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# 550 AP<sup>®</sup>

## Calculus AB & BC Practice Questions

4 full-length practice tests (2 each for AB and BC Calculus)

Tons of drills organized by major calculus topics, including differentiation and integration

Answer explanations for each practice question

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# 550 AP<sup>®</sup> CALCULUS AB & BC Practice Questions

The Staff of the Princeton Review

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# **PREVIEW: YOUR KNOWLEDGE, YOUR EXPECTATIONS**

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Your route to a high score on the AP Calculus Exam depends a lot on how you plan to use this book. Start thinking about your plan by responding to the following questions.

1. Rate your level of confidence about your knowledge of the content tested by the AP Calculus Exam:

- A. Very confident—I know it all
- B. I'm pretty confident, but there are topics for which I could use help
- C. Not confident—I need quite a bit of support
- D. I'm not sure

2. If you have a goal score in mind, circle your goal score for the AP Calculus Exam:

5      4      3      2      1      I'm not sure yet

3. What do you expect to learn from this book? Circle all that apply to you.

- A. A general overview of the test and what to expect
- B. Strategies for how to approach the test
- C. The content tested by this exam
- D. I'm not sure yet

## **YOUR GUIDE TO USING THIS BOOK**

This book is organized to provide as much—or as little—support as you need, so you can use this book in whatever way will be most helpful for improving your score on the AP Calculus Exam.

- The remainder of **Part One** will provide guidance on how to use this book and help you determine your strengths and weaknesses.
- **Part Two** of this book will
  - provide information about the structure, scoring, and content of the AP Calculus Exam.
  - help you to make a study plan.
  - point you towards additional resources.
- **Part Three** of this book will explore various strategies:
  - how to attack multiple choice questions
  - how to write a high-scoring free response answer
  - how to manage your time to maximize the number of points available to you
- **Part Four** of this book contains practice drills covering all of the AB Calculus and BC Calculus concepts you will find on the exams.
- **Part Five** of this book contains practice tests.

You may choose to use some parts of this book over others, or you may work through the entire book. This will depend on your needs and how much time you have. Let's now look how to make that determination.

## HOW TO BEGIN

## 1. **Take a Test**

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Before you can decide how to use this book, you need to take a practice test. Doing so will give you insight into your strengths and weaknesses, and the test will also help you make an effective study plan. If you're feeling test-phobic, remind yourself that a practice test is a tool for diagnosing yourself—it's not how well you do that matters but how you use the information gleaned from your performance to guide your preparation.

So, before you read further, take the AP Calculus AB Diagnostic Test starting at [this page](#) of this book or take the AP Calculus BC Diagnostic Test starting on [this page](#). Be sure to do so in one sitting, following the instructions that appear before the test.

## 2. **Check Your Answers**

Using the answer key on [this page](#) (for Calculus AB) or [this page](#) (for Calculus BC), count how many multiple choice questions you got right and how many you missed. Don't worry about the explanations for now, and don't worry about why you missed questions. We'll get to that soon.

## 3. **Reflect on the Test**

After you take your first test, respond to the following questions:

- How much time did you spend on the multiple choice questions?
- How much time did you spend on each free response question?

question?

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- How many multiple choice questions did you miss?
- Do you feel you had the knowledge to address the subject matter of the essays?
- Do you feel you wrote well organized, thoughtful essays?
- Circle the content areas that were most challenging for you and draw a line through the ones in which you feel confident/did well.
  - Functions, Graphs, and Limits
  - Differential Calculus
  - Integral Calculus
  - Polynomial Approximations and Series (for BC Calculus Students)
  - Applications of Derivatives
  - Applications of Integrals

#### 4. Read **Part Two** and Complete the Self-Evaluation

As discussed in the Goals section above, **Part Two** will provide information on how the test is structured and scored. It will also set out areas of content that are tested.

As you read **Part Two**, re-evaluate your answers to the questions above. At the end of **Part Two**, you will revisit an

refine the questions you answered above. You will then be able to make a study plan, based on your needs and time available that will allow you to use this book most effectively.

