Name ______________________

Class ______________________

Part 1 – Calculator Active Exam Tips

Tip #1 – Know the course

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

On the two FR sections you have a total 1 hour and 30 minutes to do 6 questions, 3 with your TI-89 handheld and 3 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?

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 and 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 the HOME screen, enter ***d*(3t+6.5sin(2t),t)|t=2**. You can access the derivative command by selecting **F3:Calc > 1:*d*(differentiate**, or by using the shortcut [2nd] + [*d*]. The "such that" bar after the derivative command is input by pressing the [|] key.

Notice the mode settings at the bottom of your screen. It should say RAD indicating that you are in radian mode. To change the angle mode, go to **MODE > Angle**. You will only need to be in radian mode for the entire AP exam.

Using AUTO mode under **MODE > Exact/Approx** 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 [◆] + [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. $h(x) = \int_0^x \left(t\cos\left(t^3\right) - 0.7\right)dt$. Where is $h(x)$ increasing on the interval $-1.8 < x < 1.4$?

Find the solution graphically. Press [◆] + [Y=] and enter the function in **y1**(*x*). The integration command can be entered by pressing [2nd] + [∫]. Change the window to view only the domain by pressing [◆] + [WINDOW] and entering **XMin**: –1.8 and **XMax**: 1.4. Graph the derivative. Why? What are you looking for?

Find the zeros by selecting **F5:Math > 2:Zero**. You can trace to input your lower and upper limits to find each root or enter your lower and upper limits on the keypad.

Try solving for the zeros algebraically. Press [HOME] to return to the HOME screen. Then press **F2:Algebra > Solve**. If you have already entered the function in **y1**(*x*) and the derivative of the function in **y2**(*x*), enter **solve(y2(x)=0,x)|–1.8<x<1.4**.

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

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 is to graph the functions using a suitable window and then selecting **F5:Math > 5:Intersection**. Use the [ENTER] key and the arrow keys to select the two curves and input a lower and upper bound. To store a value, like the *x*-coordinate of the point of intersection, press the [STO▸] key. This will store the *x*-coordinate of the point of intersection 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. Next, return to the HOME screen and solve the integral.

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) $y = x - 2\pi$