Name (Last, First): _____

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1. Is the set W of 2×2 symmetric matrices a subspace of the vector space V of all 2×2 matrices?

   (Recall that a matrix A is symmetric if and only if $A^T = A$. Equivalently, a symmetric 2×2 matrix is of the form $\begin{bmatrix} a & b \\ b & c \end{bmatrix}$.)

2. Let $\mathcal{B} = \left\{ \begin{bmatrix} 1 \\ -4 \end{bmatrix}, \begin{bmatrix} 2 \\ -3 \end{bmatrix} \right\}$ be a basis of $\mathbb{R}^2$.

a. Calculate the change-of-coordinates matrix $P_{\mathcal{B}}$ from $\mathcal{B}$ to the standard basis of $\mathbb{R}^2$.

b. Use part a. to calculate $[\mathbf{x}]_{\mathcal{B}}$ given $\mathbf{x} = \begin{bmatrix} -1 \\ -6 \end{bmatrix}$