CALCULUS II - 3450:222
TEST #1 SPRING 03

NAME _____

100 Points

Show all your work.

1. (6 pts) If g is the inverse function of $f(x) = x^5 + 3x^3 + 2x - 1$, find $g'(-1)$

6 Points

2. Given the one–to–one function $f(x) = \ln\left(\frac{1}{2}x + 3\right)$ answer the following questions:

   a. (6 pts) Find $f^{-1}(x)$

   b. (3 pts) What is the domain of f?

   c. (2 pts) What is the range of f?

11 Points

3. (4 pts) Use the properties of logarithms to simplify $\ln\left(\frac{e^{x^2}\sin x}{x}\right)$.

4 Points

4. Find the derivatives of the following functions: (You only need to simplify your answer in part e.)

a. (4 pts) $f(x) = 1.6^x + x^{1.6}$

b. (3 pts) $f(x) = e^{\sin(5x)}$

c. (6 pts) $f(x) = \sin^{-1}\left(\sqrt{\ln x - x^3}\right)$

d. (10 pts) $y = x^{\sin x}$

e. (8 pts) $f(x) = \dfrac{1 - \cosh x}{1 + \cosh x}$ (Be sure to simplify your answer.)

31 Points

5. Evaluate the following integrals:

a. (8 pts) $\int \left(\frac{\sin x}{4 + \cos x}\right) dx$

b. (8 pts) $\int x\, e^{-x^2}\, dx$

c. (10 pts) $\int \left(\frac{2x + 1}{x^2 + 4}\right) dx$

26 Points

6. Evaluate the following limits:

a. (2 pts) $\lim_{x \to 2^+} e^{3/(2-x)}$

b. (3 pts) $\lim_{x \to \infty} \ln(10 + e^{-x^2})$

c. (7 pts) $\lim_{x \to 0} \left(\frac{e^x - 1 - x}{x^2} \right)$

d. (10 pts) $\lim_{x \to 0} (1 - 2x)^{1/x}$

22 Points