MATH 240 HOMEWORK 6 NAME ____________________

Prof. J. Beachy Wednesday, 11/6/02 Score / 20

1. (p 290 #8) Let $L : M_{22} \to M_{22}$ be defined by $L(A) = \begin{bmatrix} 1 & 2 \\ 3 & 4 \end{bmatrix} A$, for all A in M_{22}. Consider the ordered bases $S = \left\{ \begin{bmatrix} 1 & 0 \\ 0 & 0 \end{bmatrix}, \begin{bmatrix} 0 & 1 \\ 0 & 0 \end{bmatrix}, \begin{bmatrix} 0 & 0 \\ 1 & 0 \end{bmatrix}, \begin{bmatrix} 0 & 0 \\ 0 & 1 \end{bmatrix} \right\}$ and
$T = \left\{ \begin{bmatrix} 1 & 0 \\ 0 & 1 \end{bmatrix}, \begin{bmatrix} 1 & 1 \\ 0 & 0 \end{bmatrix}, \begin{bmatrix} 1 & 0 \\ 1 & 0 \end{bmatrix}, \begin{bmatrix} 0 & 1 \\ 0 & 0 \end{bmatrix} \right\}$.

(a) Find the matrix representation $M_{S \leftarrow S}(L)$ of L with respect to S.

(b) Find the matrix representation $M_{T \leftarrow T}(L)$ of L with respect to T.

(c) Find the matrix representation $M_{T \leftarrow S}(L)$ of L with respect to S and T.

(d) Find the matrix representation $M_{S \leftarrow T}(L)$ of L with respect to T and S.

2. (p 290 #10) Let $L : \mathcal{P}_1 \to \mathcal{P}_2$ be defined by $L(p(t)) = tp(t) + p(0)$.

(a) Find the matrix representation $M_{T \leftarrow S}(L)$ of L with respect to the bases $S = \{t, 1\}$ for $\mathcal{P}_1$ and $T = \{t^2, t, 1\}$ for $\mathcal{P}_2$.

(b) Find the matrix representation $M_{T' \leftarrow S'}(L)$ of L with respect to the bases $S' = \{t+1, t-1\}$ for $\mathcal{P}_1$ and $T' = \{t^2+1, t-1, t+1\}$ for $\mathcal{P}_2$.