AP Calculus Exam Prep

APCalcExamPrep.tns

Name _____

Class _____

Press ctrl and the forward and backward arrows on the TouchPad to navigate between pages. ctrl tab is a way to toggle between applications on a split screen.

Part 1 – Calculator Active Exam Tips

The AP* Calculus exam is long. ***It is a marathon of the mind***. *Success requires training.*

Tip #1 – Know the course

There is a free-response (FR) section and multiple-choice (MC) section. For both there is a 'calculator NOT allowed' section and a 'graphing calculator is required' section.

Beginning in 2011, you are not penalized addition points for 'guessing' on the multiple choice.

On the two FR sections you have a total 1 hour and 30 minutes to do 6 questions, 2 with your TI-Nspire CAS handheld and 4 without. In Section 1 Part A, you will have 55 minutes to complete 28 MC questions where a calculator is NOT allowed. Section 1 Part B requires a calculator to complete 17 MC questions in 50 minutes.

1. About how much time should you spend on each question in each part of the exam?

Answer: _____

Tip #2 – Know the expectations

On the calculator active questions you should:

- Give answers to 3 decimal places (unless it says otherwise, e.g., give answer to the nearest cent).
- Be able to do the following four things:
  - graph on an arbitrary window
  - solve equations (find zeros & intersection points)
  - numerically calculate the derivative
  - numerically calculate the definite integral

2. The position function of a particle is $s(t) = 3t + 6.5\sin(2t)$. What is $v(2)$? _____

On a *Calculator* page, enter $\frac{d}{dt}$**(3t+6.5sin(2t))|t=2**. A shortcut for the derivative template is shift −. The "such that" bar after the derivative command is found by pressing ctrl =.

Notice the mode in the upper right corner of your screen. This should say RAD, so you should be in radian mode. To change the angle mode, go to **HOME > Settings & Status > Settings > General**. For the AP Calculus exam use radians.

Using AUTO mode is also nice. You get an exact answer if possible, or if there is a decimal in what you enter, you get a decimal answer. Pressing ctrl enter (≈) will give an approximation.

Tip #3 – Have the right gear

Besides the right settings, bring a couple of pencils. You can actually bring 2 graphing calculators. Be sure they have reasonably fresh batteries.

3. $h(x) = \int_0^x \left(t \cdot \cos\left(t^3\right) - 0.7\right) dt$. Where is $h(x)$ increasing between $-1.8 < x < 1.4$?

Find the solution graphically. Press (on) and select  Graphs to insert a graph in this document. (You could also choose (doc), or (ctrl)(0), to graph the function in the **Scratchpad**.) First change the window to view only the domain by selecting (menu) **> Window/Zoom > Window Settings**: **XMin**: –1.8, **XMax**: 1.4. **enter**.

Graph the derivative. Why? What are you looking for? _____

Did it not graph? Trouble shoot tip: Did you graph f1(x) as a function of x, not t? Did you put a multiplication symbol between x and cos(x^3)? Note, '*xcos*' is an undefined variable.

Find the zeros using the **Graph Trace** feature. Select **MENU > Trace > Graph Trace**. You can enter a value to get to where you want to go faster. Press (enter) to 'drop' a point.

Try using CAS with a limited domain. Another way to add a page is to press (ctrl)(doc) ([+page]). Choose 'Add Calculator.' Then (menu) Algebra > Solve. If you have already entered the function in **f1**(x), enter **solve(f1(x)=0,x)|–1.8<x<1.4**.

The 'such that' symbol needs to be outside of the parentheses.

Answer: _____

4. Find the area of the region bounded by $y = \frac{1}{x}$, $y = 3\ln(x)$, and the vertical line $x = 3$.

One way to find the intersection point on a *Graphs* page is to select (menu) **> Points & Lines > Intersections Point(s)**. Then click the two things you want to find the intersection of. When finished finding the intersection, press (esc) to escape out of 'intersection mode.' (See the icon in the upper left corner of a *Graphs* page to see what command is activated.)

