

Math 213 (Fall 2004)

Name: _____

John Bowman

Mon 8:50

Mon 12:05

Wed 8:50

Wed 12:05

Yeon Kim

Mon 9:55

Mon 2:25

Wed 9:55

Wed 2:25

Exam 1

Thursday, October 7, 11:00

7 problems — 100 points — 70 minutes

Please write your NAME and circle your SECTION on top of this sheet.

Do not detach these sheets.

If you run out of space, use the back of the sheets.

Show ALL Work for Full Credit

NO GRAPHING CALCULATORS may be used on this exam

Problem 1 (10 points):

Problem 2 (10 points):

Problem 3 (15 points):

Problem 4 (15 points):

Problem 5 (15 points):

Problem 6 (15 points):

Problem 7 (20 points):

Total:

2

1. (10 points) Find the indefinite integral

$$\int 33^x + 3x^3 + x^{33} + 3^{33} dx$$

2. (10 points) Evaluate the definite integral

$$\int_1^2 \frac{x^2}{\sqrt{2x^3 - 1}} dx$$

3. (15 points) Evaluate the definite integral

$$\int_1^3 \ln(5x) dx$$

4. (15 points) Compute the area between the curves $f(x) = e^x$ and $g(x) \equiv e$ from $x = -1$ to $x = 2$.

5. (15 points) Compute the volume of the solid of revolution formed by rotating the region, bounded by the curves $f(x) = 4 - x^2$ and $y = 0$, about the x -axis.

6. (15 points) Evaluate the improper integral

$$\int_1^{\infty} \frac{1}{x} - \frac{2}{2x+1} dx$$

Note: The formulas $\ln(ab) = \ln(a) + \ln(b)$ and $\ln\left(\frac{1}{a}\right) = -\ln(a)$ may be useful.

7. (20 points) The rate of change of the volume of water in a dam is given by $V'(t) = te^{-t}$. The initial volume is $V(0) = 2$ (in millions of liters; time t is in years).

(a) Find the volume function $V(t)$.

(b) Compute the average volume of water in the lake during the first 2 years.