

GEORGIA TECH

SCHOOL OF MATHEMATICS

MATH 1502

## CALCULUS II, SECTION D

## Quiz # 11

November 18th 2009

15 minutes

First Name : \_\_\_\_\_

Last Name : \_\_\_\_\_

1. Let  $\mathbf{v} = \begin{bmatrix} 1 \\ -1 \\ 0 \\ 0 \end{bmatrix}$ .

- (a) Give the matrix  $P$  of the orthogonal projection onto the space spanned by  $\mathbf{v}$ .

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

$$P =$$

- (b) Give the matrix  $P_{\perp}$  of the orthogonal projection onto the subspace orthogonal to  $\mathbf{v}$ .

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

$$P_{\perp} =$$

2. Let  $A = \begin{bmatrix} 1 & 3 & 1 \\ 1 & 1 & 0 \\ 0 & 2 & 1 \end{bmatrix}$ .

(a) Give a basis for  $\text{Im}(A)$

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

(b) Give an orthonormal basis for  $\text{Im}(A)$

*(Hint : use the Gram-Schmidt procedure)*

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

(c) Give the  $QR$  factorization for  $A$

$$Q = \qquad R =$$

*Use this page for your calculations*

*Use this page for your calculations*