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AP 统计学 5分制胜

Statistics

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西安交通大学出版社
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Statistics

Duane C. Hinders
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编著

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前　言

AP项目（Advanced Placement Program）始于1955年，由美国大学理事会（the College Board）主持，是在高中阶段开设的具有大学水平的课程，即大学预修课程。AP项目目前设有34门课程和考试，它可以使有余力、有能力、成绩优秀的高中生有机会先修部分美国大学基础课程以获得大学学分，因此吸引了很多成绩优秀的学生选修。目前，已有60多个国家的几千所大学把AP学分作为其入学参考标准，其中包括哈佛大学、耶鲁大学、牛津大学、剑桥大学等世界知名大学。

美国每年约有200万高中毕业生，他们都要参加美国高考SAT和AP课程的考试。美国高中生会在11年级时完成SAT考试，在12年级（高中最后一年）完成两件大事：第一，根据SAT的考试成绩申请大学和奖学金；第二，选修AP课程，并进行备考。在高中选修AP课程和通过AP考试不仅是对学生能力和学业水平的证明，还可以使学生：1. 在申请大学时具有很大的优势。美国大学把学生在AP考试中的表现作为衡量其是否能够胜任大学学习的依据。从美国大学录取顾问委员会公布的影响大学录取因素的比较分析可以看出，AP成绩以80.3%的影响力位居第一，因为它向学校充分展示了学生的才智、专长及学习能力。2. 进入大学后，可以获得大学学分，免修同类课程，提早选修更高级的课程或跳级。3. 提前毕业。4. 节省大学学费。在美国，初等教育是免费的，但高等教育是收费的。选修的AP课程越多，免修的大学课程也就越多，节省的学费也就越多。另外，对中国学生而言，除了可以获得美国大学学分、省时省钱外，还可以在国内提前适应美国大学课程。

AP考试成绩的评定为5分制，满分5分表示极为优秀，4分为优秀，3分相当于合格，即可为大多数学校所接受，2分为可能有资格，1分则不予推荐。 AP考试在每年5月份举行一次，为期两周。每门课程的考试时间约为2～3个小时，考试费用为每科1000元人民币或1400元港币左右。

更多信息可查询以下网站：

AP考试官网：http://www.collegeboard.com

AP国内报名网站：http://apchina.net.cn

香港考务局报名网址：https://www2.hkeaa.edu.hk

为满足国内考生对AP考试资料日益增长的需求，我们从美国知名教育出版公司McGraw-Hill Education引进了本系列AP考试丛书，共包括7本，分别为《AP微观/宏观经济学5分制胜》、《AP统计学5分制胜》、《AP微积分5分制胜》、《AP美国历史5分制胜》、《AP物理5分制胜》、《AP生

物5分制胜》和《AP化学5分制胜》。AP各学科分册由AP考试相关领域专家编写，精准把握考试命题特点，设计“五步”高效学习方案，总结与考试相关的学科内容和要点，精选针对性练习以及全真模拟试题，并配以答案和准确详尽的解析。本系列丛书适用于备考AP的所有考生，便于考生巩固所学，紧抓重点，取得高分。

本书为其中的《AP统计学5分制胜》。要想在AP统计学考试中表现优秀，就要仔细阅读这本书，认真学习AP统计学课程中的全部知识。书中不仅涵盖了美国大学理事会（the College Board）发布的课程简介中所列出的全部内容，而且还包括了一些在AP统计学官方大纲中没有要求但是有时会在考试中出现的知识点。然而，本书并不能替代课堂学习或课本。考生可以把这本书作为课堂学习的补充，作为快速复习某个知识点的参考书，作为备战AP考试的主要资料之一。

你应该从阅读本书的简介和STEP 1开始你的备考之路。然后，利用STEP 2中的诊断测试（Diagnostic Exam）对自己进行定位，检验在复习过程中需要注意哪些知识点。其次，领会STEP 3提供的建议和策略，以便最终掌握STEP 4中的全部知识内容。最后，通过STEP 5中的试题来巩固从本书中学到的知识，并检测你对书中内容的掌握程度。

为了在AP统计学考试中取得好成绩，我们建议考生：

- 从书中选取一个学习计划。
- 学习每章内容并做完所有习题。
- 进行诊断测试和模拟测试。
- 根据诊断测试和模拟测试的成绩进行必要的复习。
- 考前睡个好觉。

INTRODUCTION: THE FIVE-STEP PROGRAM

The Basics

Sometime, probably last spring, you signed up for AP Statistics. Now you are looking through a book that promises to help you achieve the highest grade in AP Statistics: a 5. Your in-class experiences are all-important in helping you toward this goal but are often not sufficient by themselves. In statistical terms, we would say that there is strong evidence that specific preparation for the AP exam beyond the classroom results in significantly improved performance on the exam. If that last sentence makes sense to you, you should probably buy this book. If it didn't make sense, you should definitely buy this book.

