Name:
J#:
Date:

Dr. Clontz

MASTERY QUIZ DAY 25 Math 237 – Linear Algebra
Version 2 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 A3.	Mark:

Determine if each of the following linear transformations is injective (one-to-one) and/or surjective (onto).

(a) $S:\mathbb{R}^4\to\mathbb{R}^3$ where $S(\vec{e}_1)=\begin{bmatrix}2\\1\\0\end{bmatrix}$, $S(\vec{e}_2)=\begin{bmatrix}1\\2\\1\end{bmatrix}$, $S(\vec{e}_3)=\begin{bmatrix}0\\-1\\0\end{bmatrix}$, and $S(\vec{e}_4)=\begin{bmatrix}3\\2\\1\end{bmatrix}$,

(b) $T:\mathbb{R}^3\to\mathbb{R}^3$ where $T(\vec{e}_1)=\begin{bmatrix}2\\2\\1\end{bmatrix}$, $T(\vec{e}_2)=\begin{bmatrix}1\\0\\4\end{bmatrix}$, and $T(\vec{e}_3)=\begin{bmatrix}1\\2\\-3\end{bmatrix}$.

Standard A4.	Mark:

Let $T:\mathbb{R}^3\to\mathbb{R}^3$ be the linear map given by $T\left(\begin{bmatrix}x\\y\\z\end{bmatrix}\right)=\begin{bmatrix}8x-3y-z\\y+3z\\-7x+3y+2z\end{bmatrix}$. Compute a basis for the kernel and a basis for the image of T.

Additional Notes/Marks	