## **5. Engage with the Drills as Needed**

Notice the word *engage*. You'll get more out of this book if you use it intentionally than if you read it passively, hoping for an improved score through osmosis.

The drills are designed to give you the opportunity to assess your mastery of calculus concepts through test-appropriate questions.

## **6. Take Test 2 and Assess Your Performance**

Once you feel you have developed the strategies you need and gained the knowledge you lacked, you should take one of the practice exams at the end of this book. You should do so in one sitting, following the instructions at the beginning of the test. When you are done, check your answers to the multiple choice sections.

Once you have taken the test, reflect on what areas you still need to work on, and revisit the drills in this book that address those topics. Through this type of reflection and engagement, you will continue to improve.

## **7. Keep Working**

As you work through the drills, consider what additional work you need to do and how you will change your strategic approach to different parts of the test.



If you do need more guidance, there are plenty of resources available to you. Our *Cracking the AP Calculus AB & BC Exam* guide gives you a comprehensive review of all the calculus topics you need to know for the exam and offers 5 practice tests (3 for AB and 2 for BC). In addition, you can go to the AP Central website for more information about exam schedule and calculus concepts.

# AB Calculus Diagnostic Test

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(Click [here](#) to download a PDF of Diagnostic Test)

# AP<sup>®</sup> Calculus AB Exam

## SECTION I: Multiple-Choice Questions

**DO NOT OPEN THIS BOOKLET UNTIL YOU ARE TOLD TO DO SO.**

### At a Glance

**Total Time**

1 hour and 45 minutes

**Number of Questions**

45

**Percent of Total Grade**

50%

**Writing Instrument**

Pencil required

### Instructions

Section I of this examination contains 45 multiple-choice questions. Fill in only the ovals for numbers 1 through 45 on your answer sheet.

**CALCULATORS MAY NOT BE USED IN THIS PART OF THE EXAMINATION.**

Indicate all of your answers to the multiple-choice questions on the answer sheet. No credit will be given for anything written in this exam booklet, but you may use the booklet for notes or scratch work. After you have decided which of the suggested answers is best, completely fill in the corresponding oval on the answer sheet. Give only one answer to each question. If you change an answer, be sure that the previous mark is erased completely. Here is a sample question and answer.

### Sample Question

Chicago is a

---

- (A) state
- (B) city
- (C) country
- (D) continent
- (E) village

Sample Answer

(A) ● (C) (D) (E)

Use your time effectively, working as quickly as you can without losing accuracy. Do not spend too much time on any one question. Go on to other questions and come back to the ones you have not answered if you have time. It is not expected that everyone will know the answers to all the multiple-choice questions.

### **About Guessing**

Many candidates wonder whether or not to guess the answers to questions about which they are not certain. Multiple choice scores are based on the number of questions answered correctly. Points are not deducted for incorrect answers, and no points are awarded for unanswered questions. Because points are not deducted for incorrect answers, you are encouraged to answer all multiple-choice questions. On any questions you do not know the answer to, you should eliminate as many choices as you can, and then select the best answer among the remaining choices.

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CALCULUS AB

SECTION I, Part A

Time—55 Minutes

Number of questions—28

A CALCULATOR MAY NOT BE USED ON THIS PART OF THE EXAMINATION

**Directions:** Solve each of the following problems, using the available space for scratchwork. After examining the form of the choices, decide which is the best of the choices given and fill in the corresponding oval on the answer sheet. No credit will be given for anything written on the test book. Do not spend too much time on any one problem.

**In this test:** Unless otherwise specified, the domain of a function  $f$  is assumed to be the set of all real numbers  $x$  for which  $f(x)$  is a real number.

1  
2  
)  
nonexistent  
 $2\pi$

---

)  
 $\infty$   
3  
The limit does not exist.

