Math 3160 - Quiz 4

Name:_____

1. Let T be the linear transformation $T : \mathbb{R}^3 \to \mathbb{R}^4$ where

$$T(\mathbf{e_1}) = \begin{bmatrix} 1 \\ 2 \\ 3 \\ 4 \end{bmatrix}, T(\mathbf{e_2}) = \begin{bmatrix} 0 \\ -1 \\ 0 \\ 1 \end{bmatrix} \text{ and } T(\mathbf{e_3}) = \begin{bmatrix} 0 \\ 3 \\ 3 \\ 3 \end{bmatrix}.$$

   (a) Write the formula for the transformation T.

   (b) Write the matrix, A, for the transformation T.

   (c) Compute

$$T(\begin{bmatrix} 0 \\ 3 \\ 3 \end{bmatrix})$$

   .

2. Compute the determinant of $A = \begin{bmatrix} 1 & 2 & 3 \\ 1 & 0 & -1 \\ 0 & 1 & 1 \end{bmatrix}$

3. Row reduce the matrix B to REF and compute the determinant of the matrix B using the row reduction techniques.

$$B = \begin{bmatrix} 1 & 4 & 0 & -1 \\ 0 & 4 & 0 & -1 \\ 0 & 4 & 5 & -1 \\ 0 & 4 & 1 & 13 \end{bmatrix}$$