

**AP\* Calculus Exam Prep**

ID: 12624

**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 graphing, finding intersections, zeros, 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**

- On self-check questions, students can get immediate feedback by selecting **MENU > Check Answer** (or by pressing  $\text{Ctrl} + \blacktriangle$ ). With TI-Nspire Teacher Edition software, teachers can change self-check questions to exam mode so students cannot check their answer. On any question, click the Teacher Tool Palette and select Question Properties. Change the Document Type from Self-Check to Exam.
- 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 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).
- The use of CAS technology is not required to complete this activity, but it is suggested. Notes on where CAS is used are included in this document.
- **To download the student and solution TI-Nspire documents (.tns files) and student worksheet, go to [education.ti.com/exchange](http://education.ti.com/exchange) and enter “12624” in the keyword search box.**

**Associated Materials**

- ExamPrep\_Student.doc
- ExamPrep.tns
- ExamPrep\_Soln.tns

**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) — 8052
- 1998 Multiple Choice AP Calculus BC Exam (TI-84 Plus and TI-Navigator) — 6918
- Helicopter Bungee Jump (TI-Nspire CAS technology) — 11761

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**Part 1 – Calculator Active Exam Tips**

Students will read and answer questions in the TI-Nspire document 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 handheld technology 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. Since students are allowed bring two graphing calculators, some may consider bringing a TI-Nspire CAS handheld even if they are new to it.

For Exercise 3, students will need CAS functionality for the portion of this exercise using the *Calculator* application or Scratchpad. Students without CAS cannot easily solve the problem using the **nSolve** command, as it only returns one solution.

**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.

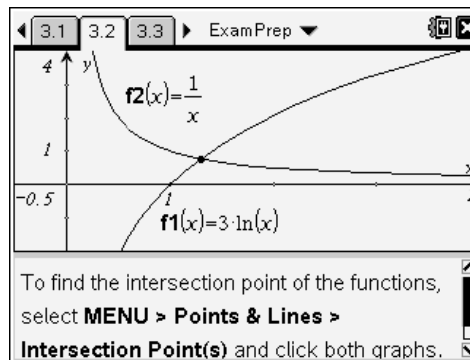
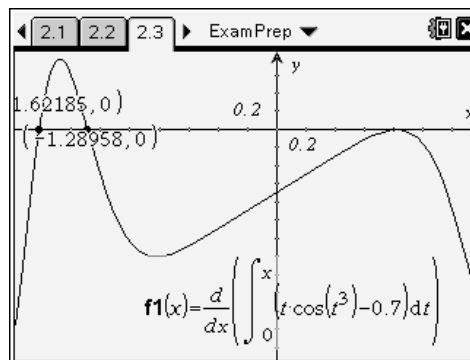
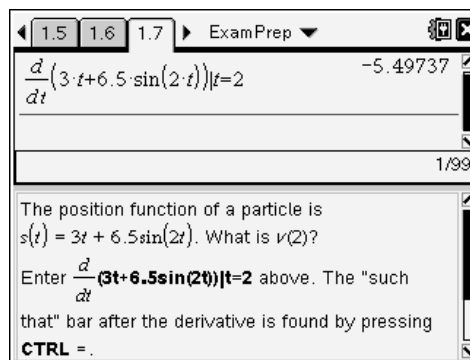
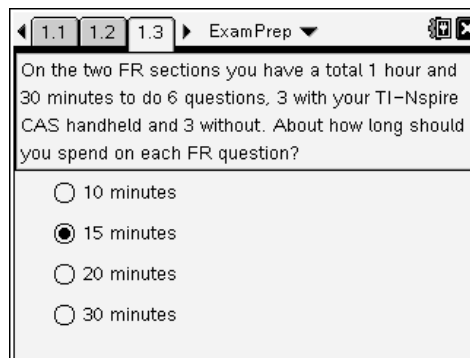
2.  $\frac{d}{dt}(3t + 6.5 \cos(2t))|_{t=2} = -5.497$

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  $xc = 1.2939$

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.

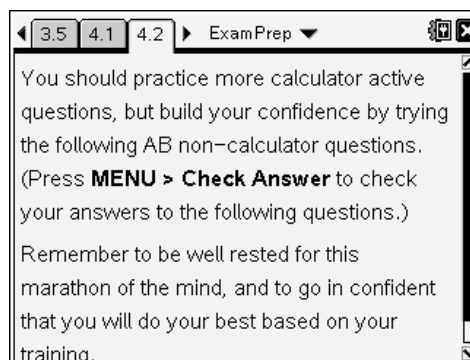


**Part 2 – AB exam practice non-calculator type questions**

This section allows students to 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.

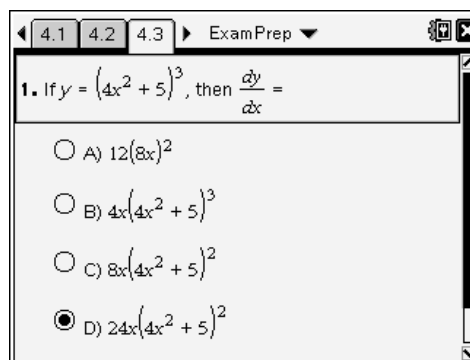


Discussion Question:

- Ask students to reflect on what they learned. 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 know 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.