

出国留学考试用书

 太傻留学
www.taisha.org

BARRON'S SAT II 数学

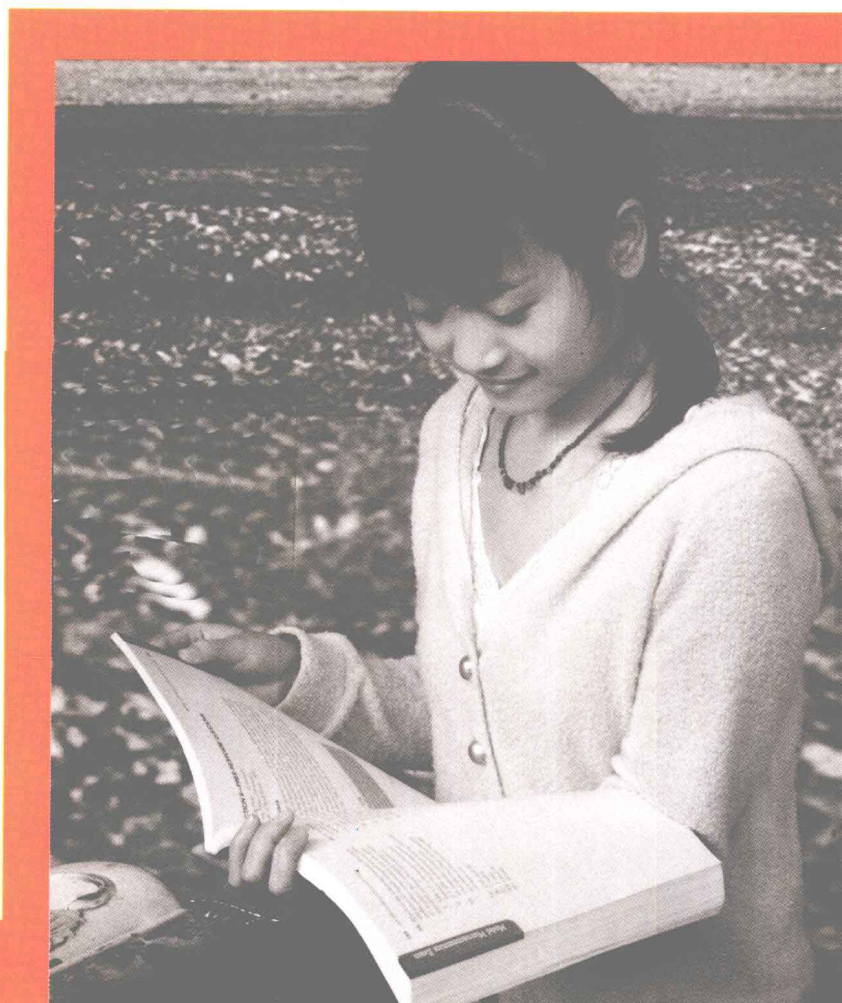
Subject Test Math Level 2

(第9版)

[美]库 (Richard Ku), [美]道奇 (Howard P. Dodge) 编著

备考指南 考点透析
数百道习题邀您轮番操练
诊断测试助您认清强弱项
全真测试题帮您考前热身

世界图书出版公司



BARRON'S SAT Ⅱ 数学

Subject Test Math Level 2 (第9版)

[美]库 (Richard Ku), [美]道奇 (Howard P. Dodge) 编著



世界图书出版公司
北京·广州·上海·西安

图书在版编目 (CIP) 数据

Barron's SAT II 数学 = Barron's SAT Subject Test Math Level 2: 英文/(美) 库 (Ku, R.), (美) 道奇 (Dodge, H. P.) 编著. — 第 9 版. — 北京: 世界图书出版公司北京公司, 2011. 6
(Barron's SAT 系列)

书名原文: Barron's SAT Subject Test Math Level 2

ISBN 978-7-5100-3521-0

I. B… II. ①库…②道… III. ①中学数学课—高等学校—入学考试—美国—教学参考资料
IV. ①G634.603

中国版本图书馆 CIP 数据核字 (2011) 第 074589 号

Barron's SAT Subject Test Math Level 2 (Barron's How to Prepare for the SAT II Mathematics, Level II C)
(Paperback) by Richard Ku M. A., Howard P. Dodge, M. A.

