This is an amended version of last year's exam (it reflects what we have done in class so far). I have also attached some more practice problems.

-Prof Balof

Math 126: Calculus 2 Exam the First

You have the class period to complete this closed-book-closed-notes-closed-colleague exam. Please read the statement below and sign it when you are finished.

I have not used my calculator on this examination except for arithmetic, trigonometric, logarithmic, and exponential functions. I certify that the work on this exam is my own and that I have not discussed the contents of this exam with anyone prior to my taking it.

Signature:

1. (10 points) What is the formula for $\int_a^b f(x)dx$ in terms of Riemann Sums? Be as explicit as possible in stating the formula.

2. (16 points) Find the area under the line $y = 2x + 3$ between $x = 1$ and $x = 4$ using

    (a) Geometry.

    (b) Calculus.

3. Solve the following. (8 points each)

(a) $\int \frac{x^3+1}{x^2} dx$

(b) $\int (x+3)\cos(x^2 + 6x + 5)dx$

(c) $\int_0^a \frac{xdx}{\sqrt{1-x^2}}dx$. What are the restrictions on a?

4. Consider the area under the curve $y = e^x$ between $x = 0$ and $x = \ln 3$

(a) (10 points) Find c such that the line $x = c$ bisects this area. Is c greater than, less than, or equal to $\frac{1}{2}\ln 3$? Explain graphically.

(b) (8 points each) Compute the volume generated by revolving this area about

    i. the x axis. (solve this integral...)

    ii. the y axis. (...but not this one.)

5. Find the ratio of area above the x axis to area below the x axis of the curve $y = x^3 - 9x$

6. If we know that $\int_{-a}^{a} x^3 f(x)\, dx = 0$ for all values of a, what kind of function is $f(x)$? Explain.