

ap bc calculus 2017

Ebook Description: AP BC Calculus 2017

This ebook provides a comprehensive review of the 2017 AP Calculus BC curriculum, equipping students with the knowledge and skills necessary to excel on the AP exam. It covers all essential topics, from limits and derivatives to integration techniques and infinite series, offering clear explanations, worked examples, and practice problems to solidify understanding. Mastering AP Calculus BC opens doors to advanced studies in STEM fields, demonstrating a strong foundation in mathematical reasoning and problem-solving crucial for college success. This guide is particularly relevant for students preparing for the 2017 exam or those seeking a solid understanding of advanced calculus concepts. The book emphasizes strategic test-taking techniques and provides insights into the exam's structure and scoring, maximizing students' chances of achieving a high score.

Ebook Title: Conquering AP Calculus BC: A 2017 Review Guide

Outline:

Introduction: Overview of AP Calculus BC, exam format, scoring, and study strategies.

Chapter 1: Limits and Continuity: Exploring limits, continuity, and their applications.

Chapter 2: Derivatives: Differentiation rules, applications of derivatives (related rates, optimization), and curve sketching.

Chapter 3: Integrals: Integration techniques, fundamental theorem of calculus, applications of integrals (area, volume).

Chapter 4: Differential Equations: Solving differential equations, slope fields, applications of differential equations.

Chapter 5: Infinite Sequences and Series: Convergence tests, Taylor and Maclaurin series, power series.

Chapter 6: Parametric Equations and Polar Coordinates: Derivatives and integrals in parametric and polar coordinates.

Chapter 7: Practice Exams and Solutions: Full-length practice exams mirroring the actual AP exam, with detailed solutions.

Conclusion: Recap of key concepts, final exam preparation tips, and resources for further learning.

Article: Conquering AP Calculus BC: A 2017 Review Guide

Introduction: Mastering the Fundamentals of AP Calculus BC (2017)

The AP Calculus BC exam is a challenging but rewarding experience for high school students aiming for

success in higher-level mathematics and STEM fields. This comprehensive guide focuses on the 2017 curriculum, providing a structured approach to mastering the core concepts. Understanding the exam's format, scoring, and efficient study strategies is crucial for maximizing your chances of achieving a high score. We'll cover essential topics, including limits, derivatives, integrals, differential equations, and infinite sequences and series, each with ample examples and practice problems.

Chapter 1: Limits and Continuity: The Foundation of Calculus

Understanding Limits and Continuity in AP Calculus BC

Limits form the cornerstone of calculus. We will explore the concept of a limit, both intuitively and rigorously using epsilon-delta definitions (though the epsilon-delta definition is less emphasized on the AP exam). This includes one-sided limits, infinite limits, and limits at infinity. Continuity is explored through the lens of limits, identifying types of discontinuities (removable, jump, infinite) and their graphical representations. Mastering these concepts is crucial for understanding derivatives and integrals.

Key Concepts:

Limit notation and its interpretation

One-sided limits and their relationship to the overall limit

Infinite limits and limits at infinity

Continuity and its different types (removable, jump, infinite)

Intermediate Value Theorem

Chapter 2: Derivatives: The Rate of Change

Mastering Differentiation Techniques and Applications

Derivatives measure the instantaneous rate of change of a function. This chapter covers various differentiation techniques, including power rule, product rule, quotient rule, chain rule, and implicit differentiation. We'll then delve into the applications of derivatives, such as finding critical points, determining concavity, and solving optimization and related rates problems.

Key Concepts:

Power rule, product rule, quotient rule, and chain rule

Implicit differentiation

Higher-order derivatives

Mean Value Theorem

Optimization problems

Related rates problems

Curve sketching using derivatives

Chapter 3: Integrals: Accumulation and Antiderivatives

Understanding Integration Techniques and Applications

Integration is the reverse process of differentiation. We'll explore various integration techniques, including power rule, u-substitution, integration by parts, and trigonometric substitutions. The fundamental theorem of calculus connects differentiation and integration, forming a central pillar of calculus. Applications of integrals include calculating areas, volumes, and solving accumulation problems.

