1/27/2003 MA423 Numerical Analysis Name:_____
Dr. Lunsford Quiz 2 (20 Points Total)

Neatly show ALL of your work and CLEARLY indicate your answers. Use the back of the page if necessary.

I. Explain why the equation $\sin x + 3x^2 = \cos x$ has at least one solution on the interval $\left[0, \frac{\pi}{4}\right]$.

DO NOT try to find the solution. (5 points)

II. Find the 4th degree Taylor polynomial, $P_4(x)$, centered at $\frac{\pi}{2}$ for the function $\sin x$. (6 points)

III. Use $P_4(x)$ found above to estimate $\sin(100^\circ)$. (4 points)

IV. Given that the remainder for $P_4(x)$ found above is $\frac{-\sin(\xi(x))}{6!}\left(x - \frac{\pi}{2}\right)^6$, find an error bound to the approximation of $\sin(100^\circ)$. Compare this to the actual error (use your calculator approximation of $\sin(100^\circ)$ as its actual value). (5 points)