

EXAM 3
Math 2423
4-23-04

Name _____

Row _____

Instructions *Work all of the following problems in the space provided. If there is not enough room, you may write on the back sides of the pages. Give thorough explanations to receive full credit.*

1. (8 points) Prove that $\frac{d}{dx}(\arcsin x) = \frac{1}{\sqrt{1-x^2}}$.

2. (12 points) Use logarithmic differentiation to find the derivative of $y = (\sin x)^{\ln x}$.

3. (16 points) Find the limit.

a) $\lim_{x \rightarrow 0} \frac{\sec x - 1}{x^2}$

b) $\lim_{x \rightarrow 0^+} x^2 \ln x$

4. (44 points) Find the indefinite integral, showing all work:

a) $\int \sin^3 x \cos^8 x \, dx$

b) $\int x^{10} \ln x \, dx$

c) $\int \frac{x}{(\sqrt{1-x^2})^5} dx$

d) $\int \frac{7x-19}{x^2-8x+7} dx$

5. (20 points) Find the definite integral, showing all work:

a) $\int_0^1 \frac{x^2}{1+x^6} dx$ (Hint: put $u = x^3$.)

b) $\int_0^{\pi/3} x \cos x \, dx$