© Copyright 2010, 2008 by Barron's Educational Series, Inc. Previous edition © Copyright 2003, 1998 under the title *How to Prepare for the SAT II: Math Level II C*. Prior editions © Copyright 1994 under the title *How to Prepare for the SAT II: Mathematics Level II C* and © Copyright 1991, 1987, 1984, 1979 under the title *How to Prepare for the College Board Achievement Test—Math Level II* by Barron's Educational Series, Inc.

This edition arranged with BARRON'S EDUCATIONAL SERIES, INC.
through BIG APPLE TUTTLE-MORI AGENCY, LABUAN, MALAYSIA.

Simplified Chinese edition copyright:

2011 BEIJING WORLD PUBLISHING CORPORATION

All rights reserved.

MAINLAND CHINA EXCLUDING THE HONG KONG SAR AND THE MACAU SAR.

仅限于中华人民共和国境内 (不包括中国台湾地区、中国香港和澳门特别行政区) 销售发行。

Barron's SAT II 数学 (第 9 版)

原 书 名: Barron's SAT Subject Test Math Level 2 (9th Edition)

编 著 者: [美] 库 (Richard Ku), [美] 道奇 (Howard P. Dodge)

责任编辑: 张颖颖

出 版: 世界图书出版公司北京公司

出 版 人: 张跃明

发 行: 世界图书出版公司北京公司

(地址: 北京市朝内大街 137 号 邮编: 100010 电话: 64077922)

销 售: 各地新华书店及外文书店

印 刷: 三河市国英印务有限公司

开 本: 880 mm×1230 mm 1/16

印 张: 21.25

字 数: 603 千

版 次: 2011 年 6 月第 1 版 2011 年 6 月第 1 次印刷

版权登记: 京权图字 01-2011-0570

ISBN 978-7-5100-3521-0/G · 471

定价: 49.00 元 (含 1 张 CD-ROM)

版权所有 翻印必究

目 录

绪论	1	1.3 三角函数与其反函数	59
		定义	59
第一部分 诊断测试		习题	62
诊断测试	9	弧度与角度	63
答案	21	习题	65
答案解析	22	特殊角	66
自评表	29	习题	68
		图像	68
第二部分 考点复习		习题	72
第一章 函数	33	恒等式、等式、不等式	74
1.1 概述	33	习题	75
定义	33	反三角函数	77
习题	34	习题	79
组合函数	34	三角形	80
习题	35	习题	83
反函数	36	答案与解析	85
习题	39	1.4 指数函数与对数函数	91
奇函数与偶函数	40	习题	94
习题	43	答案与解析	96
答案与解析	43	1.5 有理函数与极限	97
1.2 多项式函数	45	习题	100
线性函数	45	答案与解析	101
习题	47	1.6 杂项函数	102
二次函数	48	参数方程	102
习题	51	习题	103
高次多项式函数	52	分段函数	104
习题	55	习题	107
不等式	56	答案与解析	110
习题	56	第二章 几何学与测量法	113
答案与解析	57	2.1 坐标几何	113
		变换及对称	113

习题	116	3.4 序列与级数	153
圆锥截面	118	递归序列	153
习题	124	等差序列	155
极坐标	126	等比数列	156
习题	127	级数	157
答案与解析	128	习题	159
2.2 三维几何	129	答案与解析	160
表面积与体积	129	3.5 向量	161
习题	131	习题	162
三维坐标	132	答案与解析	163
习题	133	第四章 数据分析、统计、概率	165
答案与解析	134	4.1 数据分析和统计	165
第三章 数和运算	135	度量与回归	165
3.1 计算	135	习题	168
维恩图解	135	答案与解析	170
习题	136	4.2 概率	171
乘法法则	136	独立事件	173
习题	137	互斥事件	174
阶乘、排列、组合	137	习题	175
习题	138	答案与解析	177
答案与解析	139	第三部分 测试题	
3.2 复数	140	测试题 1	183
虚数	140	答案	195
习题	141	答案解析	196
复数算术	141	自评表	203
习题	141	测试题 2	207
图示复数	142	答案	221
习题	142	答案解析	222
答案与解析	143	自评表	228
3.3 矩阵	143	测试题 3	233
加、减、纯量乘法	143	答案	245
习题	144	答案解析	246
矩阵乘法	146	自评表	253
习题	147	测试题 4	257
方阵的行列式与逆矩阵	148	答案	269
习题	149		
解方程组	150		
习题	151		
答案与解析	151		

