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Barron's 巴朗

AP

数理统计 (第8版)

Barron's AP
Statistics (8th edition)

[美] 施泰恩施泰因 (Martin Sternstein Ph.D.) 著

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STATISTICS
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by

MARTIN STERNSTEIN PH.D.

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Introduction 绪论

The contents of this book cover the topics recommended by the AP Statistics Development Committee. A review of each of the 15 topics is followed by multiple-choice and free-response questions on that topic. Detailed explanations are provided for all answers. It should be noted that some of the topic questions are not typical AP exam questions but rather are intended to help review the topic. Finally, there is a diagnostic exam, and there are five full-length practice exams, totaling 276 questions, all with instructive, complete answers. An optional disk contains two new, full-length exams with 92 more questions.

Several points with regard to particular answers should be noted. First, step-by-step calculations using the given tables sometimes give minor differences from calculator answers due to round-off error. Second, calculator packages easily handle degrees of freedom that are not whole numbers, also resulting in minor answer differences. In the above cases, multiple-choice answers in this book have only one reasonable correct answer, and written explanations are necessary when answering free-response questions.

Students taking the AP Statistics Examination will be furnished with a list of formulas (from descriptive statistics, probability, and inferential statistics) and tables (including standard normal probabilities, t -distribution critical values, χ^2 critical values, and random digits). While students will be expected to bring a graphing calculator with statistics capabilities to the examination, answers should not be in terms of calculator syntax. Furthermore, many students have commented that calculator usage was less than they had anticipated. However, even though the calculator is simply a tool, to be used sparingly, as needed, students should be proficient with this technology.

The examination will consist of two parts: a 90-minute section with 40 multiple-choice problems and a 90-minute free-response section with five open-ended questions and an investigative task to complete. In grading, the two sections of the exam will be given equal weight. Students have remarked that the first section involves “lots of reading,” while the second section involves “lots of writing.” The percentage of questions from each content area is approximately 25% data analysis, 15% experimental design, 25% probability, and 35% inference. Questions in both sections may involve reading generic computer output.

Note that in the multiple-choice section the questions are much more conceptual than computational, and thus use of the calculator is minimal. The score on the multiple-choice section is based on the number of correct answers, with no points deducted for incorrect answers. Blank answers are ignored.

In the free-response section, students must show all their work, and communication skills go hand in hand with statistical knowledge. Methods must be clearly indicated, as the problems will be graded on the correctness of the methods as well as on the accuracy of the results and explanation. That is, the free-response answers should address *why* a particular test was

chosen, not just *how* the test is performed. Even if a statistical test is performed on a calculator such as the TI-84, formulas should still be stated. Choice of test, in inference, must include confirmation of underlying assumptions, and answers must be stated in context, not just as numbers.

Free-response questions are scored on a 0 to 4 scale with 1 point for a *minimal* response, 2 points for a *developing* response, 3 points for a *substantial* response, and 4 points for a *complete* response. Individual parts of these questions are scored as E for *essentially* correct, P for *partially* correct, and I for *incorrect*. Note that *essentially* correct does not mean *perfect*. Work is graded *holistically*, that is, a student's complete response is considered as a whole whenever scores do not fall precisely on an integral value on the 0 to 4 scale.

Each open-ended question counts 15% of the total free-response score and the investigative task counts 25% of the free-response score. The first open-ended question is typically the most straightforward, and after doing this one to build confidence, students might consider looking at the investigative task since it counts more. Each completed AP examination paper will receive a grade based on a 5-point scale, with 5 the highest score and 1 the lowest score. Most colleges and universities accept a grade of 3 or better for credit or advanced placement or both.

While a review book such as this can be extremely useful in helping prepare students for the AP exam (practice problems, practice more problems, and practice even more problems are the three strongest pieces of advice), nothing can substitute for a good high school teacher and a good textbook. This author personally recommends the following texts from among the many excellent books on the market: *Stats: Modeling the World* by Bock, Velleman, and DeVeaux; *The Practice of Statistics* by Starnes, Yates, and Moore; *Workshop Statistics: Discovery with Data* by Rossman and Chance, *Introduction to Statistics and Data Analysis* by Peck, Olsen, and Devore; and *Statistics: The Art and Science of Learning from Data* by Agresti and Franklin.

Other wonderful sources of information are the College Board's websites: www.collegeboard.org for students and parents, and www.apcentral.collegeboard.com for teachers.

A good piece of advice is for the student from day one to develop critical practices (like checking assumptions and conditions), to acquire strong technical skills, and to always write clear and thorough, yet to the point, interpretations in context. Final answers to most problems should be not numbers, but rather sentences explaining and analyzing numerical results. To help develop skills and insights to tackle AP free response questions (which often choose contexts students haven't seen before), pick up newspapers and magazines and figure out how to apply what you are learning to better understand articles in print that reference numbers, graphs, and statistical studies.