Introducing the Five-Step Preparation Program

This book is organized as a five-step program to prepare you for success on the exam. These steps are designed to provide you with the skills and strategies vital to the exam and the practice that can lead you to that perfect 5. Each of the five steps will provide you with the opportunity to get closer and closer to that level of success. Here are the five steps.

Step 1: Set Up Your Study Program

In this step you will read an overview of the AP Statistics exam (Chapter 1). Included in this overview are: an outline of the topics included in the course; the percentage of the exam that you can expect to cover each topic; the format of the exam; how grades on the exam are determined; the calculator policy for Statistics; and what you need to bring to the exam. You will also learn about a process to help determine which type of exam preparation you want to commit yourself to (Chapter 2):

1. Month-by-month: September through mid-May
2. The calendar year: January through mid-May
3. Basic training: Six weeks prior to the exam

Step 2: Determine Your Test Readiness

In this step you will take a diagnostic exam in statistics (Chapter 3). This pretest should give you an idea of how prepared you are to take both of the practice tests in Step 5 as you prepare for the real exam. The Diagnostic Exam covers the material on the AP exam, but the questions are more basic. Solutions to the exam are given, as well as suggestions for how to use your results to determine your level of readiness. You should go through the Diagnostic Exam and the given solutions step-by-step and question-by-question to build your confidence level.

Step 3: Develop Strategies for Success

In this step, you'll learn strategies that will help you do your best on the exam (Chapter 4). These cover general strategies for success as well as more specific tips and strategies for both the multiple-choice and free-response sections of the exam. Many of these are drawn from

my seven years of experience as a grader for the AP exam; others are the collected wisdom of people involved in the development and grading of the exam.

Step 4: Review the Knowledge You Need to Score High

This step represents the major part, at least in length, of this book. You will review the statistical content you need to know for the exam. Step 4 includes Chapters 5–14 and provides a comprehensive review of statistics as well as sample questions relative to the topics covered in each chapter. If you thoroughly review this material, you will have studied all that is tested on the exam and hence have increased your chances of earning a 5. A combination of good effort all year long in your class and the review provided in these chapters should prepare you to do well.

Step 5: Build Your Test-Taking Confidence

In this step you'll complete your preparation by testing yourself on practice exams. There are two complete sample exams in Step 5 as well as complete solutions to each exam. These exams mirror the AP exam (although they are not reproduced questions from the actual exam) in content and difficulty.

Finally, at the back of this book you'll find additional resources to aid your preparation:

- A summary of formulas related to the AP Statistics exam
- A set of tables needed on the exam
- A brief bibliography
- A short list of Web sites that might be helpful
- A glossary of terms related to the AP Statistics exam.

The Graphics Used in This Book

To emphasize particular skills and strategies, we use several icons throughout this book. An icon in the margin will alert you to pay particular attention to the accompanying text. We use four icons:

This icon indicates a very important concept that you should not pass over.

This icon highlights a strategy that you might want to try.

This icon alerts you to a tip that you might find useful.

This icon indicates a tip that will help you with your calculator.

Boldfaced words indicate terms included in the glossary at the end of this book.

ABOUT THE AUTHORS

DUANE HINDERS taught mathematics at the high school level for 37 years, including 12 years as chair of the Mathematics Department at Gunn High School in Palo Alto, California. He taught AP Calculus for more than 25 years and AP Statistics for 5 years before retiring from the public school system. He holds a BA (mathematics) from Pomona College, and an MA and an EdD (mathematics education) from Stanford University. He was a reader for the AP Calculus exam for six years and was a table leader for the AP Statistics reading for the first seven years of the exam. He has conducted over 50 one-day workshops and over 15 one-week workshops for teachers of AP Statistics. He was a co-author of an online AP Statistics course and is also the author of the *Annotated Teacher's Edition* for the 3rd edition of *The Practice of Statistics* by Yates, Moore, and Starnes (W.H. Freeman & Co., New York, 2008). He was a *Woodrow Wilson Fellow* in 1984, a *Tandy Technology Scholar* in 1994, and served on the Editorial Panel of *The Mathematics Teacher* for 3 years. He currently lives in Mountain View, California and teaches Statistics at Foothill College in Los Altos Hills, California.

BILL CRAINE is a mathematics teacher and chair of the mathematics department at Lansing High School in upstate New York. He has taught AP Statistics since 1999. He serves as an AP Statistics presenter in the Rewarding Achievement (REACH) Program, an innovative pay-for-performance initiative that aims to improve the college readiness of low-income students. He is the author of numerous ancillary materials to accompany *Stats: Modeling the World; Intro Stats; and Stats: Data and Models* by Bock, Vellerman, and DeVeaux (Pearson/Addison-Wesley, Boston, 2010). Currently, he is working on a solutions manual and teacher's resource guide to accompany *Stats in Your World* by Bock and Mariano (Pearson/Addison-Wesley, Boston, 2010). He lives in Lansing, New York.

