. Processors and control units
 1. Instruction sets
 2. Register and ALU organization
 3. Number representation
 4. Control sequencing
 5. Data paths
 - C. Memories and their hierarchies
 1. Speed, capacity, cost, allocation
 2. Cache, main, secondary storage
 3. Virtual memory, paging, segmentation
 - D. Communication
 1. Bus, switch, and network structures and protocols
 2. I/O
 3. Synchronization
 - E. High-performance architectures
 1. Pipelining super-scalar and out-of-order execution processors
 2. Parallel computing
 3. Distributed computing
- III. THEORY — 25%
- A. Automata and language theory
 1. Models of computation (finite automata, pushdown automata, Turing machines)
 2. Formal languages (regular languages, context-free languages)
 3. Decidability
 - B. Design and analysis of algorithms and computational complexity
 1. Exact or asymptotic analysis of the best, worst, or average case for the time and space complexity of specific algorithms
 2. Algorithmic design techniques (divide and conquer, dynamic programming, greedy)
 3. Upper and lower bounds on the complexity of specific problems
 4. NP-completeness
- C. Correctness of programs
 1. Formal specifications and assertions
 2. Verification techniques
- IV. MATHEMATICAL BACKGROUND — 15%
- A. Discrete structures
 1. Mathematical logic
 2. Elementary combinatorics, including graph theory and counting arguments
 3. Elementary discrete mathematics, including number theory, discrete probability, recurrence relations
 - B. Numerical mathematics
 1. Computer arithmetic, including number representations, roundoff errors, overflow and underflow
 2. Classical numerical algorithms
 3. Linear algebra
- V. OTHER TOPICS — 5%
- Topics including modeling and simulation, information retrieval, artificial intelligence, computer graphics, data communications, databases, VLSI, logic programming.

Preparing for a Subject Test

GRE Subject Test questions are designed to measure skills and knowledge gained over a long period of time. Although you might increase your scores to some extent through preparation a few weeks or months before you take the test, last-minute cramming is unlikely to be of further help. The following information may be helpful.

- A general review of your college courses is probably the best preparation for the test. However, the test covers a broad range of subject matter, and no one is expected to be familiar with the content of every question.

- Use this practice book to become familiar with the types of questions in the GRE Computer Science Test, paying special attention to the directions. If you thoroughly understand the directions before you take the test, you will have more time during the test to focus on the questions themselves.

Test-Taking Strategies

The questions in the practice test in this book illustrate the types of multiple-choice questions in the test. When you take the test, you will mark your answers on a separate machine-scorable answer sheet. Total testing time is two hours and fifty minutes; there are no separately timed sections. Following are some general test-taking strategies you may want to consider.

- Read the test directions carefully, and work as rapidly as you can without being careless. For each question, choose the best answer from the available options.
- All questions are of equal value; do not waste time pondering individual questions you find extremely difficult or unfamiliar.
- You may want to work through the test quite rapidly, first answering only the questions about which you feel confident, then going back and answering questions that require more thought, and concluding with the most difficult questions if there is time.
- If you decide to change an answer, make sure you completely erase it and fill in the oval corresponding to your desired answer.
- Questions for which you mark no answer or more than one answer are not counted in scoring.
- As a correction for haphazard guessing, one-fourth of the number of questions you answer incorrectly is subtracted from the number of questions you answer correctly. It is improbable that mere guessing will improve your score significantly; it may even lower your score. If, however, you are not certain of the correct answer but have some knowledge of the question

and are able to eliminate one or more of the answer choices, your chance of getting the right answer is improved, and it may be to your advantage to answer the question.

- Record all answers on your answer sheet. Answers recorded in your test book will not be counted.
- Do not wait until the last five minutes of a testing session to record answers on your answer sheet.

