Problem 1

Determine if $\mathcal{B} = \left\{ \begin{bmatrix} -1 \\ 2 \\ 0 \end{bmatrix}, \begin{bmatrix} 3 \\ -1 \\ 1 \end{bmatrix} \right\}$ is a basis for $\mathbb{R}^3$.

Problem 2

Verify that $\beta = \left\{ \begin{bmatrix} 0 \\ 2 \end{bmatrix}, \begin{bmatrix} 3 \\ 1 \end{bmatrix} \right\}$ is a basis for $\mathbb{R}^2$. Then, for $v = \begin{bmatrix} 6 \\ 8 \end{bmatrix}$, find $[v]_\beta$.

Problem 3

Verify that $\alpha = \left\{ \begin{bmatrix} 1 \\ 1 \\ 1 \end{bmatrix}, \begin{bmatrix} 1 \\ 1 \\ 0 \end{bmatrix}, \begin{bmatrix} 1 \\ 0 \\ 0 \end{bmatrix} \right\}$ is a basis for $\mathbb{R}^3$. Then, for $v = \begin{bmatrix} 3 \\ 4 \\ 5 \end{bmatrix}$, find $[v]_\alpha$.