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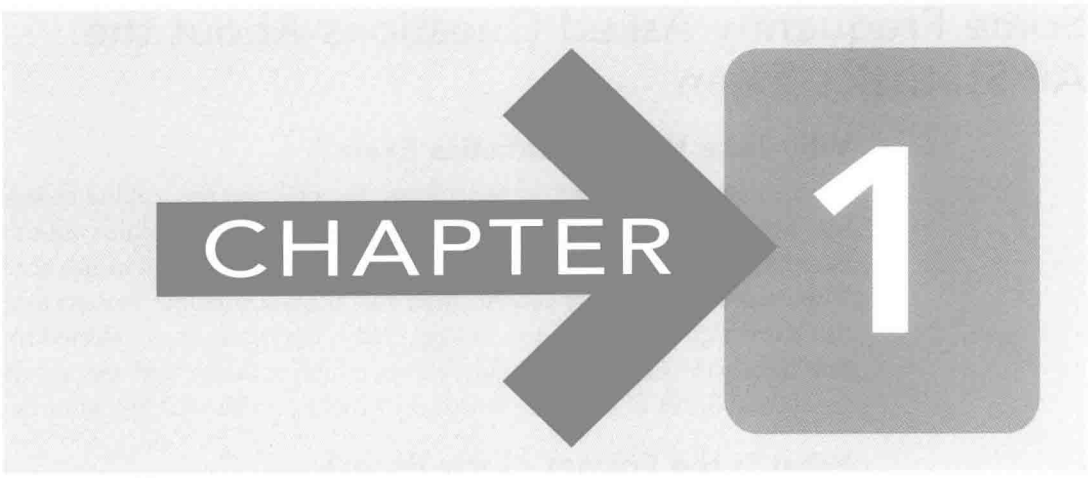
CONTENTS

Set Up Your Study Program



What You Need to Know About the AP Statistics Exam

IN THIS CHAPTER

Summary: Learn what topics are tested, how the test is scored, and basic test-taking information.

KEY IDEA

Key Ideas

- Most colleges will award credit for a score of 4 or 5. Some will award credit for a 3.
- Multiple-choice questions account for one-half of your final score.
- One point is earned for each correct answer on the multiple-choice section.
- Free-response questions account for one-half of your final score.
- Your composite score out of a possible 100 on the two test sections is converted to a score on the 1-to-5 scale.

Background Information

The AP Statistics exam that you are taking was first offered by the College Board in 1997. In that year, 7,667 students took the Stats exam (the largest first year exam ever). Since then, the number of students taking the test has grown rapidly. By 2009, the number of students taking the Statistics exam had increased to 116,876. Statistics is now one of the 10 largest AP exams. The mean score in 2009 was 2.83.

Some Frequently Asked Questions About the AP Statistics Exam

Why Take the AP Statistics Exam?

Most of you take the AP Statistics exam because you are seeking college credit. The majority of colleges and universities will accept a 4 or 5 as acceptable credit for their noncalculus-based statistics courses. A small number of schools will sometimes accept a 3 on the exam. This means you are one course closer to graduation before you even begin. Even if you do not score high enough to earn college credit, the fact that you elected to enroll in AP courses tells admission committees that you are a high achiever and serious about your education. In 2009, 58.8% of students scored 3 or higher on the AP Statistics exam.

What Is the Format of the Exam?

AP Statistics

SECTION	NUMBER OF QUESTIONS	TIME LIMIT
I.	40	90 Minutes
Multiple-Choice		
II.		
A. Free-Response	5	60–65 Minutes
B. Investigative Task	1	25–30 Minutes

Approved graphing calculators are allowed during all parts of the test. The two sections of the test are completely separate and are administered in separate 90-minute blocks. Please note that you are not expected to be able to answer all the questions in order to receive a grade of 5. Specific instructions for each part of the test are given in the Diagnostic Exam and the Practice Exams at the end of this book.

You will be provided with a set of common statistical formulas and necessary tables. Copies of these materials are in the appendix to this book.

Who Writes the AP Statistics Exam?

Development of each AP exam is a multiyear effort that involves many education and testing professionals and students. At the heart of the effort is the AP Statistics Test Development Committee, a group of college and high school statistics teachers who are typically asked to serve for three years. The committee and other college professors create a large pool of multiple-choice questions. With the help of the testing experts at Educational Testing Service (ETS), these questions are then pretested with college students enrolled in Statistics courses for accuracy, appropriateness, clarity, and assurance that there is only one possible answer. The results of this pretesting allow each question to be categorized by degree of difficulty.

The free-response essay questions that make up Section II go through a similar process of creation, modification, pretesting, and final refinement so that the questions cover the necessary areas of material and are at an appropriate level of difficulty and clarity. The committee also makes a great deal of effort to construct a free-response exam that will allow for clear and equitable grading by the AP readers.