Math 117 / SyDe 111 Assignment #8 Fall 2006

due November 24th

MEM, p. 550 #80d, 83be

p. 558 #84ce, 89d, 92, 94c (Hint for 84e: $x^2 = 1 + x^2 - 1$)
(Hint for 89d: $\frac{d}{dx}(\sinh^{-1} x) = \frac{1}{\sqrt{1+x^2}}$)

p. 494 #10, and p. 558 #95

Problem I Find $f'(x)$ if $f(x) = \int_x^{2x^2+1} \sin(t^2)\,dt$.

Problem II Use differentials to find an approximate value for $\sqrt[3]{28}$.

Problem III The electrical resistance R of a certain wire is given by $R = k/r^2$, where k is a constant and r is the radius of the wire. Assuming that the radius r has a possible error of $\pm 5\%$, use differentials to estimate the percentage error in R. (Assume that we know k exactly).

Note: The relative change in a function f is $\frac{\Delta f}{f}$; in percentage form this is just $\left(\frac{\Delta f}{f} \times 100\right)\%$. In the present problem we are told that $\left|\frac{\Delta r}{r}\right| \leq 0.05$, and we essentially want to find an upper limit for $\left|\frac{\Delta R}{R}\right|$.

Suggested Problems (not to be handed in):

MEM p. 550 #78, 80ae, 82a-f, 83acd

p. 558 #84abdf, 86, 93, 94.