Name:

J#:

Date:

Dr. Clontz

MASTERY QUIZ DAY 6
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.

	Mark:
Standard E1.	

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

$$x_1 + 4x_3 = 1$$
$$x_2 - x_3 = 7$$
$$x_1 - x_2 + 3x_3 = -1$$

Solution:

$$\begin{bmatrix} 1 & 0 & 4 & | & 1 \\ 0 & 1 & -1 & | & 7 \\ 1 & -1 & 3 & | & -1 \end{bmatrix}$$

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	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

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

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Standard E4.

Find a basis for the solution set of the system of equations

$$x + 2y + 3z + w = 0$$
$$3x - y + z + w = 0$$
$$2x - 3y - 2z = 0$$
$$-x + 2z + 5w = 0$$

Solution:

$$\text{RREF}\left(\left[\begin{array}{cccc} 1 & -2 & 3 & 1 \\ 3 & -1 & 1 & 1 \\ 2 & -3 & -2 & 0 \\ -1 & 0 & 2 & 5 \end{array}\right]\right) = \begin{bmatrix} 1 & 0 & 0 & -1 \\ 0 & 1 & 0 & -2 \\ 0 & 0 & 1 & 2 \\ 0 & 0 & 0 & 0 \end{bmatrix}$$

Then the solution set is

$$\left\{ \begin{bmatrix} a \\ 2a \\ -2a \\ a \end{bmatrix} \middle| \; a \in \mathbb{R} \right\}$$

So a basis for the solution set is $\left\{ \begin{bmatrix} 1 \\ 2 \\ -2 \\ 1 \end{bmatrix} \right\}$.