Name _____ Linear Algebra, Quiz 5

1) Using the information below, find a formula for $\vec{x}_{B_2}$. That is, find the vector $\vec{x}$ expressed in $B_2$ coordinates. No need to simplify anything.

$$B_1 = \left\{\begin{bmatrix}-1\\1\\-1\end{bmatrix}, \begin{bmatrix}2\\5\\0\end{bmatrix}, \begin{bmatrix}4\\2\\1\end{bmatrix}\right\}, B_2 = \left\{\begin{bmatrix}1\\2\\3\end{bmatrix}, \begin{bmatrix}7\\6\\5\end{bmatrix}, \begin{bmatrix}1\\0\\1\end{bmatrix}\right\}, \vec{x} = \begin{bmatrix}3\\4\\5\end{bmatrix}_{B_1}$$

2) A linear operator $T$ takes input from $\mathbb{R}^7$. It is known that there is a vector $\vec{b}$ such that $T(\vec{x}) = \vec{b}$ has at least 4 solutions. List all possible values for $\dim\big(\mathrm{Col}([T])\big)$. That is, list all possible values for the dimension of the column space of the matrix associated to $T$.