Name:_____

Pledged:_____

Math 115: Applied Calculus
Module 5 Exam

Problem	Points	Score
1	20	
2	20	
3	10	
4	20	
5	15	
6	15	
Total	100	

SHOW ALL WORK. May the force be with you.

1. (20 points) Approximate the area under the curve $f(x) = 2x^2$ from $x = 2$ to $x = 3$ using each of the following methods.

   a. (10 points) A Right Riemann Sum with $n = 5$.

   b. (10 points) A Midpoint Riemann Sum with $n = 5$.

2. (20 points) Determine the exact value of each definite integral.

a. (10 points)

$$\int_1^2 x^3 + 4\sqrt{x}\, dx$$

c. (10 points)

$$\int_0^{\pi} 2e^{-x} + 2\cos(2.5x)\, dx$$

3. (10 points) Determine the average value of the function $f(x) = \dfrac{1}{x}$ as x ranges from $x = 1$ to $x = 5$.

4. (20 points) What is the area between the curves $y = x^3$ and $y = 4x$ as x ranges from -2 to 2? You may **not** use the graphical feature on your calculator for this question.

   Hint: Find the (three) intersection points of these functions and then plug in x-values between the intersection points to determine which function is larger on that interval.

5. (15 points) What is the volume of the solid formed by rotating $y = 2x - 3$ as x ranges from 0 to 2 about the x-axis?

6. (15 points) Compute the double integral.

$$\int_0^1 \left(\int_0^3 x^2 y - e^x \, dy \right) dx$$