Homework 4A

Name___________________________________

SHORT ANSWER. Write the word or phrase that best completes each statement or answers the question.

1) Find the result of performing the elementary row operation $R_3 + (5)\,R_2$ on the system $\left[\begin{array}{ccc|c} 1 & 0 & 3 & 9 \\ 0 & 1 & -3 & 2 \\ 0 & -5 & 4 & 1 \end{array}\right]$. 1) ______________

MULTIPLE CHOICE. Choose the one alternative that best completes the statement or answers the question.

2) The system $\left[\begin{array}{ccc|c} 1 & 0 & 0 & -2 \\ 0 & 1 & 3 & 5 \\ 1 & 1 & -3 & 4 \end{array}\right]$ is equivalent to the system 2) _______

A) $\left[\begin{array}{ccc|c} 1 & 0 & 0 & -2 \\ 0 & 1 & -3 & 5 \\ 0 & 1 & -3 & 4 \end{array}\right]$.

B) $\left[\begin{array}{ccc|c} 1 & 0 & 0 & -2 \\ 0 & 1 & -3 & 5 \\ 0 & 0 & 0 & 4 \end{array}\right]$.

C) $\left[\begin{array}{ccc|c} 1 & 0 & 0 & -2 \\ 0 & 1 & 3 & 5 \\ 0 & 1 & -3 & 6 \end{array}\right]$.

D) $\left[\begin{array}{ccc|c} 1 & 0 & 0 & -2 \\ 0 & 3 & -9 & 5 \\ 1 & 1 & -3 & 4 \end{array}\right]$.

SHORT ANSWER. Write the word or phrase that best completes each statement or answers the question.

Use the indicated row operation to change the matrix.

3) Replace R_2 by $\frac{1}{3}R_1 + \frac{1}{2}R_2$. 3) ______________

$$\left[\begin{array}{cc|c} 3 & 0 & 12 \\ -2 & 4 & 6 \end{array}\right]$$

Use the Gauss–Jordan method to solve the system of equations.

4) 4) ______________

$$\begin{cases} 3x + 5y = 16 \\ 3x \quad\;\; = -9 \end{cases}$$

5) 5) ______________

$$\begin{cases} x - y + 4z = -6 \\ 5x \quad + z = -1 \\ x + 3y + z = 5 \end{cases}$$

6) Pivot the matrix $\begin{bmatrix} 1 & 3 \\ 4 & -2 \end{bmatrix}$ about the element 3. 6) ______________

Solve the system of linear equations using the Gaussian elimination method. If there is no solution, state so; if there are infinitely many solutions, find two of them.

7) 7) ______________

$$\begin{cases} x - y + 2z = 2 \\ \quad\;\; y - 2z = 1 \\ -3x + 5y - 10z = -4 \end{cases}$$

8)

$$\begin{cases} x - y - 2z = 2 \\ y - 2z = 1 \\ -3x + 5y - 10z = -4 \end{cases}$$

8) ______________

For the system of equations, state whether there is one, none, or infinitely many solutions. If there are one or more solutions, give all values of x, y, and z that satisfy the system.

9)

$$\begin{cases} x + y - z = 1 \\ y - 2z = 1 \\ x + y - z = 2 \end{cases}$$

9) ______________

MULTIPLE CHOICE. Choose the one alternative that best completes the statement or answers the question.

10) Consider the system: $\begin{cases} x - y = 7 \\ 2x - 2y = k \end{cases}$. Which of the following statements is true?

10) ______

A) If $k = 10$, the system has infinitely many solutions.
B) If $k = 10$, the system has no solution.
C) If $k \neq 10$, the system has exactly one solution.
D) none of these

SHORT ANSWER. Write the word or phrase that best completes each statement or answers the question.

Use the Gauss–Jordan method to solve the system of equations.

11) $-4x - 2y = 6$
$-16x - 8y = -1$

11) ______________

Perform the matrix operation.

12) Let $A = \begin{bmatrix} 1 & 3 \\ 2 & 6 \end{bmatrix}$ and $B = \begin{bmatrix} 0 & 4 \\ -1 & 6 \end{bmatrix}$. Find $4A + B$.

12) ______________

13) Let $C = \begin{bmatrix} 1 \\ -3 \\ 2 \end{bmatrix}$ and $D = \begin{bmatrix} -1 \\ 3 \\ -2 \end{bmatrix}$. Find $C - 4D$.

13) ______________

Find the matrix product AB, if it is defined.

14) $A = \begin{bmatrix} -1 & 3 \\ 2 & 2 \end{bmatrix}$, $B = \begin{bmatrix} -2 & 0 \\ -1 & 4 \end{bmatrix}$.

14) ______________

15) $A = \begin{bmatrix} 3 & -2 & 1 \\ 0 & 4 & -2 \end{bmatrix}$, $B = \begin{bmatrix} 4 & 0 \\ -2 & 3 \end{bmatrix}$.

15) ______________

16) $A = \begin{bmatrix} 1 & 3 & -2 \\ 2 & 0 & 3 \end{bmatrix}$, $B = \begin{bmatrix} 3 & 0 \\ -2 & 1 \\ 0 & 3 \end{bmatrix}$.

16) ______________

17) Write the system of linear equations as a matrix equation. 17) ______________

$$\begin{cases} x + 2y + 3z = 4 \\ \quad\;\; 6y + 7z = 8 \\ x \qquad\qquad\;\; = 5 \end{cases}$$

Write the matrix equation as a system of linear equations without matrices.

18) 18) ______________

$$\begin{bmatrix} -7 & 0 \\ 1 & 1 \\ -8 & -5 \end{bmatrix} \begin{bmatrix} x_1 \\ x_2 \end{bmatrix} = \begin{bmatrix} -8 \\ 8 \\ -7 \end{bmatrix}$$