What Your Scores Mean

Your raw score—that is, the number of questions you answered correctly minus one-fourth of the number you answered incorrectly—is converted to the scaled score that is reported. This conversion ensures that a scaled score reported for any edition of a Subject Test is comparable to the same scaled score earned on any other edition of the same test. Thus, equal scaled scores on a particular Subject Test indicate essentially equal levels of performance regardless of the test edition taken. Test scores should be compared only with other scores on the same Subject Test. (For example, a 680 on the Computer Science Test is not equivalent to a 680 on the Mathematics Test.)

Before taking the test, you may find it useful to know approximately what raw scores would be required to obtain a certain scaled score. Several factors influence the conversion of your raw score to your scaled score, such as the difficulty of the test edition and the number of test questions included in the computation of your raw score. Based on recent editions of the Computer Science Test, the table on the next page gives the range of raw scores associated with selected scaled scores for three different test editions. (Note that when the number of scored questions for a given test is greater than the range of possible scaled scores, it is likely that two or more raw scores will convert to the same scaled score.) The three test editions in the table that follows were selected to reflect varying degrees of difficulty. Examinees should note that future test editions may be somewhat more or less difficult than the test editions illustrated in the table.

**Range of Raw Scores* Needed to
Earn Selected Scaled Scores on
Three Computer Science Test Editions
That Differ in Difficulty**

| Scaled Score | Raw Scores | | |
|---|------------|--------|--------|
| | Form A | Form B | Form C |
| 800 | 55 | 48-49 | 45 |
| 700 | 39 | 31 | 28-29 |
| 600 | 23 | 19 | 16 |
| 500 | 7 | 6-7 | 4 |
| Number of Questions Used to Compute Raw Score | | | |
| | 70 | 70 | 69 |

*Raw Score = Number of correct answers minus one-fourth the number of incorrect answers, rounded to the nearest integer.

For a particular test edition, there are many ways to earn the same raw score. For example, on the edition listed above as “Form A,” a raw score of 39 would earn a scaled score of 700. Below are a few of the possible ways in which a scaled score of 700 could be earned on that edition.

**Examples of Ways to Earn a Scaled Score
of 700 on the Edition Labeled as “Form A”**

| Raw Score | Questions Answered Correctly | Questions Answered Incorrectly | Questions Not Answered | Number of Questions Used to Compute Raw Score |
|-----------|------------------------------|--------------------------------|------------------------|---|
| 39 | 39 | 0 | 31 | 70 |
| 39 | 42 | 11 | 17 | 70 |
| 39 | 45 | 23 | 2 | 70 |

Practice Test

To become familiar with how the administration will be conducted at the test center, first remove the answer sheet (pages 53 and 54). Then go to the back cover of the test book (page 48) and follow the instructions for completing the identification areas of the answer sheet. When you are ready to begin the test, note the time and begin marking your answers on the answer sheet.

THE GRADUATE RECORD
EXAMINATIONS®

GRE®



COMPUTER SCIENCE 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.*

THIS TEST BOOK MUST NOT BE TAKEN FROM THE ROOM.

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Princeton, N.J. 08541

I

NOTE: To ensure prompt processing of test results, it is important that you fill in the blanks exactly as directed.

SUBJECT TEST

A. Print and sign your full name in this box:

PRINT: _____
(LAST) (FIRST) (MIDDLE)

SIGN: _____

Copy this code in box 6 on your answer sheet. Then fill in the corresponding ovals exactly as shown.

| 6. TITLE CODE | | | | |
|---------------|---|---|---|---|
| 2 | 9 | 5 | 2 | 1 |
| 0 | 0 | 0 | 0 | 0 |
| 1 | 1 | 1 | 1 | ● |
| ● | 2 | 2 | ● | 2 |
| 3 | 3 | 3 | 3 | 3 |
| 4 | 4 | 4 | 4 | 4 |
| 5 | 5 | ● | 5 | 5 |
| 6 | 6 | 6 | 6 | 6 |
| 7 | 7 | 7 | 7 | 7 |
| 8 | 8 | 8 | 8 | 8 |
| 9 | ● | 9 | 9 | 9 |

Copy the Test Name and Form Code in box 7 on your answer sheet.

