Math 203 Sec D Midterm Test 26 February 2002

Professor:	*Richard Hall*
Instructions:	*Please answer all 6 questions, which carry equal marks. Explain your work clearly. Calculators are permitted. The time allowed is 1 hour.*

1. consider the functions defined by $f_1(x) = \sin(1/x)$ and $f_2(x) = x\sin(1/x)$ for $x \neq 0$, and $f_1(0) = f_2(0) = 0$. Sketch these functions and discuss their continuity at $x = 0$.

2. Find the functions $f \circ g$, $g \circ f$, and $f \circ f$ if $f(x) = 1/(1+x)$ and $g(x) = cos(x^2)$. [Recall *composition* $(f \circ g)(x) = f(g(x))$]

3. Find the inverse function $f^{-1}(x)$ of the function $f(x) = tan(e^x)$ and specify its domain.

4. Find dy/dx if

   (a) $y = \arctan(x)e^{\cos(x^2+x)}$; (b) $y = \frac{(x^2+1)^7}{(e^x+x)^3}$.

5. Find the equation to the tangent line to the curve $y^3 - 4yx^3 + x^2 = 1$ at the point $(x, y) = (1, 2)$.

6. Find the second derivative of the function $f(x) = \frac{\sin x}{\ln x}$.