Georgia Tech School of Mathematics
Math 1502

Calculus II, Section D

Quiz # 6

October 7, 2009

First Name : _____

Last Name : _____

1. Let $A = \begin{bmatrix} \sqrt{2} & -2 \\ 1 & -\sqrt{2} \end{bmatrix}$. Compute A^2

$A^2 =$

2. Let $A = \begin{bmatrix} 1 & 1 & 0 \\ 0 & 1 & 1 \\ 0 & 0 & 1 \end{bmatrix}$ and let $B = \begin{bmatrix} 1 & u & v \\ 0 & 1 & w \\ 0 & 0 & 1 \end{bmatrix}$ where u, v, w are real numbers.

   (a) Compute AB.

$$AB =$$

   (b) By choosing u, v, w conveniently compute the inverse of A

$$A^{-1} =$$

3. Let A be a 3×3 matrix with column representation $A = [\mathbf{v}_1, \mathbf{v}_2, \mathbf{v}_3]$. Find an explicit numerical 3×3 matrix B such that

$$AB = [\mathbf{v}_2 + \mathbf{v}_3, \mathbf{v}_1 + \mathbf{v}_3, \mathbf{v}_1 + \mathbf{v}_2]$$

$$B = \begin{bmatrix} & & \\ & & \\ & & \\ & & \\ & & \\ & & \\ & & \\ & & \\ & & \end{bmatrix}$$

4. Compute the angle θ between $\mathbf{x} = \begin{bmatrix} \sqrt{3} \\ 1 \end{bmatrix}$ and $\mathbf{y} = \begin{bmatrix} \sqrt{3} - 1 \\ \sqrt{3} + 1 \end{bmatrix}$.

Hint : compute the lengths of each vector, their dot product and $\cos\theta$*. Warning : give* θ *as a result !*

$\theta =$