MA 35100

HW # 8 - due Monday, November 4

1. Which transformation is actually a *linear transformation* (**LT**)?

(a) $T : M(2,2) \longrightarrow \mathbb{R}$, where $T(A) =$ **Rank** (A)

(b) $T : \mathbb{R}^2 \longrightarrow \mathcal{P}_2$, where $T \begin{bmatrix} a \\ b \end{bmatrix} = 3a - 4bx^2$

2. Page 156: **T/F Question**: **# 3.1**.

3. If $T : \mathcal{P}_2 \longrightarrow \mathbb{R}^2$ is a **LT** where $T(4 + x^2) = \begin{bmatrix} 2 \\ -3 \end{bmatrix}$ and $T(6x - x^2) = \begin{bmatrix} 0 \\ 1 \end{bmatrix}$,

then $T(2 - 9x + 2x^2) = ?$ (**Justify your answer!**)

A. $\begin{bmatrix} 1 \\ -3 \end{bmatrix}$

B. $\begin{bmatrix} -1 \\ 1 \end{bmatrix}$

C. $\begin{bmatrix} 2 \\ -2 \end{bmatrix}$

D. $\begin{bmatrix} -2 \\ -4 \end{bmatrix}$

E. Cannot be determined

4. Page 160: # 3.15(a)(b) ← *Just find matrix representation A for each.*

5. Page 190: **T/F Question**: **# 3.27**.

6. Page 190: # 3.64(a)(c)(p).

7. Using Standard Basis for all vector spaces below, find the matrix representation M for each of the following linear transformations:

(a) $T : \mathbb{R}^2 \longrightarrow \mathbb{R}^4$, where $T \begin{bmatrix} x \\ y \end{bmatrix} = \begin{bmatrix} x + y \\ x + y \\ 2x - 3y \\ 8y \end{bmatrix}$

(b) $T : \mathbb{R}^2 \longrightarrow \mathcal{P}_2$, where $T \begin{bmatrix} a \\ b \end{bmatrix} = 3a + bx - 4bx^2$

(c) $T : \mathcal{P}_2 \longrightarrow \mathbb{R}^2$, where $T(a + bx + cx^2) = \begin{bmatrix} a + b - 2c \\ 3c + 4a \end{bmatrix}$