答案解析	270	答案解析	315
自评表	276	自评表	321
测试题 5	281	公式汇总	323
答案	292	索引	327
答案解析	293		
自评表	299		
测试题 6	303		
答案	314		

Contents

Introduction	1	1.3 Trigonometric Functions and Their Inverses	59
PART 1		Definitions	59
DIAGNOSTIC TEST		Exercises	62
		Arcs and Angles	63
		Exercises	65
		Special Angles	66
		Exercises	68
		Graphs	68
		Exercises	72
		Identities, Equations, and Inequalities	74
		Exercises	75
		Inverse Trig Functions	77
		Exercises	79
		Triangles	80
		Exercises	83
		Answers and Explanations	85
		1.4 Exponential and Logarithmic Functions	91
		Exercises	94
		Answers and Explanations	96
		1.5 Rational Functions and Limits	97
		Exercises	100
		Answers and Explanations	101
		1.6 Miscellaneous Functions	102
		Parametric Equations	102
		Exercises	103
		Piecewise Functions	104
		Exercises	107
		Answers and Explanations	110
PART 2			
REVIEW OF MAJOR TOPICS			
1 Functions	33		
1.1 Overview	33		
Definitions	33		
Exercises	34		
Combining Functions	34		
Exercises	35		
Inverses	36		
Exercises	39		
Odd and Even Functions	40		
Exercises	43		
Answers and Explanations	43		
1.2 Polynomial Functions	45		
Linear Functions	45		
Exercises	47		
Quadratic Functions	48		
Exercises	51		
Higher-Degree Polynomial Functions	52		
Exercises	55		
Inequalities	56		
Exercises	56		
Answers and Explanations	57		

2	Geometry and Measurement	113		
	2.1 Coordinate Geometry	113		
	Transformations and Symmetry	113		
	Exercises	116		
	Conic Sections	118		
	Exercises	124		
	Polar Coordinates	126		
	Exercises	127		
	Answers and Explanations	128		
	2.2 Three-Dimensional Geometry	129		
	Surface Area and Volume	129		
	Exercises	131		
	Coordinates in Three Dimensions	132		
	Exercises	133		
	Answers and Explanations	134		
3	Numbers and Operations	135		
	3.1 Counting	135		
	Venn Diagrams	135		
	Exercise	136		
	Multiplication Rule	136		
	Exercises	137		
	Factorial, Permutations, Combinations	137		
	Exercises	138		
	Answers and Explanations	139		
	3.2 Complex Numbers	140		
	Imaginary Numbers	140		
	Exercise	141		
	Complex Number Arithmetic	141		
	Exercises	141		
	Graphing Complex Numbers	142		
	Exercises	142		
	Answers and Explanations	143		
	3.3 Matrices	143		
	Addition, Subtraction, and Scalar Multiplication	143		
	Exercises	144		
	Matrix Multiplication	146		
	Exercises	147		
	Determinants and Inverses of Square Matrices	148		
	Exercises	149		
	Solving Systems of Equations	150		
	Exercises	151		
	Answers and Explanations	151		
	3.4 Sequences and Series	153		
	Recursive Sequences	153		
	Arithmetic Sequences	155		
	Geometric Sequences	156		
	Series	157		
	Exercises for Sequences and Series	159		
	Answers and Explanations	160		
	3.5 Vectors	161		
	Exercises	162		
	Answers and Explanations	163		
4	Data Analysis, Statistics, and Probability	165		
	4.1 Data Analysis and Statistics	165		
	Measures and Regression	165		
	Exercises	168		
	Answers and Explanations	170		
	4.2 Probability	171		
	Independent Events	173		
	Mutually Exclusive Events	174		
	Exercises	175		
	Answers and Explanations	177		

PART 3
MODEL TESTS**Model Test 1 183**

Answer Key	195
Answers Explained	196
Self-Evaluation Chart	203

Model Test 2 207

Answer Key	221
Answers Explained	222
Self-Evaluation Chart	228

Model Test 3 233

Answer Key	245
Answers Explained	246
Self-Evaluation Chart	253

Model Test 4 257

Answer Key	269
Answers Explained	270
Self-Evaluation Chart	276

Model Test 5 281

Answer Key	292
Answers Explained	293
Self-Evaluation Chart	299

Model Test 6 303

Answer Key	314
Answers Explained	315
Self-Evaluation Chart	321

Summary of Formulas 323**Index 327**

Introduction 绪论

The purpose of this book is to help you prepare for the SAT Level 2 Mathematics Subject Test. This book can be used as a self-study guide or as a textbook in a test preparation course. It is a self-contained resource for those who want to achieve their best possible score.

