Name:
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Date:

Dr. Clontz

MASTERY QUIZ DAY 22 Math 237 – Linear Algebra
Version 3 Fall 2017

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.

Standard A1.	Mark:

Let $T:\mathbb{R}^4\to\mathbb{R}^2$ be the linear transformation given by

$$T\left(\begin{bmatrix}x_1\\x_2\\x_3\\x_4\end{bmatrix}\right)=\begin{bmatrix}x_1+3x_3\\3x_2-5x_3\end{bmatrix}.$$

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

Solution:

$$\begin{bmatrix}1&0&3&0\\0&3&-5&0\end{bmatrix}$$

□

Standard A2.	Mark:

Let $T:\mathbb{R}^2\to\mathbb{R}^2$ be given by $T\left(\begin{bmatrix}x\\y\end{bmatrix}\right)=\begin{bmatrix}x+y\\\sqrt{x}+\sqrt{y}\end{bmatrix}$. Determine if T is a linear transformation.

Solution:

$$T\left(\begin{bmatrix}0\\4\end{bmatrix}\right)=\begin{bmatrix}4\\2\end{bmatrix}\neq\begin{bmatrix}4\\4\end{bmatrix}=4T\left(\begin{bmatrix}0\\1\end{bmatrix}\right)$$

So T is not a linear transformation.

□

Standard M1.	Mark:

Let

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

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

Solution: AB and CA are the only ones that can be computed, and

$$AB = \begin{bmatrix} -3 & -5 & 6 & 14 \\ 0 & 0 & 7 & 35 \end{bmatrix}$$

$$CA = \begin{bmatrix} 3 & 9 & 11 \\ 0 & 0 & 7 \end{bmatrix}$$

□

Additional Notes/Marks	