---

At what point does the following function have a removable discontinuity?

$$f(x) = f(x) = \frac{x^2 + x - 2}{x^2 + 7x + 10}$$

$(-5, -1)$

$(-2, -1)$

---

$(-2, 1)$

$(1, 1)$

$(1, -1)$

---

Which of the following functions is NOT continuous at  $x = -3$ ?

$$f(x) = \begin{cases} \frac{x^3 + x - 2}{x^2 - 6x + 9}, & x < -3 \\ 3x^3 + 2x, & x \geq -3 \end{cases}$$

$$g(x) = \begin{cases} x^2, & x < -3 \\ 9, & x = -3 \\ |3x|, & x > -3 \end{cases}$$

$$h(x) = \frac{2x^2 - 8x + 6}{x^2 + x - 2}$$

$$i(x) = \sqrt{x - 2}$$

$$j(x) = (x + 3)^2$$

---

Which of the following functions is continuous at  $x = -3$ ?

$$f(x) = \begin{cases} \frac{x^3 + x - 2}{x^2 - 6x + 9}, & x < 0 \\ 3x^3 + 2x, & x \geq 0 \end{cases}$$

$$g(x) = \begin{cases} x^2 + 1, & x < -3 \\ 9, & x = -3 \\ |3x|, & x > -3 \end{cases}$$

$$h(x) = \frac{x^2 + x - 2}{2x^2 + 4x - 6}$$

$$i(x) = (x - 2)^{\frac{3}{2}}$$

$$j(x) = (\sqrt[3]{x + 2})^2$$

---

What is  $\lim_{h \rightarrow 0} \frac{\sec\left(\frac{\pi}{2} + h\right) - \sec\left(\frac{\pi}{2}\right)}{h}$ ?

)

1

The limit does not exist.

---

If  $f(x) = (2x^3 + 33)(\sqrt[5]{x} - 2x)$ , then  $f'(x) =$

$(2x^3 + 33) \left( \frac{1}{5\sqrt[5]{x^4}} - 2 \right) + 6x^2(\sqrt[5]{x} - 2x)$

$(2x^3 + 33) \left( \frac{1}{5\sqrt[5]{x^4}} - 2 \right) + 6x^3(\sqrt[5]{x} - 2x)$

$(2x^3 + 33) \left( \frac{1}{5} \sqrt[5]{x^4} - 2 \right) + 6x^2(\sqrt[5]{x} - 2x)$

$(2x^3 + 33) \left( \frac{1}{5\sqrt[5]{x^4}} - 2 \right) + 6x^2(\sqrt[5]{x} - 2x)$

$(2x^3 + 33)(5\sqrt[5]{x^4} - 2) + 6x^3(\sqrt[5]{x} - 2x)$

---

If  $y = \left( \frac{x^3 - 1}{x^2 + x} \right)^4$ , then  $\frac{dy}{dx} =$

Find the second derivative of  $x^2y^2 = 2$  at  $(2,1)$ .

1

-2

$\frac{1}{2}$

2

$$-\frac{1}{2}$$

---

---

If the line  $y = ax^2 + bx + c$  goes through the point (2,1) and is normal to  $y = \frac{1}{3}x + 2$  at the point (0,2), then  $a = ?$

$$-\frac{5}{4}$$

$$\frac{5}{4}$$

$$\frac{4}{5}$$

$$-\frac{4}{5}$$

$$2$$

---

---

If  $\frac{d}{dx}f(x) = 2g(x)$  and if  $h(x) = x^3$ , then  $\frac{d}{dx}f(h(x)) =$

$$5x^2g(x^3)$$

$$2g(x^3)$$

$$2x^2g(x^3)$$

$$5g(x^3)$$

$$2x^3g(x^3)$$

---

---

Which of the following statements about the function given by  $f(x) = \frac{6}{5}x^5 - 2x^3$  is true?

The function has no relative extrema.

The graph has one point of inflection and two relative extrema.

The graph has three points of inflection and one relative extremum.

The graph has three points of inflection and two relative extrema.

The graph has two points of inflection and two relative extrema.

---

---

$$\int (2x - 5)^3 dx =$$
$$+ C$$



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