Math 125G - Spring 2002
First Mid-Term Exam
April 23, 2002

Name _____   Section _____

1	10	
2	10	
3	10	
4	10	
5	10	
6	10	
7	10	
8	10	
Total	80	

- Complete all questions.

- You may use a scientific calculator during this examination. Other calculating devices are not allowed.

- You may use one hand-written 8.5 by 11 inch page of notes.

- Show all work for full credit.

- You have 80 minutes to complete the exam.

1. Is $\dfrac{1}{2}x^2 \ln x - \dfrac{1}{4}x^2$ an antiderivative of $x \ln x$? Explain.

2. Suppose $f''(x) = 2 + e^x$, $f'(0) = 3$ and $f(0) = 2$. Find $f(x)$.

3. Use the midpoint rule with $n = 3$ to approximate the integral

$$\int_0^6 \ln(\sin x + 3)\, dx.$$

4. Solve the following equation for m:

$$\int_0^1 f(x)\, dx - 2\int_0^{\frac{1}{2}} f(2x)\, dx - \int_1^0 f(x)\, dx = m\int_0^1 f(x)\, dx$$

5. Find the derivative of each of the following functions.

(a) $g(x) = \int_2^{x^2} \sin(t^2 + 3t)\, dt$

(b) $h(x) = \int_2^3 \frac{\ln v}{\sin v}\, dv$

6. Evalate the following integrals:

(a) $\int \dfrac{x}{x^2 + 1}\, dx$

(b) $\int_{-1}^{1} (2 - x)^6\, dx$

7. Find the area of the region bounded by the curves $y = x^2 - \frac{3}{2}$ and $y = \frac{1}{2} - x^2$.

8. Let $p > 1$. Suppose the region in the first quadrant bounded by $y = x$ and $y = x^p$ is rotated about the x-axis to create a solid of revolution. If the volume of the solid is $\dfrac{\pi}{6}$, find p.