Name:

Linear Algebra: Quiz 9

<u>Show ALL work, as unjustified answers may receive no credit</u>. Calculators are not allowed on any quiz or test paper. Make sure to exhibit skills discussed in class. Box all answers and clean up answers as much as possible.

1. ***<u>Change of Basis (4.7)</u>***

Let $\mathcal{B} = \left\{ \begin{bmatrix} 1 \\ 1 \\ 1 \end{bmatrix}, \begin{bmatrix} 1 \\ 1 \\ 0 \end{bmatrix}, \begin{bmatrix} 1 \\ 0 \\ 0 \end{bmatrix} \right\}$ and $\mathcal{C} = \left\{ \begin{bmatrix} 1 \\ 0 \\ 0 \end{bmatrix}, \begin{bmatrix} 1 \\ 1 \\ 0 \end{bmatrix}, \begin{bmatrix} 1 \\ 1 \\ 1 \end{bmatrix} \right\}$ be two Bases for $\mathbb{R}^3$.

(a) [3pts] Find the Change of Coordinates Matrix from $\mathcal{B}$ to $\mathcal{C}$.

(b) [3pts] Find the Change of Coordinates Matrix from $\mathcal{C}$ to $\mathcal{B}$.

(c) [4pts] Let $\vec{x}$ be a vector in $\mathbb{R}^3$, such that $[\ \vec{x}\ ]_{\mathcal{B}} = \begin{bmatrix} 1 \\ 2 \\ 3 \end{bmatrix}$. Find $\vec{x}$ and $[\ \vec{x}\ ]_{\mathcal{C}}$