

Math 3160 - Quiz 3

Name: _____

1. Compute the inverses for the following matrices

$$A = \begin{bmatrix} 1 & 2 & 3 \\ 0 & 2 & 3 \\ 0 & 0 & 3 \end{bmatrix}, B = \begin{bmatrix} 1 & 2 & 3 \\ 1 & 2 & 3 \\ 1 & 2 & 3 \end{bmatrix} \text{ and } C = \begin{bmatrix} 1 & 0 & 0 \\ 0 & 2 & 0 \\ 0 & 0 & 3 \end{bmatrix}$$

2. Compute the indicated operation

(a) Let A, B, C and D be invertible $n \times n$ matrices. Compute $(ABDC)(C^{-1}D^{-1}A^{-1}B^{-1})$.

(b) Compute $\begin{bmatrix} 1 & 2 & 3 \\ 0 & 2 & 3 \\ 0 & 0 & 3 \end{bmatrix}^2$

(c) Compute $\begin{bmatrix} 0 & 0 & 0 \\ 0 & -2 & 0 \\ 0 & 0 & 4 \end{bmatrix}^{-4}$

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

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