These are the warm ups for Friday, Week 9.

1. Find the matrix (or product of matrices) for $T : (\mathbb{P}_2, \beta) \to (\mathbb{R}^2, \alpha)$ given by $T(p(x)) = \begin{bmatrix} p(0) \\ p(1) \end{bmatrix}$ where $\beta = \{x^2, 3x, 4\}$ and $\alpha = \{\begin{bmatrix} 1 \\ 1 \end{bmatrix}, \begin{bmatrix} 2 \\ -2 \end{bmatrix}\}$.

2. Find the matrix (or product of matrices) for $T : (\mathbb{P}_2, \beta) \to (M_{2\times 2}, \gamma)$ given by $T(a+bx+cx^2) = \begin{bmatrix} a & a \\ b & b \end{bmatrix}$ where $\beta = \{x^2, 3x, 4\}$ and $\gamma = \left\{ \begin{bmatrix} 1 & 0 \\ 0 & 1 \end{bmatrix}, \begin{bmatrix} 0 & 1 \\ 1 & 0 \end{bmatrix}, \begin{bmatrix} -1 & 0 \\ 0 & 1 \end{bmatrix}, \begin{bmatrix} 0 & -1 \\ 1 & 0 \end{bmatrix} \right\}$

3. Find the matrix (or product of matrices) for $T : (M_{2\times 2}, std) \to (M_{2\times 2}, \gamma)$ given by $T(\mathbf{A}) = \mathbf{AB} - \mathbf{BA}$ where $\mathbf{B} = \begin{bmatrix} 1 & -1 \\ -1 & 1 \end{bmatrix}$ and where $\gamma = \left\{ \begin{bmatrix} 1 & 0 \\ 0 & 1 \end{bmatrix}, \begin{bmatrix} 0 & 1 \\ 1 & 0 \end{bmatrix}, \begin{bmatrix} -1 & 0 \\ 0 & 1 \end{bmatrix}, \begin{bmatrix} 0 & -1 \\ 1 & 0 \end{bmatrix} \right\}$