Because the SAT Subject Tests cover specific content, they should be taken as soon as possible after completing the necessary course(s). This means that you should register for the Level 2 Mathematics Subject Test in June after you complete a precalculus course.

You can register for SAT Subject Tests at the College Board's web site, www.collegeboard.com; by calling (866) 756-7346, if you previously registered for an SAT Reasoning Test or Subject Test; or by completing registration forms in the SAT Registration Booklet, which can be obtained in your high school guidance office. You can also write to:

College Board SAT Program
P.O. Box 025505
Miami, FL 33102

You may register for up to three Subject Tests at each sitting.

Colleges use SAT Subject Tests to help them make both admission and placement decisions. Because the Subject Tests are not tied to specific curricula, grading procedures, or instructional methods, they provide uniform measures of achievement in various subject areas. This way, colleges can use Subject Test results to compare the achievement of students who come from varying backgrounds and schools.

You can consult college catalogs and web sites to determine which, if any, SAT Subject Tests are required as part of an admissions package. Many “competitive” colleges require the Level 1 Mathematics Test.

If you intend to apply for admission to a college program in mathematics, science, or engineering, you may be required to take the Level 2 Mathematics Subject Test. If you have been generally successful in high school mathematics courses and want to showcase your achievement, you may want to take the Level 2 Subject Test and send your scores to colleges you are interested in even if it isn't required.

OVERVIEW OF THIS BOOK 本书概述

A Diagnostic Test in Part 1 follows this introduction. This test will help you quickly identify your weaknesses and gaps in your knowledge of the topics. You should take it under test conditions (in one quiet hour). Use the Answer Key immediately following the test to check your answers, read the explanations for the problems you did not get right, and complete the self-evaluation chart that follows the explanations. These explanations include a code for calculator use, the correct answer choice, and the location of the relevant topic in the Part 2 “Review of Major Topics.” For your convenience, a self-evaluation chart is also keyed to these locations.

The majority of those taking the Level 2 Mathematics Subject Test are accustomed to using graphing calculators. Where appropriate, explanations of problem solutions are based on their use. Secondary explanations that rely on algebraic techniques may also be given.

Part 3 contains six model tests. The breakdown of test items by topic approximately reflects the nominal distribution established by the College Board. The percentage of questions for which calculators are required or useful on the model tests is also approximately the same as that specified by the College Board. The model tests are self-contained. Each has an answer sheet and a complete set of directions. Each test is followed by an answer key, explanations such as those found in the Diagnostic Test, and a self-evaluation chart.

OVERVIEW OF THE LEVEL 2 SUBJECT TEST

SAT II 数学概述

The SAT Mathematics Level 2 Subject Test is one hour in length and consists of 50 multiple-choice questions, each with five answer choices. The test is aimed at students who have had two years of algebra, one year of geometry, and one year of trigonometry and elementary functions. According to the College Board, test items are distributed over topics as follows:

- **Numbers and Operation: 5–7 questions**
Operations, ratio and proportion, complex numbers, counting, elementary number theory, matrices, sequences, series, and vectors
- **Algebra and Functions: 24–26 questions**
Work with equations, inequalities, and expressions; know properties of the following classes of functions: linear, polynomial, rational, exponential, logarithmic, trigonometric and inverse trigonometric, periodic, piecewise, recursive, and parametric
- **Coordinate Geometry: 5–7 questions**
Symmetry, transformations, conic sections, polar coordinates
- **Three-dimensional Geometry: 2–3 questions**
Volume and surface area of solids (prisms, cylinders, pyramids, cones, and spheres); coordinates in 3 dimensions
- **Trigonometry: 6–8 questions**
Radian measure; laws of sines and law of cosines; Pythagorean theorem, cofunction, and double-angle identities
- **Data Analysis, Statistics, and Probability: 3–5 questions**
Measures of central tendency and spread; graphs and plots; least squares regression (linear, quadratic, and exponential); probability


CALCULATOR USE 计算器的使用

As noted earlier, most taking the Level 2 Mathematics Subject Test will use a graphing calculator. In addition to performing the calculations of a scientific calculator, graphing calculators can be used to analyze graphs and to find zeros, points of intersection of graphs, and maxima and minima of functions. Graphing calculators can also be used to find numerical solutions to equations, generate tables of function values, evaluate statistics, and find regression equations. The authors assume that readers of this book plan to use a graphing calculator when taking the Level 2 test.