TEST NAME Computer Science

FORM CODE GR9629

GRADUATE RECORD EXAMINATIONS SUBJECT TEST

B. The Subject Tests are intended to measure your achievement in a specialized field of study. Most of the questions are concerned with subject matter that is probably familiar to you, but some of the questions may refer to areas that you have not studied.

Your score will be determined by subtracting one-fourth the number of incorrect answers from the number of correct answers. Questions for which you mark no answer or more than one answer are not counted in scoring. If you have some knowledge of a question and are able to rule out one or more of the answer choices as incorrect, your chances of selecting the correct answer are improved, and answering such questions will likely improve your score. It is unlikely that pure guessing will raise your score; it may lower your score.

You are advised to use your time effectively and to work as rapidly as you can without losing accuracy. Do not spend too much time on questions that are too difficult for you. Go on to the other questions and come back to the difficult ones later if you can.

YOU MUST INDICATE ALL YOUR ANSWERS ON THE SEPARATE ANSWER SHEET. No credit will be given for anything written in this examination book, but you may write in the book as much as you wish to work out your answers. After you have decided on your response to a question, fill in the corresponding oval on the answer sheet. BE SURE THAT EACH MARK IS DARK AND COMPLETELY FILLS THE OVAL. Mark only one answer to each question. No credit will be given for multiple answers. Erase all stray marks. If you change an answer, be sure that all previous marks are erased completely. Incomplete erasures may be read as intended answers. Do not be concerned that the answer sheet provides spaces for more answers than there are questions in the test.

Example:

What city is the capital of France?

- (A) Rome
- (B) Paris
- (C) London
- (D) Cairo
- (E) Oslo

Sample Answer

(A) ● (C) (D) (E)

(A) ✕ (C) (D) (E)

(A) ⊖ (C) (D) (E)

(A) ● (C) (D) (E)

(A) ● (C) (D) (E)

CORRECT ANSWER PROPERLY MARKED

IMPROPER MARKS

DO NOT OPEN YOUR TEST BOOK UNTIL YOU ARE TOLD TO DO SO.

Scoring Your Subject Test

Computer Science Test scores typically range from 520 to 800. The range for different editions of a given test may vary because different editions are not of precisely the same difficulty. The differences in ranges among different editions of a given test, however, usually are small. This should be taken into account, especially when comparing two very high scores. In general, differences between scores at the 99th percentile should be ignored. **The score conversion table on page 51 shows the score range for this edition of the test only.**

The worksheet on page 50 lists the correct answers to the questions. Columns are provided for you to mark whether you chose the correct (C) answer or an incorrect (I) answer to each question. Draw a line across any question you omitted, because it is not counted in the scoring. At the bottom of the page, enter the total number correct and the total number incorrect. Divide the total incorrect by 4 and subtract the resulting number from the total correct. This is the adjustment made for guessing. Then round the result to the nearest whole number. This will give you your raw total score. Use the total score conversion table to find the scaled total score that corresponds to your raw total score.

Example: Suppose you chose the correct answers to 38 questions and incorrect answers to 22. Dividing 22 by 4 yields 5.5. Subtracting 5.5 from 38 equals 32.5, which is rounded to 33. The raw score of 33 corresponds to a scaled score of 670.

Worksheet for the Computer Science Test, Form GR9629 Only
Answer Key and Percentages* of Examinees
Answering Each Question Correctly

| QUESTION | | P + | TOTAL | |
|----------|--------|-----|-------|---|
| Number | Answer | | C | I |
| 1 | C | 64 | | |
| 2 | E | 69 | | |
| 3 | E | 81 | | |
| 4 | E | 82 | | |
| 5 | D | 88 | | |
| 6 | E | 78 | | |
| 7 | D | 76 | | |
| 8 | A | 78 | | |
| 9 | A | 70 | | |
| 10 | D | 83 | | |
| 11 | D | 43 | | |
| 12 | D | 65 | | |
| 13 | B | 69 | | |
| 14 | C | 39 | | |
| 15 | C | 52 | | |
| 16 | D | 56 | | |
| 17 | D | 76 | | |
| 18 | C | 69 | | |
| 19 | A | 67 | | |
| 20 | D | 76 | | |
| 21 | B | 21 | | |
| 22 | C | 64 | | |
| 23 | D | 70 | | |
| 24 | B | 28 | | |
| 25 | B | 42 | | |
| 26 | C | 72 | | |
| 27 | E | 68 | | |
| 28 | D | 64 | | |
| 29 | C | 52 | | |
| 30 | A | 64 | | |
| 31 | A | 56 | | |
| 32 | C | 48 | | |
| 33 | A | 83 | | |
| 34 | A | 39 | | |
| 35 | D | 26 | | |

