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# AP Calculus AB Study Guide

Are you preparing for the AP Calculus AB exam? This study guide covers exam basics, what's covered on the exam, and how to prepare for the exam.

To access practice tests, check out Peterson's AP Calculus AB test prep.

## Exam Basics

- **Test time:** 3 hours, 15 minutes
- **Section I of the exam:** 45 multiple-choice questions; 50% exam weighting; 105 minutes to complete; graphing calculator required for part of this section.
- **Section II of the exam:** 6 free-response questions; 50% exam weighting; 90 minutes to complete; graphing calculator required for 30 minutes of this section.

**The exam assesses the following content:**

1. Change
2. Limits
3. Analysis of functions

| Multiple-choice section weighting | Free-response section weighting |
|---|---|
| • Implementing mathematical processes : 53-66% | • Implementing mathematical processes : 37-55% |
| • Connecting representations: 18-28% | • Connecting representations: 9-16% |
| • Justification: 11-18% | • Justification: 37-55% |
| | • Communication and notation: 13-24% |

## What's on the Calculus AB Exam?

### Limits and Continuity

- How limits help us to handle change at an instant
- Definition and properties of limits in various representations
- Definitions of continuity of a function at a point and over a domain
- Asymptotes and limits at infinity
- Reasoning using the Squeeze theorem and the Intermediate Value Theorem

Exam weighting: 10-12%

### Differentiation: Definition and Fundamental Properties

- Defining the derivative of a function at a point and as a function
- Connecting differentiability and continuity
- Determining derivatives for elementary functions
- Applying differentiation rules

Exam weighting: 10-12%

### Differentiation: Composite, Implicit, and Inverse Functions

- The chain rule for differentiating composite functions
- Implicit differentiation
- Differentiation of general and particular inverse functions
- Determining higher-order derivatives of functions

Exam weighting: 9-13%

### Contextual Applications of Differentiation

- Identifying relevant mathematical information in verbal representations of real-world problems involving rates of change
- Applying understandings of differentiation to problems involving motion
- Generalizing understandings of motion problems to other situations involving rates of change
- Solving related rates problems
- Local linearity and approximation
- L'Hospital's rule

Exam weighting: 10-15%

### Applying Derivatives to Analyze Functions

- Mean Value Theorem and Extreme Value Theorem
- Derivatives and properties of functions
- How to use the first derivative test, second derivative test, and candidates test
- Sketching graphs of functions and their derivatives
- How to solve optimization problems
- Behaviors of Implicit relations

Exam weighting: 15-18%

### Integration and Accumulations of Change

- Using definite integrals to determine accumulated change over an interval
- Approximating integrals using Riemann Sums
- Accumulation functions, the Fundamental Theorem of Calculus, and definite integrals
- Antiderivatives and indefinite integrals
- Properties of integrals and integration techniques

Exam weighting: 17-20%

### Differential Equations

- Interpreting verbal descriptions of change as separable differential equations
- Sketching slope fields and families of solution curves
- Solving separable differential equations to find general and particular solutions
- Deriving and applying a model for exponential growth and decay

Exam weighting: 6-12%

### Applications of Integration

- Determining the average value of a function using definite integrals
- Modeling particle motion
- Solving accumulation problems
- Finding the area between curves
- Determining volume with cross-sections, the disc method, and the washer method

Exam weighting: 10-15%

## Preparing for the AP Calculus AB Exam

### Make a study plan

Creating a study plan can help guide you in the right direction to ensure success on the AP Calculus AB exam.

Determine how much time you have before the exam and how much time you can devote to prepare for the exam. Answering these questions will help you set a pace for your review.

### Take a diagnostic test

The diagnostic test will help you identify your weak spots in the course. Based on the results of the test, plan your study time to address the areas where you need improvement.

### Take practice tests

Completing practice tests will help you maintain pacing, and in understanding and answering multiple-choice question, and practice in writing timed questions.

Pacing is important! Work quickly and carefully throughout the test. Answer as many questions as you can as quickly as you can, and then go back and try to fill in the others.

### Complete assignments

Complete all assignments for your regular AP Calculus AB class. The test is designed to measure your development and understanding of calculus.

### Test Prep

To help you prepare for the AP Calculus AB exam, check out Peterson's Calculus AB test prep course, which includes two full-length practice tests, self-learning skills, and strategies.

**Tip** In the free-response sections, be neat, thorough, and very clear. You don't want those scoring your exam to guess what you wrote or what you meant.

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