Math 112-3
Test 3
Friday, February 27, 1998

Name:____
SSN:____

SHOW ALL WORK ! UNSUPPORTED ANSWERS WILL RECEIVE LESS THAN HALF CREDIT.

1. (24pts) Find $\dfrac{dy}{dx}$ if

(a) $y = e^{\sqrt{x}} \ln(x^3)$

(b) $y = \arctan(\ln x)$

(c) $y = 2^{\text{arcsec(5x)}}$

(d) $y = x^{\ln x}$

(Problem 1 continued)

(e) $e^{xy} = \arcsin(y)$

(f) $y = \sqrt{x+1}\ \sqrt[3]{x+2}\ \sqrt[4]{x+3}$ (Use Logarithmic Differentiation.)

2. (28pts) Compute the following integrals:

(a) $\displaystyle\int \frac{dx}{4x+5}$

(b) $\displaystyle\int \frac{dx}{x \ln x}$

(c) $\displaystyle\int \frac{e^x\,dx}{1+e^{2x}}$

(d) $\displaystyle\int \frac{e^{2x}\,dx}{1+e^{2x}}$

(Problem 2 continued)

(e) $\int e^{3-5x}\,dx$

(f) $\int \frac{dx}{\sqrt{16-x^2}}$

(g) $\int_1^{\sqrt{2}} \frac{dx}{x\sqrt{2x^2-1}}$

3. (8pts) Carbon extracted from an ancient skull contains 1/6 as much ^{14}C as carbon extracted from modern bone. How old is the skull? (Remember, the half-life of ^{14}C is 5700 years.)

4. (10pts) Let $f(x) = x^5 + 2x^3 + 4x$. Show that f has an inverse function g. Find $g(7)$. Find $g'(7)$.