| QUESTION | | P + | TOTAL | |
|----------|--------|-----|-------|---|
| Number | Answer | | C | I |
| 36 | C | 54 | | |
| 37 | A | 25 | | |
| 38 | B | 70 | | |
| 39 | B | 29 | | |
| 40 | B | 46 | | |
| 41 | C | 33 | | |
| 42 | E | 61 | | |
| 43 | B | 62 | | |
| 44 | B | 49 | | |
| 45 | E | 60 | | |
| 46 | B | 60 | | |
| 47 | B | 74 | | |
| 48 | A | 33 | | |
| 49 | D | 32 | | |
| 50 | B | 30 | | |
| 51 | A | 47 | | |
| 52 | C | 41 | | |
| 53 | A | 20 | | |
| 54 | E | 57 | | |
| 55 | C | 35 | | |
| 56 | A | 56 | | |
| 57 | B | 43 | | |
| 58 | D | 17 | | |
| 59 | B | 45 | | |
| 60 | D | 28 | | |
| 61 | B | 24 | | |
| 62 | D | 40 | | |
| 63 | E | 25 | | |
| 64 | D | 29 | | |
| 65 | C | 45 | | |
| 66 | C | 22 | | |
| 67 | E | 42 | | |
| 68 | B | 39 | | |
| 69 | E | 22 | | |
| 70 | C | 45 | | |

Correct (C) _____

Incorrect (I) _____

Total Score:

C - I/4 = _____

Scaled Score (SS) = _____

* The P+ column indicates the percentage of Computer Science Test examinees that answered each question correctly; it is based on a sample of December 1996 examinees selected to represent all Computer Science Test examinees tested between October 1, 1993, and September 30, 1996.

**Score Conversions and Percents Below*
For GRE Computer Science Test, Form GR9629 Only**

| TOTAL SCORE | | | | | |
|-------------|--------------|----|-----------|--------------|----|
| Raw Score | Scaled Score | % | Raw Score | Scaled Score | % |
| 70 | 910 | 99 | 36-37 | 690 | 60 |
| 68-69 | 900 | 99 | 35 | 680 | 56 |
| | | | 33-34 | 670 | 53 |
| 67 | 890 | 99 | 32 | 660 | 49 |
| 65-66 | 880 | 99 | 30-31 | 650 | 46 |
| 64 | 870 | 99 | 29 | 640 | 42 |
| 62-63 | 860 | 98 | 27-28 | 630 | 39 |
| 61 | 850 | 97 | 25-26 | 620 | 35 |
| 59-60 | 840 | 96 | 24 | 610 | 32 |
| 58 | 830 | 95 | 22-23 | 600 | 29 |
| 56-57 | 820 | 94 | | | |
| 55 | 810 | 93 | 21 | 590 | 25 |
| 53-54 | 800 | 91 | 19-20 | 580 | 23 |
| | | | 18 | 570 | 19 |
| | | | 16-17 | 560 | 17 |
| 52 | 790 | 89 | 15 | 550 | 15 |
| 50-51 | 780 | 86 | 13-14 | 540 | 12 |
| 48-49 | 770 | 85 | 12 | 530 | 11 |
| 47 | 760 | 82 | 10-11 | 520 | 9 |
| 45-46 | 750 | 79 | 9 | 510 | 7 |
| 44 | 740 | 77 | 7-8 | 500 | 6 |
| 42-43 | 730 | 74 | | | |
| 41 | 720 | 71 | 6 | 490 | 5 |
| 39-40 | 710 | 67 | 4-5 | 480 | 4 |
| 38 | 700 | 64 | 2-3 | 470 | 3 |
| | | | 1 | 460 | 2 |
| | | | 0 | 450 | 1 |

