Math 002B Assignment 2.1-2.3 Last Name_________________1st________

Give complete solutions to the following problems. Be sure to provide all the necessary steps to support your answers.

1. Let $\mathbf{A}=\begin{bmatrix} 2 & -3 \\ -4 & 6 \end{bmatrix}$, and $\mathbf{B}=\begin{bmatrix} 4 & -5 \\ 3 & k \end{bmatrix}$.

   What value(s) of k, if any, will make A B=B A?

2. Let $\mathbf{u}=\begin{bmatrix} -2 \\ 3 \\ -4 \end{bmatrix}$, and $\mathbf{v}=\begin{bmatrix} a \\ b \\ c \end{bmatrix}$. Compute $\mathbf{u}^{\mathbf{T}}\mathbf{v}, \mathbf{v}^{\mathbf{T}}\mathbf{u}, \mathbf{u}\mathbf{v}^{\mathbf{T}}$, and $\mathbf{v}\mathbf{u}^{\mathbf{T}}$.

3. Use an agumented matrix and the rref function to find the inverse of the matrix A

   $$\mathbf{A}=\begin{bmatrix} 1 & 1 & 1 \\ 2 & 0 & 1 \\ 1 & 0 & 1 \end{bmatrix}$$

4. Solve the given matrix equation using an inverse matrix computed in problem 3.

   $$\begin{bmatrix} 1 & 1 & 1 \\ 2 & 0 & 1 \\ 1 & 0 & 1 \end{bmatrix}\begin{bmatrix} x \\ y \\ z \end{bmatrix}=\begin{bmatrix} 5 \\ 4 \\ 3 \end{bmatrix}$$

5. T is a linear transformation from R^2 into R^2.

$T(x_1, x_2) = (-5x_1 + 9x_2, 4x_1 - 7x_2)$

a. Find the associated matrix transformation for the following

b. Show that T is invertible and find a formula for T^{-1} in the form $T^{-1}(x_1, x_2) =$

6. T is a linear transformation from R^3 into R^3.

$T(x_1, x_2, x_3) = (x_1 + 2x_2 + x_3, x_1 + x_3, x_1 + 2x_2 + 2x_3)$

a. Find the associated matrix transformation for the following

b. Show that T is invertible and find a formula for T^{-1} in the form $T^{-1}(x_1, x_2, x_3) =$