

GEORGIA TECH

SCHOOL OF MATHEMATICS

MATH 1502

## CALCULUS II, SECTION D

## Quiz # 9

October 29th 2008

20 minutes

First Name : -----

Last Name : -----

1. Let  $A = \begin{bmatrix} 1 & 2 & 4 \\ 4 & 1 & 2 \\ 2 & 4 & 1 \end{bmatrix}$ .

- (a) Find a unit lower triangular matrix  $R$  and a row reduced matrix  $U$  such that the systems  $A\mathbf{x} = \mathbf{b}$  is equivalent to  $U\mathbf{x} = R\mathbf{b}$

*(Give results here and use the back pages for your calculations)*

$$[U|R] =$$

- (b) Find a unit lower triangular matrix  $L$  such that  $A = LU$

*(Give results here and use the back pages for your calculations)*

$$L =$$

2. Let  $Q = \begin{bmatrix} 4 & 1 \\ 1 & 5/2 \end{bmatrix}$ .

(a) Show that  $Q$  is positive definite

(b) Use Cholesky's method to write  $Q$  as  $M M^t$  with  $M$  an invertible, lower triangular matrix

*(Give results here and use the back pages for your calculations)*

$$M =$$

3. If  $B = \begin{bmatrix} 1 & 2 & 1 \\ 4 & 4 & 1 \\ 2 & 4 & 2 \\ 0 & 4 & 3 \end{bmatrix}$ , give a one-to-one parametrization of its image

*(Give results here and use the back pages for your calculations)*

$$\text{Im}(B) =$$

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*Use the bottom of this page and the back page for your calculations*

*Use this page for your calculations*