Practice 04

10.1 Solving Systems of Linear Equations Using Matrices
10.2 Inconsistent Systems and Dependent Equations
10.3 Operations on Matrices
10.4 Inverse Matrices and Matrix Equations
10.5 Determinants and Cramer's Rule

Write the augmented matrix for the given system.

1) $x + 3y + 5z = -3$
$-5y + 3z = -8$
$-8z = -6$ 1) _____

A) $\left[\begin{array}{ccc|c} 1 & 3 & 5 & -3 \\ 0 & -5 & 3 & -8 \\ 0 & 0 & -8 & -6 \end{array}\right]$

B) $\left[\begin{array}{ccc|c} 1 & 3 & 5 & -3 \\ 0 & -5 & 3 & -8 \\ 1 & 1 & -8 & -6 \end{array}\right]$

Write a system of linear equations represented by the augmented matrix.

2) $\left[\begin{array}{cc|c} -7 & 9 & -1 \\ 5 & -6 & 7 \end{array}\right]$ 2) _____

A) $-7x + 9y = -1$
$5x - 6y = 7$

B) $-7x + 9y = -1$
$5x - 6y = -7$

Perform the elementary row operation on the given matrix.

3) $3R_2 + R_1 \rightarrow R_1$ 3) _____

$\left[\begin{array}{cc|c} 4 & 5 & 1 \\ -2 & -7 & -1 \end{array}\right]$

A) $\left[\begin{array}{cc|c} -10 & -26 & -4 \\ -2 & -7 & -1 \end{array}\right]$

B) $\left[\begin{array}{cc|c} -2 & -16 & -2 \\ -2 & -7 & -1 \end{array}\right]$

4) $R_2 \Leftrightarrow R_3$ 4) _____

$\left[\begin{array}{ccc|c} -8 & 2 & -9 & -4 \\ -3 & 7 & -6 & 6 \\ 5 & 0 & 3 & 6 \end{array}\right]$

A) $\left[\begin{array}{ccc|c} -8 & 2 & -9 & -4 \\ 5 & 0 & 3 & 6 \\ -3 & 7 & -6 & 6 \end{array}\right]$

B) $\left[\begin{array}{ccc|c} -8 & 2 & -9 & -4 \\ -3 & 7 & -6 & 6 \\ 2 & 7 & -3 & 9 \end{array}\right]$

Determine if the matrix is in row-echelon form.

5) $\left[\begin{array}{ccc|c} 1 & -6 & -8 & -7 \\ 0 & 1 & 0 & 8 \\ 0 & 0 & 2 & 3 \end{array}\right]$ 5) _____

A) Yes B) No

For the given augmented matrix, determine the number of solutions to the corresponding system of equations.

6) $\left[\begin{array}{ccc|c} 1 & 0 & 7 & -2 \\ 0 & 1 & -8 & 1 \\ 0 & 0 & 0 & 0 \end{array}\right]$ 6) _____

A) No solution B) Infinitely many solutions

Determine the solution set for the system represented by the augmented matrix.

7) $\left[\begin{array}{ccc|c} 1 & 0 & -7 & 4 \\ 0 & 1 & 6 & 1 \\ 0 & 0 & 0 & 1 \end{array}\right]$ 7) _____

A) {(11, -5, 1)} B) {(4, 1, 0)} C) { } D) {(-7, 6, 0)}

8) $\left[\begin{array}{ccc|c} 1 & 0 & -4 & 7 \\ 0 & 1 & 8 & -7 \\ 0 & 0 & 0 & 0 \end{array}\right]$ 8) _____

A) { }

B) {(7 + 4z, -7 - 8z, z) | z is any real number}

Solve the system using Gaussian elimination or Gauss-Jordan elimination.

9) $-3x - 7y + 7z = 71$ 9) _____

$-2x + 7y - 3z = -22$

$-3x - 9y + 9z = 87$

A) {(-5, 2, 6)} B) {(5, 2, 6)} C) { } D) {(-5, -2, 6)}

Find $A + B$.

10) $A = \begin{bmatrix} -6 & -2 \\ 9 & 4 \\ 0 & 2 \end{bmatrix}$, $B = \begin{bmatrix} -2 & 7 \\ -8 & -1 \\ 8 & 4 \end{bmatrix}$ 10) _____

A) $\begin{bmatrix} -4 & 5 \\ 17 & 3 \\ -8 & 6 \end{bmatrix}$ B) $\begin{bmatrix} -8 & 5 \\ 1 & 3 \\ 8 & 6 \end{bmatrix}$

Given the matrices *A* and *B*, solve for *X*.