*Percentage scoring below the scaled score is based on the performance of 13,161 examinees who took the Computer Science Test between October 1, 1993, and September 30, 1996. Due to changes in the test-taking population, the percentile rank data have also changed. To obtain current percentile rank information, visit the GRE Web site at www.gre.org/codelst.html, or contact the GRE Program.

Evaluating Your Performance

Now that you have scored your test, you may wish to compare your performance with the performance of others who took this test. Both the worksheet on page 50 and the table on page 51 use performance data from GRE Computer Science Test examinees.

The data in the worksheet on page 50 are based on the performance of a sample of the examinees who took this test in December 1996. This sample was selected to represent the total population of GRE Computer Science Test examinees tested between October 1993 and September 1996. The numbers in the column labeled “P+” on the worksheet indicate the percentages of examinees in this sample who answered each question correctly. You may use these numbers as a guide for evaluating your performance on each test question.

The table on page 51 contains, for each scaled score, the percentage of examinees tested between October 1993 and September 1996 who received lower scores. Interpretive data based on the scores earned by examinees tested in this three-year period were used by admissions officers in the 1997-98 testing year. These percentages appear in the score conversion table in a

column to the right of the scaled scores. For example, in the percentage column opposite the scaled score of 730 is the number 74. This means that 74 percent of the GRE Computer Science Test examinees tested between October 1993 and September 1996 scored lower than 730. To compare yourself with this population, look at the percentage next to the scaled score you earned on the practice test. *Note:* due to changes in the test-taking population, the percentile rank data have also changed. To obtain current percentile rank information, visit the GRE Web site at www.gre.org/codelst.html, or contact the GRE Program.

It is important to realize that the conditions under which you tested yourself were not exactly the same as those you will encounter at a test center. It is impossible to predict how different test-taking conditions will affect test performance, and this is only one factor that may account for differences between your practice test scores and your actual test scores. By comparing your performance on this practice test with the performance of other GRE Computer Science Test examinees, however, you will be able to determine your strengths and weaknesses and can then plan a program of study to prepare yourself for taking the GRE Computer Science Test under standard conditions.

SUBJECT TEST

COMPLETE THE
CERTIFICATION STATEMENT,
THEN TURN ANSWER SHEET
OVER TO SIDE 1.

CERTIFICATION STATEMENT

Please write the following statement below, DO NOT PRINT.

"I certify that I am the person whose name appears on this answer sheet. I also agree not to disclose the contents of the test I am taking today to anyone." Sign and date where indicated.

SIGNATURE: _____ DATE: _____
Month Day Year

BE SURE EACH MARK IS DARK AND COMPLETELY FILLS THE INTENDED SPACE AS ILLUSTRATED HERE: ●
YOU MAY FIND MORE RESPONSE SPACES THAN YOU NEED. IF SO, PLEASE LEAVE THEM BLANK.

