Name:	
J#:	Dr. Clontz
Date:	

MASTERY QUIZ DAY 8
Math 237 – Linear Algebra
Version 4
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.

	Mark:
Standard E1.	

Write a system of linear equations corresponding to the following augmented matrix.

$$\begin{bmatrix} -4 & -1 & 3 & | & 2 \\ 1 & 2 & -1 & | & 0 \\ -1 & 4 & 1 & | & 4 \end{bmatrix}$$

Solution:

$$-4x_1 - x_2 + 3x_3 = 2$$
$$x_1 + 2x_2 - x_3 = 0$$
$$-x_1 + 4x_2 + x_3 = 4$$

☐

	Mark:
Standard E3.	

Solve the system of equations

$$x + 3y - 4z = 5$$
$$3x + 9y + z = 2$$

Solution:

$$\text{RREF}\left(\begin{bmatrix} 1 & 3 & -4 & | & 5 \\ 3 & 9 & 1 & | & 2 \end{bmatrix}\right) = \begin{bmatrix} 1 & 3 & 0 & | & 1 \\ 0 & 0 & 1 & | & -1 \end{bmatrix}$$

So the solution set is

$$\left\{ \begin{bmatrix} 1 - 3c \\ c \\ -1 \end{bmatrix} \,\middle|\, c \in \mathbb{R} \right\}$$

☐

	Mark:
Standard E4.	

Find a basis for the solution set to the homogeneous system of equations given by

$$3x + 2y + z = 0$$
$$x + y + z = 0$$

Solution: Let $A = \begin{bmatrix} 3 & 2 & 1 & | & 0 \\ 1 & 1 & 1 & | & 0 \end{bmatrix}$, so RREF $A = \begin{bmatrix} 1 & 0 & -1 & | & 0 \\ 0 & 1 & 2 & | & 0 \end{bmatrix}$. It follows that the basis for the solution set is given by $\left\{ \begin{bmatrix} 1 \\ -2 \\ 1 \end{bmatrix} \right\}$.

☐

Standard V1.	Mark:

Let V be the set of all pairs of real numbers with the operations, for any $(x_1, y_1), (x_2, y_2) \in V$, $c \in \mathbb{R}$,

$$(x_1, y_1) \oplus (x_2, y_2) = (x_1 + x_2, y_1 + y_2)$$
$$c \odot (x_1, y_1) = (0, cy_1)$$

Determine if V is a vector space or not.

Solution: V is not a vector space, as $1 \odot (x_1, y_1) = (0, y_1) \neq (x_1, y_1)$.

☐

Additional Notes/Marks	