11) $2X = 2A - B$. 11) _____

$A = \begin{bmatrix} -6 & -4 \\ 6 & 4 \end{bmatrix}$ and $B = \begin{bmatrix} -8 & -18 \\ 6 & 16 \end{bmatrix}$

A) $\begin{bmatrix} -2 & -5 \\ -3 & -4 \end{bmatrix}$

B) $\begin{bmatrix} -2 & 5 \\ 3 & -4 \end{bmatrix}$

Find *AB*, if possible.

12) $A = \begin{bmatrix} 4 & 4 & 1 \\ 7 & 5 & 8 \end{bmatrix}$ and $B = \begin{bmatrix} -6 & 7 \\ 3 & 8 \\ 1 & 7 \end{bmatrix}$ 12) _____

A) $\begin{bmatrix} -11 & 67 \\ -19 & 145 \end{bmatrix}$

B) Not possible

13) $A = \begin{bmatrix} 2 & -1 \\ 6 & 5 \end{bmatrix}$ and $B = \begin{bmatrix} 6 & 2 \\ 1 & 6 \end{bmatrix}$ 13) _____

A) Not possible

B) $\begin{bmatrix} 11 & -2 \\ 41 & 42 \end{bmatrix}$

14) $A = \begin{bmatrix} 4 & 3 & 7 \\ -3 & 8 & 0 \end{bmatrix}$ and $B = \begin{bmatrix} -6 & 7 & -2 \\ 7 & 1 & -6 \end{bmatrix}$ 14) _____

A) $\begin{bmatrix} -25 & 49 \\ 34 & -77 \end{bmatrix}$

B) Not possible

15) $A = \begin{bmatrix} -7 & 7 & -5 \\ 3 & 9 & 3 \\ 8 & -9 & 1 \end{bmatrix}$ and $B = \begin{bmatrix} 5 \\ 8 \\ -1 \end{bmatrix}$ 15) _____

A) Not possible

B) $\begin{bmatrix} 26 \\ 84 \\ -33 \end{bmatrix}$

Determine whether *A* and *B* are inverses.

16) $A = \begin{bmatrix} 4 & 1 \\ 2 & 2 \end{bmatrix}$ and $B = \begin{bmatrix} 3 & -2 \\ -11 & 8 \end{bmatrix}$ 16) _____

A) Yes

B) No

Determine the inverse of the given matrix, if possible. Otherwise, state the matrix is singular.

17) $A = \begin{bmatrix} -5 & 1 \\ -3 & -1 \end{bmatrix}$ 17) _____

A) $A^{-1} = \begin{bmatrix} -\frac{1}{8} & -\frac{1}{8} \\ \frac{3}{8} & -\frac{5}{8} \end{bmatrix}$

B) Singular matrix

Write the system of equations as a matrix equation of the form $AX = B$, where A is the coefficient matrix, X is the column matrix of variables, and B is the column matrix of constants.

18) $-5x - 2y = -7$
$3x + 3y = 6$ 18) _____

A) $\begin{bmatrix} -5 & -2 \\ 3 & 3 \end{bmatrix} \begin{bmatrix} x \\ y \end{bmatrix} = \begin{bmatrix} 7 \\ -6 \end{bmatrix}$

B) $\begin{bmatrix} -5 & -2 \\ 3 & 3 \end{bmatrix} \begin{bmatrix} x \\ y \end{bmatrix} = \begin{bmatrix} -7 \\ 6 \end{bmatrix}$

Solve the system by using the inverse of the coefficient matrix.

19) $4x - 5y = -11$
$-2x + 3y = 5$ 19) _____

A) {(-4, -1)}

B) {(4, 1)}

Evaluate the determinant of the given matrix.

20) $A = \begin{bmatrix} -1 & 6 \\ -7 & -9 \end{bmatrix}$ 20) _____

21) $A = \begin{bmatrix} e^{x} & e^{9x} \\ 6 & -e^{8x} \end{bmatrix}$ 21) _____

Evaluate the determinant of the given matrix and state whether the matrix is invertible.

22) $A = \begin{bmatrix} -5 & -3 & 1 \\ -4 & 3 & -9 \\ -5 & 6 & 4 \end{bmatrix}$ _____

Solve the system by using Cramer's rule. If Cramer's rule does not apply, solve the system by using another method.

23) $8x + 4y = 3$
$16x - 20y = -9$ 23) _____

1) A
2) A
3) B
4) A
5) B
6) B
7) C
8) B
9) D
10) B
11) B
12) A
13) B
14) B
15) B
16) B
17) A
18) B
19) A
20) 51
21) $-7e^{9x}$
22) -522, Yes
23) $\left\{\left(\frac{3}{28}, \frac{15}{28}\right)\right\}$