Math 304 Spring 2010
2/18/2010
Quiz #4 Name: _____

Show all work clearly and in order. Please box your answers. 10 minutes.

1. Solve $\begin{bmatrix} 1 & 0 \\ -2 & 1 \end{bmatrix} X = \begin{bmatrix} 1 & 0 \\ 0 & 1 \end{bmatrix}$

2. Let
$$A = \begin{bmatrix} 0 & 1 \\ 0 & 0 \end{bmatrix}, \quad B = \begin{bmatrix} 0 \\ -1 \end{bmatrix}$$
   (a) Compute A^{T}.
   (b) Compute AA^{T}.
   (c) Compute $(AB)^{\mathrm{T}}$.

3. Let $T{:}\mathbb{R}^2 \to \mathbb{R}^2$ be a linear transformation, and suppose
$$T\left(\begin{bmatrix} 1 \\ 0 \end{bmatrix}\right) = \begin{bmatrix} -1 \\ 6 \end{bmatrix} \text{ and } T\left(\begin{bmatrix} 0 \\ 1 \end{bmatrix}\right) = \begin{bmatrix} 3 \\ 0 \end{bmatrix}$$
   (a) Write down the standard matrix of T (meaning write down the matrix A such that $A\mathbf{x} = T(\mathbf{x})$ for any $\mathbf{x}$ in $\mathbb{R}^2$).
   (b) Compute $T\left(\begin{bmatrix} 3 \\ 1 \end{bmatrix}\right)$.