Key Concepts:

Indefinite and definite integrals

Fundamental Theorem of Calculus (Part 1 and Part 2)

U-substitution

Integration by parts

Trigonometric integrals

Area between curves

Volumes of revolution (disk/washer and shell methods)

Chapter 4: Differential Equations: Modeling Change

Solving Differential Equations and Their Applications

Differential equations describe relationships between a function and its derivatives. We'll learn techniques for solving separable differential equations, as well as understanding slope fields and their connection to solutions. Applications of differential equations include modeling population growth, radioactive decay, and other real-world phenomena.

Key Concepts:

Separable differential equations

Slope fields

Euler's method (approximating solutions)

Applications of differential equations (population growth, radioactive decay, etc.)

Chapter 5: Infinite Sequences and Series: The Power of Infinities

Understanding Convergence and Taylor Series

Infinite sequences and series extend the concept of limits to infinite sums. This chapter explores tests for convergence and divergence of series (e.g., integral test, comparison test, ratio test). We'll then delve into Taylor and Maclaurin series, which provide polynomial approximations of functions.

Key Concepts:

Sequences and their convergence

Series and their convergence (various tests)

Taylor and Maclaurin series

Remainder theorem

Radius and interval of convergence

Chapter 6: Parametric Equations and Polar Coordinates: Beyond Cartesian

Exploring Parametric and Polar Curves

Parametric equations describe curves using a parameter, while polar coordinates provide an alternative coordinate system to represent points. We'll explore derivatives, integrals, and areas in these coordinate systems.

Key Concepts:

Parametric equations and their derivatives

Arc length in parametric equations

Polar coordinates

Area in polar coordinates

Chapter 7: Practice Exams and Solutions: Preparing for Success

Practice Exams to Master the Concepts

This section includes full-length practice exams closely mirroring the format and difficulty of the actual 2017 AP Calculus BC exam. Detailed solutions are provided to guide students through the problem-solving process and identify areas needing further attention.

Conclusion: Achieving Success on the AP Calculus BC Exam

By mastering the concepts presented in this guide, you'll be well-prepared for the 2017 AP Calculus BC exam. Consistent practice and a thorough understanding of the fundamental principles are crucial for success. Remember to utilize available resources and seek help when needed.

FAQs:

1. What is the difference between AP Calculus AB and BC? BC covers all of AB plus additional topics like sequences, series, and parametric/polar equations.
2. What calculator is allowed on the AP Calculus BC exam? Graphing calculators are permitted, but specific models may have restrictions.
3. What is the scoring system for the AP Calculus BC exam? The exam is scored on a 5-point scale (5 being the highest).
4. How many questions are on the AP Calculus BC exam? The exam consists of multiple-choice and free-response sections.
5. What are some good resources for studying AP Calculus BC besides this ebook? Khan Academy, textbooks, and online courses are helpful resources.
6. How much time should I dedicate to studying for the AP Calculus BC exam? The required study time varies based on individual needs and prior knowledge.
7. What are some common mistakes students make on the AP Calculus BC exam? Careless errors, insufficient practice, and misunderstanding of concepts are common pitfalls.
8. What topics are most heavily weighted on the AP Calculus BC exam? Derivatives, integrals, and applications of calculus are usually heavily weighted.
9. What should I do if I'm struggling with a particular topic in AP Calculus BC? Seek help from teachers, tutors, or online resources.

Related Articles:

1. Understanding Limits in Calculus: A detailed explanation of limit concepts and their significance.
2. Mastering Differentiation Techniques: A comprehensive guide to different rules of differentiation.

3. Integration Techniques and Applications: Explore various integration methods and their real-world applications.
4. Solving Differential Equations: A practical guide to solving different types of differential equations.
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6. Parametric and Polar Equations: A Visual Approach: A visual explanation of parametric and polar coordinates.
7. Strategies for Solving AP Calculus BC Problems: Tips and strategies for solving different problem types.
8. AP Calculus BC Exam Review: Key Concepts and Formulas: A concise summary of key formulas and concepts.
9. Understanding the AP Calculus BC Scoring Rubric: A detailed explanation of the grading criteria for the AP Calculus BC exam.

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