You should always read a question carefully and decide on a strategy to answer it before deciding whether a calculator is necessary. A calculator is useful or necessary on only 55–65 percent of the questions. You may find, for example, that you need a calculator only to evaluate some expression that must be determined based solely on your knowledge about how to solve the problem.

TIP



For the Diagnostic Test, practice exercises, and sample tests, a graphing calculator icon  in the Answers and Explanations section indicates that a graphing calculator is necessary.

Most graphing calculators are user friendly. They follow order of operations, and expressions can be entered using several levels of parentheses. There is never a need to round and write down the result of an intermediate calculation and then rekey that value as part of another calculation. Premature rounding can result in choosing a wrong answer if numerical answer choices are close in value.

On the other hand, graphing calculators can be troublesome or even misleading. For example, if you have difficulty finding a useful window for a graph, perhaps there is a better way to solve a problem. Piecewise functions, functions with restricted domains, and functions having asymptotes provide other examples where the usefulness of a graphing calculator may be limited.

Calculators have popularized a multiple-choice problem-solving technique called back-solving, where answer choices are entered into the problem to see which works. In problems where decimal answer choices are rounded, none of the choices may work satisfactorily. Be careful not to overuse this technique.

The College Board has established rules governing the use of calculators on the Mathematics Subject Tests:

- You may bring extra batteries or a backup calculator to the test. If you wish, you may bring both scientific and graphing calculators.
- Test centers are not expected to provide calculators, and test takers may not share calculators.
- Notify the test supervisor to have your score cancelled if your calculator malfunctions during the test and you do not have a backup.
- Certain types of devices that have computational power are **not permitted**: cell phones, pocket organizers, powerbooks and portable handheld computers, and electronic writing pads. Calculators that require an electrical outlet, make noise or “talk,” or use paper tapes are also prohibited.
- You do not have to clear a graphing calculator memory before or after taking the test. However, any attempt to take notes in your calculator about a test and remove it from the room will be grounds for dismissal and cancellation of scores.



TIP
Leave your cell phone at home, in your locker, or in your car!

HOW THE TEST IS SCORED 如何评分

There are 50 questions on the Math Level 2 Subject Test. Your raw score is the number of correct answers minus one-fourth of the number of incorrect answers, rounded to the nearest whole number. For example, if you get 30 correct answers, 15 incorrect answers, and leave 5 blank, your raw score would be $30 - \frac{1}{4}(15) \approx 26$, rounded to the nearest whole number.

Raw scores are transformed into scaled scores between 200 and 800. The formula for this transformation changes slightly from year to year to reflect varying test difficulty. In recent years, a raw score of 44 was high enough to transform to a scaled score of 800. Each point less in the raw score resulted in approximately 10 points less in the scaled score. For a raw score of 44 or more, the approximate scaled score is 800. For raw scores of 44 or less, the following formula can be used to get an approximate scaled score on the Diagnostic Test and each model test:

$$S = 800 - 10(44 - R), \text{ where } S \text{ is the approximate scaled score and } R \text{ is the rounded raw score.}$$

The self-evaluation page for the Diagnostic Test and each model test includes spaces for you to calculate your raw score and scaled score.

STRATEGIES TO MAXIMIZE YOUR SCORE 提分策略

- **Budget your time.** Although most testing centers have wall clocks, you would be wise to have a watch on your desk. Since there are 50 items on a one-hour test, you have a little over a minute per item. Typically, test items are easier near the beginning of a test, and they get progressively more difficult. Don't linger over difficult questions. Work the problems you are confident of first, and then return later to the ones that are difficult for you.
- **Guess intelligently.** As noted above, you are likely to get a higher score if you can confidently eliminate two or more answer choices, and a lower score if you can't eliminate any.
- **Read the questions carefully.** Answer the question asked, not the one you may have expected. For example, you may have to solve an equation to answer the question, but the solution itself may not be the answer.
- **Mark answers clearly and accurately.** Since you may skip questions that are difficult, be sure to mark the correct number on your answer sheet. If you change an answer, erase cleanly and leave no stray marks. Mark only one answer; an item will be graded as incorrect if more than one answer choice is marked.
- **Change an answer only if you have a good reason for doing so.** It is usually not a good idea to change an answer on the basis of a hunch or whim.
- **As you read a problem, think about possible computational shortcuts to obtain the correct answer choice.** Even though calculators simplify the computational process, you may save time by identifying a pattern that leads to a shortcut.