The student who uses this Barron's review book should study the text and illustrative examples carefully and try to complete the practice problems before referring to the solution keys. Simply reading the detailed explanations to the answers without first striving to work through the problems on one's own is not the best approach. There is an old adage: *Mathematics is not a spectator sport!* Teachers clearly may use this book with a class in many profitable ways. Ideally, each individual topic review, together with practice problems, should be assigned after the topic has been covered in class. The full-length practice exams should be reserved for final review shortly before the AP examination.

ANSWER SHEET

答题纸

Diagnostic Examination

诊断测试

- | | | | |
|---------------|---------------|---------------|---------------|
| 1. A B C D E | 11. A B C D E | 21. A B C D E | 31. A B C D E |
| 2. A B C D E | 12. A B C D E | 22. A B C D E | 32. A B C D E |
| 3. A B C D E | 13. A B C D E | 23. A B C D E | 33. A B C D E |
| 4. A B C D E | 14. A B C D E | 24. A B C D E | 34. A B C D E |
| 5. A B C D E | 15. A B C D E | 25. A B C D E | 35. A B C D E |
| 6. A B C D E | 16. A B C D E | 26. A B C D E | 36. A B C D E |
| 7. A B C D E | 17. A B C D E | 27. A B C D E | 37. A B C D E |
| 8. A B C D E | 18. A B C D E | 28. A B C D E | 38. A B C D E |
| 9. A B C D E | 19. A B C D E | 29. A B C D E | 39. A B C D E |
| 10. A B C D E | 20. A B C D E | 30. A B C D E | 40. A B C D E |

Diagnostic Examination

诊断测试

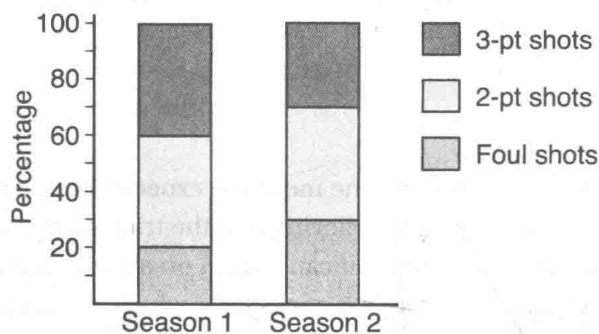
SECTION I 第一部分

Questions 1-40 1~40题

Spend 90 minutes on this part of the exam.

Directions: The questions or incomplete statements that follow are each followed by five suggested answers or completions. Choose the response that best answers the question or completes the statement.

1. The statistician for a professional basketball team calculates the percentages of points scored through 3-point shots, 2-point shots, and foul shots over two seasons. They are summarized in the following segmented bar chart.



Which of the following is an *incorrect* conclusion?

- (A) More points were scored through foul shots in the second season than in the first.
- (B) In the first season, twice as many points were scored through 2-point shots than through foul shots.
- (C) In the second season, the same number of points were scored through 3-point shots and through foul shots.
- (D) In both seasons, the same proportion of total points were scored through 2-point shots.
- (E) In the first season, a greater proportion of the points were scored through 3-point shots than in the second season.

2. Is there a linear relationship between calories and sodium content in beef hot dogs? A study of 20 beef hot dogs gives the following regression output:

Dependent variable is: Sodium

Predictor	Coef	SE Coef	T	P
Constant	-228.33	77.97	-2.93	0.009
Calories	4.0133	0.4922	8.15	0.000

S = 48.5799 R-Sq = 78.7% R-Sq(adj) = 77.5%

Which of the following gives a 99% confidence interval for the slope of the regression line?

- (A) $4.0133 \pm 2.861 \left(\frac{0.4922}{\sqrt{20}} \right)$
- (B) $4.0133 \pm (2.861)(0.4922)$
- (C) $4.0133 \pm (2.878)(0.4922)$
- (D) $4.0133 \pm 2.861 \left(\frac{48.5799}{\sqrt{20}} \right)$
- (E) $4.0133 \pm 2.878 \left(\frac{48.5799}{\sqrt{20}} \right)$
3. In tossing a fair coin, which of the following sequences is more likely to appear?
- (A) HHHHH
 (B) HTHTHT
 (C) HTHHTTH
 (D) THTHTHTH
 (E) All are equally likely.
4. An entomologist hypothesizes that the mean life expectancy of a particular species of insect is 12.5 days. Researchers believing that the true mean is less than 12.5 days plan a hypothesis test at the 5% significance level on a random sample of 50 of these insects. If the alternative hypothesis is correct, for which of the following values of μ will the power of the test be greatest?
- (A) 9
 (B) 11
 (C) 12.5
 (D) 14
 (E) 17