

Name:
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Date:

Dr. Clontz

### MASTERY QUIZ DAY 13

Math 237 – Linear Algebra

#### Version 6

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.

<b>Standard V2.</b>	Mark:
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Determine if  $\begin{bmatrix} 0 \\ 1 \\ -2 \\ 1 \end{bmatrix}$  can be written as a linear combination of the vectors  $\begin{bmatrix} 5 \\ 2 \\ -3 \\ 2 \end{bmatrix}$ ,  $\begin{bmatrix} 3 \\ 1 \\ 1 \\ 0 \end{bmatrix}$ , and  $\begin{bmatrix} 8 \\ 3 \\ 5 \\ -1 \end{bmatrix}$ .

**Solution:**

$$\text{RREF} \left( \left[ \begin{array}{cccc|c} 8 & 5 & 3 & 0 & 0 \\ 3 & 2 & 1 & 1 & 0 \\ 5 & -3 & 1 & -2 & 0 \\ -1 & 2 & 0 & 1 & 1 \end{array} \right] \right) = \left[ \begin{array}{cccc|c} 1 & 0 & 0 & 0 & 0 \\ 0 & 1 & 0 & 0 & 0 \\ 0 & 0 & 1 & 0 & 0 \\ 0 & 0 & 0 & 1 & 1 \end{array} \right]$$

The system has no solution, so  $\begin{bmatrix} 0 \\ 1 \\ -2 \\ 1 \end{bmatrix}$  is not a linear combination of the three other vectors.

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<b>Standard S1.</b>	Mark:
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Determine if the set of polynomials  $\{x^3 - 8x, x^3 + 2x^2 + 2, -x^2 + 3\}$  is linearly dependent or linearly independent

**Solution:**

$$\text{RREF} \left( \left[ \begin{array}{ccc|c} -3 & 1 & 0 & 1 \\ -8 & 2 & -1 & 2 \\ 0 & 2 & 3 & 2 \\ 0 & 0 & 0 & 0 \end{array} \right] \right) = \left[ \begin{array}{ccc|c} 1 & 0 & \frac{1}{2} & \frac{1}{2} \\ 0 & 1 & \frac{3}{2} & \frac{3}{2} \\ 0 & 0 & 0 & 0 \\ 0 & 0 & 0 & 0 \end{array} \right]$$

This has a non pivot column, therefore the set is linearly dependent.

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<b>Additional Notes/Marks</b>	
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