

## AP\* Calculus Exam Prep

ID: 12623

 Time Required  
 20 minutes

## Activity Overview

*Students will prepare for the AP Calculus exam. Students will do exercises and learn practice tips. Students will review and gain skills in such topics as graphing, finding intersections, finding zeros, evaluating derivatives at a point, and evaluating definite integrals. Examples of non-calculator multiple-choice questions are also provided.*

## Topic: AP Exam-Type Questions

- *Using a graph effectively to find zeros and intersection points.*
- *Using calculator features to help answer multiple-choice questions.*

## Teacher Preparation and Notes

- *This activity focuses on AB-type questions, since the BC exam shares many of the AB questions.*
- *After completing the activity, students should be more successful in answering many of the multiple-choice questions, especially from 2003. From the calculator-active questions, have students try 2003AB76, 81, 83, 84, 92.*
- *For practice AP exam questions from the Princeton Review, go to [http://education.ti.com/educationportal/sites/US/nonProductMulti/test\\_prep.html?bid=3](http://education.ti.com/educationportal/sites/US/nonProductMulti/test_prep.html?bid=3).*
- ***To download the student worksheet, go to [education.ti.com/exchange](http://education.ti.com/exchange) and enter "12623" in the keyword search box.***

## Associated Materials

- *APCalcExamPrep\_Student.doc*

## Suggested Related Activities

*To download any activity listed, go to [education.ti.com/exchange](http://education.ti.com/exchange) and enter the number in the keyword search box.*

- *AP Calculus Study Cards (TI-84 Plus family) — 8052*
- *1998 Multiple Choice AP Calculus BC Exam (TI-84 Plus and TI-Navigator) — 6918*
- *Helicopter Bungee Jump (TI-89 Titanium) — 11760*

\*AP, College Board, and SAT are registered trademarks of the College Board, which was not involved in the production of and does not endorse this product.

**Part 1 – Calculator Active Exam Tips**

Students will read and answer questions on their worksheet to learn and review tips for taking the AP exam. These questions are similar to some of the calculator active questions on the 2003 exam.

Although students should use the graphing calculator throughout the year that they will use on the exam, this activity was written at an introductory level. Key presses are provided on the student worksheet. Students are allowed to bring two graphing calculators, so some may consider bringing a TI-89 graphing calculator or TI-Nspire CAS handheld in addition to their normal calculator.

**Student Solutions**

1. About 15 minutes should be spent for each free response question (45 minutes for 3 calculator active, then 45 minutes for no calculator permitted). Section 1 Part A students should spend just under 2 minutes for each non calculator permitted question. Section 1 Part B students should spend just under 3 minutes for the 17 calculator active questions.

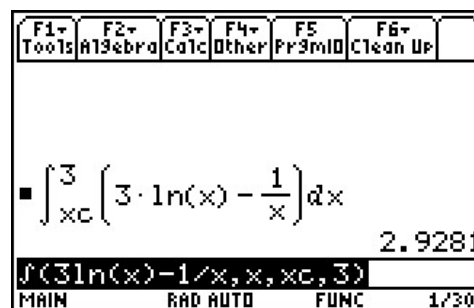
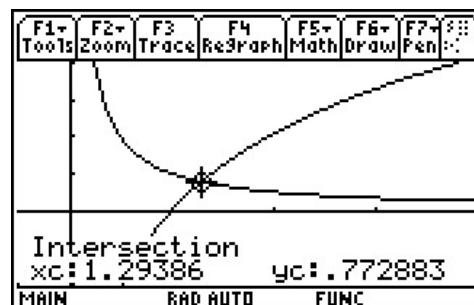
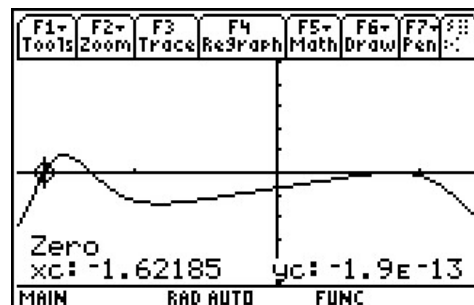
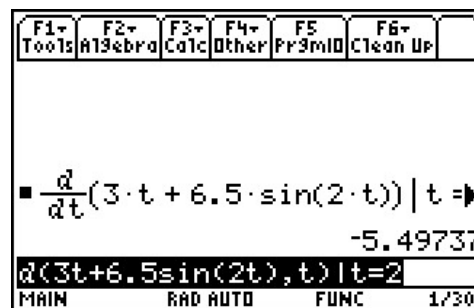
2.  $\frac{d}{dt}(3t + 6.5 \cos(2t))|_{t=2} = -5.497$

3.  $-1.622 < x < -1.290$ ; This is where the derivative of the integral is positive. Therefore this is where the function  $h(x)$  is increasing.

4.  $\int_{xc}^3 \left(3 \ln(x) - \frac{1}{x}\right) dx = 2.928$ , where  $xc$  is the x-coordinate of the intersection and  $xc = 1.29386$

Question 4 pertains to free-response questions. This point of intersection will be used for multiple parts of a free-response question.

Students should practice more calculator active questions. Old exams are available through College Board.



## Part 2 – AB exam practice non-calculator type questions

This section allows students to practice and build their confidence with AB non-calculator questions that are similar to the 2003 exam.

Students are reminded to be well rested for this marathon of the mind. They should go into the exam room with confidence and peace, planning to do the best they can based on their training and ability.

The solutions below include a rule, method, or other specific knowledge that was used to solve the problem.

### Discussion Question:

- Ask students to reflect on what they have learned in the first part of the activity. What new skills or important tips were they reminded of?

### **Student Solutions**

1. D – this is a simple chain rule question. Make sure students don't forget to multiply by the derivative of what's 'inside.'
2. E – Fundamental Theorem of Calculus with Chain Rule and remembering that  $e^0 = 1$ .
3. B – Implicit differentiation.

$$\sec^2(x) = e^y \frac{dy}{dx} \Rightarrow \frac{dy}{dx} = \frac{\sec^2(x)}{e^y} = \frac{\sec^2(x)}{\tan(x)} = \frac{1}{\sin(x)\cos(x)}$$

4. C – Quotient Rule
5. D – Fundamental Theorem of Calculus and knowledge of basic trigonometric values
6. D – limit of polynomials of same degree (focus on the leading coefficient). The other terms fade away in importance as  $x$  approaches infinity.
7. C – substitution and properties of integrals
8. D – Product Rule and Chain Rule
9. A – First find the slope when  $x = \pi$ . The slope is positive 2. Use  $(\pi, 0)$  in point-slope equation or slope-intercept equation.