- **Substitute numbers to determine the nature of a relationship.** If a problem contains only variable quantities, it is sometimes helpful to substitute numbers to understand the relationships implied in the problem.
- **Think carefully about whether to use a calculator.** The College Board's guideline is that a calculator is useful or necessary in about 60% of the problems on the Level 2 Test. An appropriate percentage for you may differ from this, depending on your experience with calculators. Even if you learned the material in a highly calculator-active environment, you may discover that a problem can be done more efficiently without a calculator than with one.
- **Check the answer choices.** If the answer choices are in decimal form, the problem is likely to require the use of a calculator.

STUDY PLANS 学习计划

Your first step is to take the Diagnostic Test. This should be taken under test conditions: timed, quiet, without interruption. Correct the test and identify areas of weakness using the cross-references to the Part 2 review. Use the review to strengthen your understanding of the concepts involved.

Ideally, you would start preparing for the test two to three months in advance. Each week, you would be able to take one sample test, following the same procedure as for the Diagnostic Test. Depending on how well you do, it might take you anywhere between 15 minutes and an hour to complete the work after you take the test. Obviously, if you have less time to prepare, you would have to intensify your efforts to complete the six sample tests, or do fewer of them.

The best way to use Part 2 of this book is as reference material. You should look through this material quickly before you take the sample tests, just to get an idea of the range of topics covered and the level of detail. However, these parts of the book are more effectively used after you've taken and corrected a sample test.

PART 1
第一部分

DIAGNOSTIC TEST
诊断测试

Answer Sheet

答题卡

DIAGNOSTIC TEST

诊断测试

- | | | | |
|------------------------|------------------------|------------------------|------------------------|
| 1 (A) (B) (C) (D) (E) | 14 (A) (B) (C) (D) (E) | 27 (A) (B) (C) (D) (E) | 40 (A) (B) (C) (D) (E) |
| 2 (A) (B) (C) (D) (E) | 15 (A) (B) (C) (D) (E) | 28 (A) (B) (C) (D) (E) | 41 (A) (B) (C) (D) (E) |
| 3 (A) (B) (C) (D) (E) | 16 (A) (B) (C) (D) (E) | 29 (A) (B) (C) (D) (E) | 42 (A) (B) (C) (D) (E) |
| 4 (A) (B) (C) (D) (E) | 17 (A) (B) (C) (D) (E) | 30 (A) (B) (C) (D) (E) | 43 (A) (B) (C) (D) (E) |
| 5 (A) (B) (C) (D) (E) | 18 (A) (B) (C) (D) (E) | 31 (A) (B) (C) (D) (E) | 44 (A) (B) (C) (D) (E) |
| 6 (A) (B) (C) (D) (E) | 19 (A) (B) (C) (D) (E) | 32 (A) (B) (C) (D) (E) | 45 (A) (B) (C) (D) (E) |
| 7 (A) (B) (C) (D) (E) | 20 (A) (B) (C) (D) (E) | 33 (A) (B) (C) (D) (E) | 46 (A) (B) (C) (D) (E) |
| 8 (A) (B) (C) (D) (E) | 21 (A) (B) (C) (D) (E) | 34 (A) (B) (C) (D) (E) | 47 (A) (B) (C) (D) (E) |
| 9 (A) (B) (C) (D) (E) | 22 (A) (B) (C) (D) (E) | 35 (A) (B) (C) (D) (E) | 48 (A) (B) (C) (D) (E) |
| 10 (A) (B) (C) (D) (E) | 23 (A) (B) (C) (D) (E) | 36 (A) (B) (C) (D) (E) | 49 (A) (B) (C) (D) (E) |
| 11 (A) (B) (C) (D) (E) | 24 (A) (B) (C) (D) (E) | 37 (A) (B) (C) (D) (E) | 50 (A) (B) (C) (D) (E) |
| 12 (A) (B) (C) (D) (E) | 25 (A) (B) (C) (D) (E) | 38 (A) (B) (C) (D) (E) | |
| 13 (A) (B) (C) (D) (E) | 26 (A) (B) (C) (D) (E) | 39 (A) (B) (C) (D) (E) | |