To store a value, like the x-coordinate of the point of intersection, you can click on the value and press (ctrl)(var) ([sto→]), or you can use the context dependent menu found by right-clicking ((ctrl)(menu)). When you hover over a value and press (ctrl)(menu) you'll see **Store**. Store the x-coordinate as *xc*. Then, use *xc* in the limits of integration. By doing this, you won't make a rounding error and you won't make a mistake in typing the numbers incorrectly. Next, insert a *Calculator* page and solve the integral. Use the math template button (÷) and select the definite integral or you can access this template with the shortcut (shift)(+).

This question is similar to a part (a) on a free response question. Part (b) and (c) may have you rotate the region about an axis or line. On the free response it is important to SHOW YOUR WORK. This means show the set up of the integral and give the answer. Show your work for this problem below:

Part 2 – AB Exam Practice Non-Calculator Type Questions

Answer the following AP-type exam questions. These are similar to non-calculator questions you will encounter on the exam. You should spend on average less than 2 minutes for each question. Don't spend too much time on any one question. On the actual exam, you will have plenty of space so extra paper will not be needed. However, for this practice you may need additional space.

1. If $y = (4x^2 + 5)^3$, then $\frac{dy}{dx} =$

(A) $12(8x)^2$ (B) $4x(4x^2 + 5)^3$ (C) $8x(4x^2 + 5)^2$

(D) $24x(4x^2 + 5)^2$ (E) $12x(4x^2 + 5)^2$

2. $\int_0^3 \left(\frac{1}{3}e^{-\frac{x}{3}}\right) dx$

(A) $\frac{1}{9}\left(1 - e^{-1}\right)$ (B) $e^{-1} - 1$ (C) e^{-1}

(D) $\frac{1}{3}\left(1 - e^{-1}\right)$ (E) $1 - e^{-1}$

3. If $\tan(x) = e^y$, what is $\frac{dy}{dx}$?

(A) $\frac{\sec(x)}{\tan(x)}$ (B) $\frac{1}{\sin(x)\cos(x)}$ (C) $\frac{\cos(x)}{\sin(x)}$

(D) $\ln(\tan(x))$ (E) $\tan(x)\sec^2(x)$

4. If $y = \frac{5x+7}{2x+3}$, then $\frac{dy}{dx} =$

(A) $\frac{-10x-14}{(2x+3)^2}$ (B) $\frac{29}{(2x+3)^2}$ (C) $\frac{1}{(2x+3)^2}$

(D) $\frac{22}{(2x+3)^2}$ (E) $\frac{5}{2}$

5. $\int_0^{\pi/6} (2\cos x)\,dx$

(A) $\sqrt{3}$ (B) $\sqrt{3}-2$ (C) –1.5

(D) 1 (E) $\frac{\sqrt{3}}{2}$

6. $\lim_{x\to\infty}\left(\frac{4x^2-5x-3}{3x^2+2x+4}\right)$

(A) $-\frac{4}{9}$ (B) $-\frac{3}{4}$ (C) 1

(D) $\frac{4}{3}$ (E) ∞

7. If $f(x) = 1 + 3g(x)$ when $2 \le x \le 7$, find $\int_2^7 (f(x)-g(x))\,dx$.

(A) $4\int_2^7 (g(x))\,dx$ (B) $x+2\int_2^7 (g(x))\,dx$ (C) $5+2\int_2^7 (g(x))\,dx$

(D) $-\int_2^7 (1+3g(x))\,dx$ (E) $-10-2\int_2^7 (g(x))\,dx$

8. If $y = \sqrt{2x}\cdot\tan(3x)$, then $\frac{dy}{dx} =$

(A) $\frac{1}{2}(2x)^{-\frac{1}{2}}\sec^2(3x)$

(B) $3(2x)^{-\frac{1}{2}}\sec^2(3x)$

(C) $\sqrt{2x}\sec^2(3x)+\frac{1}{2}(2x)^{-\frac{1}{2}}\tan(3x)$

(D) $3\sqrt{2x}\sec^2(3x)+(2x)^{-\frac{1}{2}}\tan(3x)$

(E) $\sqrt{2x}\sec^2(3x)+(2x)^{-\frac{3}{2}}\tan(3x)$

9. Find the equation of the tangent line to $y = \sin(2x)$ at the point $(\pi, 0)$.

(A) $y = 2x - 2\pi$ (B) $y = -2x + 2\pi$ (C) $y = 2x$

(D) $y = x - \pi$ (E) $y = x - 2\pi$