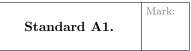
Name:	
J#:	Dr. Clontz
Date:	

## MASTERY QUIZ DAY 24

Math 237 – Linear Algebra Fall 2017

## Version 1

Show all work. Answers without work will not receive credit. You may use a calculator, but you must show all relevant work to receive credit for a standard.



Let  $T: \mathbb{R}^3 \to \mathbb{R}$  be the linear transformation given by

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

Write the matrix for T with respect to the standard bases of  $\mathbb{R}^3$  and  $\mathbb{R}$ .

**Solution:** 

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

Standard A2.

Determine if the map  $T: \mathcal{P}^6 \to \mathcal{P}^6$  given by T(f) = xf(x) - f(1) is a linear transformation or not.

Standard M1.	Mark:

Let

$$A = \begin{bmatrix} 1 & 3 & -1 & -1 \\ 0 & 0 & 7 & 2 \end{bmatrix} \qquad B = \begin{bmatrix} 0 & 1 & 7 & 7 \\ -1 & -2 & 0 & 4 \\ 0 & 0 & 1 & 5 \end{bmatrix} \qquad C = \begin{bmatrix} 3 & 2 \\ 0 & 1 \\ -2 & -1 \end{bmatrix}$$

Determine which of the six products AB, AC, BA, BC, CA, CB can be computed, and compute them.

**Solution:** CA is the only one that can be computed, and

$$CA = \begin{bmatrix} 3 & 9 & 11 & 1 \\ 0 & 0 & 7 & 2 \\ -2 & -6 & -5 & 0 \end{bmatrix}$$

Determine if the matrix  $\begin{bmatrix} 3 & -1 & 0 & 4 \\ 2 & 1 & 1 & -1 \\ 0 & 1 & 1 & 3 \\ 1 & -2 & 0 & 0 \end{bmatrix}$  is invertible.

Solution: This matrix is row equivalent to the identity matrix, so it is invertible.

## Standard M3.

Mark:

Find the inverse of the matrix  $\begin{bmatrix} 6 & 0 & 1 \\ -14 & 3 & -4 \\ -23 & 4 & -6 \end{bmatrix}$ .

Solution:

$$\begin{bmatrix} 6 & 0 & 1 \\ -14 & 3 & -4 \\ -23 & 4 & -6 \end{bmatrix}^{-1} = \begin{bmatrix} -2 & 4 & -3 \\ 8 & -13 & 10 \\ 13 & -24 & 18 \end{bmatrix}$$

Additional Notes/Marks