Math 304, Section 5 — Quiz 7 – February 27

Name:_____

1. Which augmented matrix represents the following system of equations?

$$x + 2y = 3$$
$$4y + 5x = 6$$

(a) $\left[\begin{array}{cc|c} 0 & 2 & 3 \\ 4 & 5 & 6 \end{array}\right]$

(b) $\left[\begin{array}{cc|c} 1 & 2 & 3 \\ 4 & 5 & 6 \end{array}\right]$

(c) $\left[\begin{array}{cc|c} 1 & 2 & 3 \\ 5 & 4 & 6 \end{array}\right]$

(d) $\left[\begin{array}{cc|c} 0 & 2 & 3 \\ 5 & 4 & 6 \end{array}\right]$

2. What is the solution to the system of equations represented with this augmented matrix?

$$\left[\begin{array}{ccc|c} 1 & 0 & 3 & 2 \\ 0 & 1 & 2 & 3 \\ 0 & 0 & 0 & 0 \end{array}\right]$$

(a) $x = 2$, $y = 3$, $z = 4$
(b) $x = -1$, $y = 1$, $z = 1$
(c) There are an infinite number of solutions
(d) There is no solution
(e) We cant tell without having the system of equations

3. Which of the following matrices is NOT row equivalent to the one below? In other words, which matrix could you NOT get from the matrix below through elementary row operations?

$$\begin{bmatrix} 6 & 0 & 4 & 7 \\ 2 & 0 & 1 & 9 \\ 5 & 0 & 3 & 5 \end{bmatrix}$$

(a) $\begin{bmatrix} 12 & 0 & 8 & 14 \\ 2 & 0 & 1 & 9 \\ 1 & 0 & 1 & 2 \end{bmatrix}$

(b) $\begin{bmatrix} 12 & 0 & 8 & 14 \\ 0 & 0 & 1 & -20 \\ 2 & 1 & 3 & 0 \end{bmatrix}$

(c) $\begin{bmatrix} 6 & 0 & 4 & 7 \\ 2 & 0 & 1 & 9 \\ 7 & 0 & 4 & 14 \end{bmatrix}$

(d) All are possible through elementary row operations

4. A vector space does *not* have to satisfy which of the following properties?

(a) Closure under vector addition
(b) Closure under scalar multiplication
(c) Closure under vector multiplication
(d) A vector space must satisfy all of the above properties
(e) A vector space need not satisfy any of the above properties

5. If A is a 3×3 matrix such that $A \begin{bmatrix} 0 \\ 1 \\ 2 \end{bmatrix} = \begin{bmatrix} 1 \\ 0 \\ 0 \end{bmatrix}$ and $A \begin{bmatrix} 3 \\ 4 \\ 5 \end{bmatrix} = \begin{bmatrix} 0 \\ 1 \\ 0 \end{bmatrix}$, then the product $A \begin{bmatrix} 6 \\ 7 \\ 8 \end{bmatrix}$ is

(a) $\begin{bmatrix} 0 \\ 0 \\ 1 \end{bmatrix}$

(b) $\begin{bmatrix} -1 \\ 2 \\ 0 \end{bmatrix}$

(c) $\begin{bmatrix} 1 \\ -1 \\ 0 \end{bmatrix}$

(d) $\begin{bmatrix} 9 \\ 10 \\ 11 \end{bmatrix}$

(e) Not uniquely determined by the information given

6. If $A = \begin{bmatrix} 2 & 3 & 1 \\ 0 & -1 & 3 \\ -2 & 0 & 4 \end{bmatrix}$ what is A^T?

(a) $A^T = \begin{bmatrix} 2 & 3 & 1 \\ 0 & -1 & 3 \\ -2 & 0 & 4 \end{bmatrix}$

(b) $A^T = \begin{bmatrix} 2 & 0 & -2 \\ 3 & -1 & 0 \\ 1 & 3 & 4 \end{bmatrix}$

(c) $A^T = \begin{bmatrix} -2 & 0 & 4 \\ 0 & -1 & 3 \\ 2 & 3 & 1 \end{bmatrix}$

(d) $A^T = \begin{bmatrix} 1 & 3 & 4 \\ 3 & -1 & 0 \\ 2 & 0 & -2 \end{bmatrix}$

7. If A and B are both 2×3 matrices, then which of the following is not defined?

(a) $A^T B$

(b) BA

(c) AB^T

(d) More than one of the above

(e) All of these are defined

8. If C is a $n \times 4$ matrix and $D = \begin{bmatrix} 1 & 0 & 1 \\ 0 & 1 & 1 \\ 1 & 0 & 0 \\ 0 & 0 & 0 \end{bmatrix}$, then the second column of the matrix CD is

(a) The same as the second column of C

(b) The sum of the first and second columns of C

(c) The sum of the second and fourth columns of C

(d) The same as the third row of D

(e) The sum of the first and the third columns of C