1) Suppose $A$ is a $5 \times 5$ matrix and $\vec{v}$ & $\vec{w}$ distinct $5 \times 1$ vectors. If both $\vec{v}$ and $\vec{w}$ are solutions to $A\vec{x} = \vec{0}$, how is the largest possible value for $\text{rank}(A)$?

In $\mathbb{R}^3$, define the two bases below.

$$B_1 = \left\{ \begin{bmatrix} 1 \\ 7 \\ 0 \end{bmatrix}, \begin{bmatrix} 2 \\ 8 \\ 3 \end{bmatrix}, \begin{bmatrix} 3 \\ 2 \\ 4 \end{bmatrix} \right\}; B_2 = \left\{ \begin{bmatrix} 1 \\ -1 \\ 0 \end{bmatrix}, \begin{bmatrix} -2 \\ 3 \\ 1 \end{bmatrix}, \begin{bmatrix} 0 \\ 1 \\ -1 \end{bmatrix} \right\}$$

2) Given the vector $[\vec{x}]_{B_1} = \begin{bmatrix} 2 \\ 3 \\ 4 \end{bmatrix}$, find $[\vec{x}]_S$

3) Given the vector $[\vec{x}]_{B_2} = \begin{bmatrix} 1 \\ 3 \\ 4 \end{bmatrix}$, find $[\vec{x}]_{B_1}$