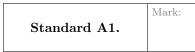
Name:	
J#:	Dr. Clontz
Date:	

## MASTERY QUIZ DAY 24

Math 237 – Linear Algebra Fall 2017

## Version 6

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.



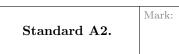
Let  $T: \mathbb{R}^3 \to \mathbb{R}^4$  be the linear transformation given by

$$T\left(\begin{bmatrix} x \\ y \\ z \end{bmatrix}\right) = \begin{bmatrix} -3x + y \\ -8x + 2y - z \\ 2y + 3z \\ 7x \end{bmatrix}.$$

Write the matrix for T with respect to the standard bases of  $\mathbb{R}^3$  and  $\mathbb{R}^4$ .

Solution:

$$\begin{bmatrix} 3 & 1 & 0 \\ -8 & 2 & -1 \\ 0 & 2 & 3 \\ 7 & 0 & 0 \end{bmatrix}$$



Determine if the map  $T: \mathcal{P}^3 \to \mathcal{P}^4$  given by T(f(x)) = xf(x) - f(x) is a linear transformation or not.

Standard M1.	Mark:

Let

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

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

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

$$CB = \begin{bmatrix} 3 & 3 & -5 & 7 \\ 4 & -4 & 12 & -12 \\ 7 & 2 & 0 & 3 \end{bmatrix}$$

Standard M2.	Ma	rk:		
Determine if the matrix	$\begin{bmatrix} 3 \\ 2 \\ 0 \end{bmatrix}$	-1 1 1	$\begin{bmatrix} 0\\1\\1\end{bmatrix}$	is invertible

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

## 

Solution:

$$\begin{bmatrix} 3 & -1 & 0 \\ 2 & 1 & 1 \\ 0 & 1 & 1 \end{bmatrix}^{-1} = \begin{bmatrix} 0 & \frac{1}{2} & -\frac{1}{2} \\ -1 & \frac{3}{2} & -\frac{3}{2} \\ 1 & -\frac{3}{2} & \frac{5}{2} \end{bmatrix}$$

Additional Notes/Marks