

Name: \_\_\_\_\_

**MASTERY QUIZ DAY 24**

Math 237 – Linear Algebra

**Version 4**

Fall 2017

Show all work and justify all of your answers. Answers without work or sufficient reasoning will not receive credit. You may use a calculator, but you must show all relevant work to receive credit for a standard.

**A1.** Let  $T : \mathbb{R}^4 \rightarrow \mathbb{R}^2$  be the linear transformation given by

$$T \left( \begin{bmatrix} x_1 \\ x_2 \\ x_3 \\ x_4 \end{bmatrix} \right) = \begin{bmatrix} x_1 + 3x_3 \\ 3x_2 - x_3 \end{bmatrix}.$$

Write the matrix for  $T$  with respect to the standard bases of  $\mathbb{R}^4$  and  $\mathbb{R}^2$ .

**A2.** Determine if the map  $T : \mathcal{P} \rightarrow \mathcal{P}$  given by  $T(f) = f' - f''$  is a linear transformation or not.

**M1.** Let

$$C = \begin{bmatrix} 2 & 3 \\ 0 & 1 \end{bmatrix}$$

$$D = \begin{bmatrix} 3 & 1 & 0 \end{bmatrix}$$

$$E = \begin{bmatrix} 2 & 0 \\ 0 & -1 \\ 1 & -1 \end{bmatrix}$$

Determine which of the six products  $CD$ ,  $CE$ ,  $DC$ ,  $DE$ ,  $EC$ ,  $ED$  can be computed, and compute them.

**M2.** Determine if the matrix  $\begin{bmatrix} 1 & 3 & 3 & 7 \\ 1 & 3 & -1 & -1 \\ 2 & 6 & 3 & 8 \\ 1 & 3 & -2 & -3 \end{bmatrix}$  is invertible.

**M3.** Find the inverse of the matrix  $\begin{bmatrix} 8 & 5 & 3 & 0 \\ 3 & 2 & 1 & 1 \\ 5 & -3 & 1 & -2 \\ -1 & 2 & 0 & 1 \end{bmatrix}$ .

**A1:**

**A2:**

**M1:**

**M2:**

**M3:**