

GEORGIA TECH

SCHOOL OF MATHEMATICS

MATH 1502

CALCULUS II, SECTION D

Quiz # 7

October 20th 2010

First Name : _____

Last Name : _____

1. Compute and draw the image of the unit square in \mathbb{R}^2 under the linear map with matrix $A = \begin{bmatrix} 5 & 3 \\ 0 & 4 \end{bmatrix}$.

2. Consider the plane in \mathbb{R}^3 that contains the points $\mathbf{p}_0 = \begin{bmatrix} 1 \\ -2 \\ 1 \end{bmatrix}$, $\mathbf{p}_1 =$

$\begin{bmatrix} 1 \\ 0 \\ 3 \end{bmatrix}$ and $\mathbf{p}_2 = \begin{bmatrix} -1 \\ -1 \\ 1 \end{bmatrix}$. Consider also the line in \mathbb{R}^3 containing the

points $\mathbf{q}_0 = \begin{bmatrix} 1 \\ 1 \\ 1 \end{bmatrix}$ and $\mathbf{q}_1 = \begin{bmatrix} 0 \\ -1 \\ 3 \end{bmatrix}$

(a) Find an equation for the plane.

(b) Parametrize the line.

(c) Compute the point of intersection of the plane and the line.

3. Consider the line in \mathbb{R}^3 with equation $2x - 2y + z = 6$, $-x + 4y + z = -3$. Find an equivalent system of equations of the form $\mathbf{a}_1 \cdot \mathbf{x} = d_1$, $\mathbf{a}_2 \cdot \mathbf{x} = d_2$ with $\mathbf{a}_1 \cdot \mathbf{a}_2 = 0$

(Hint : you can keep the first equation and modify the second to get the result. The new equations express the line as the intersection of two orthogonal planes.)