| | | | | | | | | | | | | | | | | | | | | | | | |
|-----|---|---|---|---|---|-----|---|---|---|---|---|-----|---|---|---|---|---|-----|---|---|---|---|---|
| 115 | A | B | C | D | E | 147 | A | B | C | D | E | 179 | A | B | C | D | E | 211 | A | B | C | D | E |
| 116 | A | B | C | D | E | 148 | A | B | C | D | E | 180 | A | B | C | D | E | 212 | A | B | C | D | E |
| 117 | A | B | C | D | E | 149 | A | B | C | D | E | 181 | A | B | C | D | E | 213 | A | B | C | D | E |
| 118 | A | B | C | D | E | 150 | A | B | C | D | E | 182 | A | B | C | D | E | 214 | A | B | C | D | E |
| 119 | A | B | C | D | E | 151 | A | B | C | D | E | 183 | A | B | C | D | E | 215 | A | B | C | D | E |
| 120 | A | B | C | D | E | 152 | A | B | C | D | E | 184 | A | B | C | D | E | 216 | A | B | C | D | E |
| 121 | A | B | C | D | E | 153 | A | B | C | D | E | 185 | A | B | C | D | E | 217 | A | B | C | D | E |
| 122 | A | B | C | D | E | 154 | A | B | C | D | E | 186 | A | B | C | D | E | 218 | A | B | C | D | E |
| 123 | A | B | C | D | E | 155 | A | B | C | D | E | 187 | A | B | C | D | E | 219 | A | B | C | D | E |
| 124 | A | B | C | D | E | 156 | A | B | C | D | E | 188 | A | B | C | D | E | 220 | A | B | C | D | E |
| 125 | A | B | C | D | E | 157 | A | B | C | D | E | 189 | A | B | C | D | E | 221 | A | B | C | D | E |
| 126 | A | B | C | D | E | 158 | A | B | C | D | E | 190 | A | B | C | D | E | 222 | A | B | C | D | E |
| 127 | A | B | C | D | E | 159 | A | B | C | D | E | 191 | A | B | C | D | E | 223 | A | B | C | D | E |
| 128 | A | B | C | D | E | 160 | A | B | C | D | E | 192 | A | B | C | D | E | 224 | A | B | C | D | E |
| 129 | A | B | C | D | E | 161 | A | B | C | D | E | 193 | A | B | C | D | E | 225 | A | B | C | D | E |
| 130 | A | B | C | D | E | 162 | A | B | C | D | E | 194 | A | B | C | D | E | 226 | A | B | C | D | E |
| 131 | A | B | C | D | E | 163 | A | B | C | D | E | 195 | A | B | C | D | E | 227 | A | B | C | D | E |
| 132 | A | B | C | D | E | 164 | A | B | C | D | E | 196 | A | B | C | D | E | 228 | A | B | C | D | E |
| 133 | A | B | C | D | E | 165 | A | B | C | D | E | 197 | A | B | C | D | E | 229 | A | B | C | D | E |
| 134 | A | B | C | D | E | 166 | A | B | C | D | E | 198 | A | B | C | D | E | 230 | A | B | C | D | E |
| 135 | A | B | C | D | E | 167 | A | B | C | D | E | 199 | A | B | C | D | E | 231 | A | B | C | D | E |
| 136 | A | B | C | D | E | 168 | A | B | C | D | E | 200 | A | B | C | D | E | 232 | A | B | C | D | E |
| 137 | A | B | C | D | E | 169 | A | B | C | D | E | 201 | A | B | C | D | E | 233 | A | B | C | D | E |
| 138 | A | B | C | D | E | 170 | A | B | C | D | E | 202 | A | B | C | D | E | 234 | A | B | C | D | E |
| 139 | A | B | C | D | E | 171 | A | B | C | D | E | 203 | A | B | C | D | E | 235 | A | B | C | D | E |
| 140 | A | B | C | D | E | 172 | A | B | C | D | E | 204 | A | B | C | D | E | 236 | A | B | C | D | E |
| 141 | A | B | C | D | E | 173 | A | B | C | D | E | 205 | A | B | C | D | E | 237 | A | B | C | D | E |
| 142 | A | B | C | D | E | 174 | A | B | C | D | E | 206 | A | B | C | D | E | 238 | A | B | C | D | E |
| 143 | A | B | C | D | E | 175 | A | B | C | D | E | 207 | A | B | C | D | E | 239 | A | B | C | D | E |
| 144 | A | B | C | D | E | 176 | A | B | C | D | E | 208 | A | B | C | D | E | 240 | A | B | C | D | E |
| 145 | A | B | C | D | E | 177 | A | B | C | D | E | 209 | A | B | C | D | E | 241 | A | B | C | D | E |
| 146 | A | B | C | D | E | 178 | A | B | C | D | E | 210 | A | B | C | D | E | 242 | A | B | C | D | E |

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