

Name:
J#:
Date:

Dr. Clontz

## MASTERY QUIZ DAY 22

Math 237 – Linear Algebra

### Version 1

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 A1.</b>	Mark:
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Let  $T : \mathbb{R}^3 \rightarrow \mathbb{R}$  be the linear transformation given by

$$T \left( \begin{bmatrix} x_1 \\ x_2 \\ x_3 \end{bmatrix} \right) = [x_3 + 3x_1].$$

Write the matrix for  $T$  with respect to the standard bases of  $\mathbb{R}^3$  and  $\mathbb{R}$ .

<b>Standard A2.</b>	Mark:
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Determine if the map  $T : \mathcal{P}^3 \rightarrow \mathcal{P}^4$  given by  $T(f(x)) = xf(x) - f(x)$  is a linear transformation or not.

<b>Standard M1.</b>	Mark:
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Let

$C = \begin{bmatrix} 2 & 3 \\ 0 & 1 \end{bmatrix}$ 
 $D = \begin{bmatrix} 3 & 1 & 0 \end{bmatrix}$ 
 $E = \begin{bmatrix} 2 & 0 \\ 0 & -1 \\ 1 & -1 \end{bmatrix}$

Determine which of the six products  $CD$ ,  $CE$ ,  $DC$ ,  $DE$ ,  $EC$ ,  $ED$  can be computed, and compute them.

<b>Additional Notes/Marks</b>	
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### Version 2

Fall 2017

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<b>Standard A1.</b>	Mark:
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Let  $T : \mathbb{R}^3 \rightarrow \mathbb{R}^4$  be the linear transformation given by

$$T \left( \begin{bmatrix} x \\ y \\ z \end{bmatrix} \right) = \begin{bmatrix} -3x + y \\ -8x + 2y - z \\ 7x + 2y + 3z \\ 0 \end{bmatrix}.$$

Write the matrix for  $T$  with respect to the standard bases of  $\mathbb{R}^3$  and  $\mathbb{R}^4$ .

<b>Standard A2.</b>	Mark:
---------------------	-------

Determine if the map  $T : \mathcal{P}^3 \rightarrow \mathcal{P}^4$  given by  $T(f(x)) = xf(x) - f(x)$  is a linear transformation or not.

<b>Standard M1.</b>	Mark:
---------------------	-------

Let

$C = \begin{bmatrix} 2 & 3 \\ 0 & 1 \end{bmatrix}$ 
 $D = \begin{bmatrix} 3 & 1 & 0 \end{bmatrix}$ 
 $E = \begin{bmatrix} 2 & 0 \\ 0 & -1 \\ 1 & -1 \end{bmatrix}$

Determine which of the six products  $CD$ ,  $CE$ ,  $DC$ ,  $DE$ ,  $EC$ ,  $ED$  can be computed, and compute them.

<b>Additional Notes/Marks</b>	
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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.

<b>Standard A1.</b>	Mark:
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Let  $T : \mathbb{R}^4 \rightarrow \mathbb{R}^2$  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  $\mathbb{R}^2$ .

<b>Standard A2.</b>	Mark:
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Let  $T : \mathbb{R}^2 \rightarrow \mathbb{R}^2$  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.

<b>Standard M1.</b>	Mark:
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Let

$$A = \begin{bmatrix} 1 & 3 & -1 \\ 0 & 0 & 7 \end{bmatrix}$$

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

$$C = \begin{bmatrix} 3 & 2 \\ 0 & 1 \end{bmatrix}$$

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

<b>Additional Notes/Marks</b>	
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## MASTERY QUIZ DAY 22

Math 237 – Linear Algebra

### Version 4

Fall 2017

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<b>Standard A1.</b>	Mark:
---------------------	-------

Let  $T : \mathbb{R}^3 \rightarrow \mathbb{R}^4$  be the linear transformation given by

$$T \left( \begin{bmatrix} x \\ y \\ z \end{bmatrix} \right) = \begin{bmatrix} -3x + y \\ -8x + 2y - z \\ 7x + 2y + 3z \\ 0 \end{bmatrix}.$$

Write the matrix for  $T$  with respect to the standard bases of  $\mathbb{R}^3$  and  $\mathbb{R}^4$ .

<b>Standard A2.</b>	Mark:
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Determine if  $D : \mathbb{R}^{2 \times 2} \rightarrow \mathbb{R}$  given by  $D \left( \begin{bmatrix} a & b \\ c & d \end{bmatrix} \right) = ad - bc$  is a linear transformation or not.

<b>Standard M1.</b>	Mark:
---------------------	-------

Let

$C = \begin{bmatrix} 2 & 3 \\ 0 & 1 \end{bmatrix}$ 
 $D = \begin{bmatrix} 3 & 1 & 0 \end{bmatrix}$ 
 $E = \begin{bmatrix} 2 & 0 \\ 0 & -1 \\ 1 & -1 \end{bmatrix}$

Determine which of the six products  $CD$ ,  $CE$ ,  $DC$ ,  $DE$ ,  $EC$ ,  $ED$  can be computed, and compute them.

<b>Additional Notes/Marks</b>	
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### Version 5

Fall 2017

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<b>Standard A1.</b>	Mark:
---------------------	-------

Let  $T : \mathbb{R}^3 \rightarrow \mathbb{R}^4$  be the linear transformation given by

$$T \left( \begin{bmatrix} x \\ y \\ z \end{bmatrix} \right) = \begin{bmatrix} -3x + y \\ -8x + 2y - z \\ 7x + 2y + 3z \\ 0 \end{bmatrix}.$$

Write the matrix for  $T$  with respect to the standard bases of  $\mathbb{R}^3$  and  $\mathbb{R}^4$ .

<b>Standard A2.</b>	Mark:
---------------------	-------

Let  $T : \mathbb{R}^2 \rightarrow \mathbb{R}^2$  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.

<b>Standard M1.</b>	Mark:
---------------------	-------

Let

$$A = \begin{bmatrix} 1 & 3 & -1 & -1 \\ 0 & 0 & 7 & 2 \end{bmatrix}$$

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

$$C = \begin{bmatrix} 3 & 2 \\ 0 & 1 \\ -2 & -1 \end{bmatrix}$$

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

<b>Additional Notes/Marks</b>	
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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 A1.</b>	Mark:
---------------------	-------

Let  $T : \mathbb{R}^3 \rightarrow \mathbb{R}$  be the linear transformation given by

$$T \left( \begin{bmatrix} x_1 \\ x_2 \\ x_3 \end{bmatrix} \right) = [x_3 + 3x_1].$$

Write the matrix for  $T$  with respect to the standard bases of  $\mathbb{R}^3$  and  $\mathbb{R}$ .

<b>Standard A2.</b>	Mark:
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Determine if  $T : \mathbb{R}^2 \rightarrow \mathbb{R}^2$  given by  $T \left( \begin{bmatrix} x \\ y \end{bmatrix} \right) = \begin{bmatrix} e^x \\ e^y \end{bmatrix}$  is a linear transformation.

<b>Standard M1.</b>	Mark:
---------------------	-------

Let

$$A = \begin{bmatrix} 1 & 3 & -1 \\ 0 & 0 & 7 \end{bmatrix}$$

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

$$C = \begin{bmatrix} 3 & 2 \\ 0 & 1 \end{bmatrix}$$

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

<b>Additional Notes/Marks</b>	
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