Quiz 4 for Calculus ++, Math 2605 J1-2, November 6, 2007

Name:

This quiz is to be taken without calculators and notes of any sorts. The allowed time is 20 minutes. Provide exact answers; not decimal approximations! For example, if you mean $\sqrt{2}$ do not write $1.414\ldots$.

I: (3 points) Using Householder reflections find the QR factorization of the matrix $\begin{bmatrix} 4 & 1 \\ 3 & 2 \end{bmatrix}$.

II: (2 points) Given the complex vector $\mathbf{z} = \begin{bmatrix} 1+i \\ 1-i \end{bmatrix}$, find $\langle \mathbf{z}, \mathbf{z} \rangle$.

III: (4 points) Calculate e^{At} where $A = \begin{bmatrix} 1 & 1 \\ 0 & 2 \end{bmatrix}$.

Extra credit: (3 points) Find the length of the curve $\mathbf{x}(t) = \begin{bmatrix} 1 \\ \frac{t^2}{2} \\ \frac{t^3}{3} \end{bmatrix}$, $0 \leq t \leq 1$.