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[Introduction to] Mathematics Calculus BC

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**THE BEST TEST PREPARATION FOR THE
ADVANCED PLACEMENT
EXAMINATION**

Mathematics
CALCULUS BC

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PREFACE

This book gives you the tools to prepare effectively for the Advanced Placement Examination in Mathematics: Calculus BC. These tools include a concise topical review and six full-length practice tests. Our review succinctly covers areas considered most relevant to this exam. Each REA practice test contains every type of question you can expect to encounter when you sit for the AP exam. **(Readers should note, however, that the number and types of questions, as well as the length of time allotted for the actual AP exam can vary slightly from one test administration to another.)** Following each of our tests is an answer key complete with detailed explanations designed to clarify the material for you. By completing all six tests and studying our explanatory material, you will put yourself in a position to master the AP Calculus BC exam.

ABOUT THE TEST

The AP Calculus BC Examination is offered each May at participating schools and multi-school centers throughout the world.

The Advanced Placement Program is designed to allow high school students to pursue college-level studies while attending high school. The participating colleges, in turn, grant credit and/or advanced placement to students who do well on the examinations.

The Advanced Placement Calculus BC course is designed to represent college-level mathematics, and is considerably more extensive than Calculus AB. The full-year course covers the calculus of functions, including such topics as sequences, series, and differential equations, in addition to the topics covered in Calculus AB. The course is intended for students who have a thorough knowledge of analytic geometry and elementary functions as well as college-preparatory algebra, geometry, and trigonometry. The exam is divided into two sections:

I) **Multiple-choice:** Composed of 45 multiple-choice questions, designed to measure the student's abilities in a wide range of mathematical topics. These questions vary in difficulty and complexity. This section consists of two parts. Part A comprises 28 questions, for which a calculator may not be used. Part B contains 17 questions, some of which may require the use of a graphing calculator. One hour and forty-five minutes is allotted for Section I.

II) Free-response: Designed to demonstrate the student’s reasoning aptitude, Section II is composed of six questions—three in Part A (portions of which *require* a graphing calculator) and three in Part B (in which calculator use is *not* permitted). This section involves a more extensive application of calculus and other mathematical principles as compared to the Section I questions. Forty-five minutes is allotted for each part of this section.

Approved calculator series for the test include all of those on the following list. Those denoted with an asterisk (*), however, already have *built in* all the capabilities examinees need.

Casio	cfx-9850 series *	Radio Shack
fx-6000 series	cfx-9950 series*	EC-4033
fx-6200 series	cfx-9970 series*	EC-4034
fx-6300 series	Algebra fx 2.0 series*	EC-4037
fx-6500 series	Sharp	Hewlett-Packard
fx-7000 series	EL-5200	HP-28 series *
fx-7300 series	EL-9200 series*	HP-48 series*
fx-7400 series	EL-9300 series*	HP-49 series *
fx-7500 series	EL-9600 series*	HP-38G*
fx-7700 series	Texas Instruments	HP-39G*
fx-7800 series	TI-73	HP-40G*
fx-8000 series	TI-80	Other
fx-8500 series	TI-81	Micronta
fx-8700 series	TI-82*	Smart ²
fx-8800 series	TI-83/TI-83 Plus*	
fx-9700 series*	TI-85*	
fx-9750 series*	TI-86*	
cfx-9800 series*	TI-89*	

The practice tests in this book provide calculator-related questions with explanations that include the steps that should be carried out with a calculator. These steps are illustrated after the word *calculator*, where the keystrokes that should be used are listed.

The practice tests in this book incorporate Section II free-response solutions that approximate the content breakdown you will encounter on the AP exam. The overall timing and formatting of the practice tests in this book mirror the actual test; examinees should note, however, that this section is split into two parts on the AP exam. Furthermore, prospective examinees should pay attention to restrictions on calculator use. For details, consult current official College Board materials in print or on the Web at www.collegeboard.com/ap.

ABOUT THE REVIEW SECTION

This book contains review material that students will find useful as a study aid while preparing for the AP Calculus BC Examination. This review provides information that will most likely appear on the actual test. Included in this section are the following topics:

Elementary Functions — This chapter describes the Properties of Functions, the Properties of Particular Functions, and Limits

Differential Calculus — This chapter deals with Derivatives and Application of the Derivative

Integral Calculus — This chapter explains Anti-Derivatives, Applications of Anti-Derivatives, The Law of Exponential Change, Techniques of Integration, The Definite Integral, and Applications of the Integral

Sequences and Series — This chapter describes the Sequences of Real Numbers and Functions; Convergence, Series of Real Numbers, Series of Functions, and Power Series

Elementary Differential Equations — This chapter deals with First Order, Variable Separable Equations.

SCORING THE TEST

SCORING THE MULTIPLE-CHOICE SECTION

For the multiple choice section, use this formula to calculate your raw score:

$$\frac{\text{number right}}{\text{number right}} - \left(\frac{\text{number wrong}^*}{\text{number right}} \times 1/4 \right) = \text{raw score (round to nearest whole \#)}$$

* DO NOT INCLUDE UNANSWERED QUESTIONS

SCORING THE FREE-RESPONSE SECTION

For the free-response section, use this formula to calculate your raw score:

$$\text{_____} + \text{_____} + \text{_____} + \text{_____} + \text{_____} + \text{_____} = \text{raw score}$$

problems one through six

The score for each problem should reflect how completely the question was answered, that is, the solution that was produced and the steps taken. You should gauge at what point a mistake was made, and determine whether any use of calculus or mathematics was incorrect. Each problem is given a score of between 0 and 9 points. More points should be given for correct answers that include all work in the answer explanation, and less points should be given for incorrect answers and necessary work that was not written down. It might help to have a teacher or an impartial person knowledgeable in calculus decide on the points to be awarded.

THE COMPOSITE SCORE

To obtain your composite score, use the following method:

$$1.200 \times \frac{\text{multiple choice raw score}}{\text{raw score}} = \text{_____} \quad \text{(weighted multiple-choice score)}$$

round to the nearest whole number

NOW ADD:

$$\frac{\text{weighted multiple choice raw score}}{\text{raw score}} + \frac{\text{free-response raw score}}{\text{raw score}} = \frac{\text{composite score}}{\text{score}}$$

Compare your score with this table to approximate your grade:

AP GRADE	COMPOSITE SCORE
5	78 - 102
4	64 - 77
3	45 - 63
2	30 - 44
1	0 - 29

The overall scores are interpreted as follows: 5-extremely well qualified; 4-well qualified; 3-qualified; 2-possibly qualified; and 1-no recommendation. Most colleges will grant students who earn a 3 or above either college credit or advanced placement. Check with your school guidance office about specific school requirements.