

MAT 254 – Winter Quarter 2003
Test 1

NAME _____

Show work and write clearly.

1. (10 pts.) Derive the formula for the derivative of $\sin^{-1}(x)$.

2. (20 pts.) Find the antiderivatives:

a. $f(x) = \sqrt[3]{x^2} + \sec x \tan x + \frac{5}{x} - \mathbf{p}$

b. $k(x) = \frac{1}{x^3} + \frac{1}{x\sqrt{x}}$

3. (10 pts.) Find $f(x)$: $f''(x) = \sin x$, $f'(0) = 1$, $f(0) = 6$

4. (30 pts.) Find the derivatives:

a. $g(t) = \csc^{-1}(t^2)$

b. $h(x) = \ln(1 - e^{-x})^{2x}$

c. $j(x) = (\sin x)^{\cos x}$

d. $y \sin x = x \cos y$

5. (30 pts.) Find the following limits:

a. $\lim_{x \rightarrow \infty} \frac{\ln(\ln x)}{\ln x}$

b. $\lim_{x \rightarrow 0} \frac{\sin(ax)}{\sin(bx)}$

c. $\lim_{x \rightarrow 2} \left(\frac{8}{x^2 - 4} - \frac{x}{x - 2} \right)$

d. $\lim_{x \rightarrow 3} \frac{x - 3}{\ln(2x - 5)}$