Exercises 1.1 & 1.2

MATH 244

LINEAR ALGEBRA

Which of the following is a linear equation?

A) $x^2 + 3y = 7$

B) $x - 2y + z = 4$

C) $\sin(x) + y = 2$

D) $xy + z = 0$

Multiple Choice

In the system of equations $2x + y = 4$ and $4x + 2y = 8$, identify the nature of the solution:

a. Unique

b. Infinite solutions

c. No solution

d. Cannot be determined without further information.

Multiple Choice

Consider the system of equations represented by the augmented matrix $\left[\begin{array}{cc|c} 1 & 2 & 4 \\ 0 & 0 & 1 \end{array}\right]$. What does this imply about the system?

a. It has no solution.

b. It has a unique solution.

c. It has infinitely many solutions.

d. None of the above.

Multiple Choice

The augmented matrix $\left[\begin{array}{cc|c} 1 & 2 & 3 \\ 0 & 1 & 1 \end{array}\right]$ corresponds to which system?

a. $x + y = 3, x = 1$

b. $x + 2y = 3, y = 1$

c. $y = 1, 2y = 3$

d. $x = 3, y = 1$

Multiple Choice

What does it mean for a system of equations to be consistent?

A) It has exactly one solution.

B) It has at least one solution.

C) It has infinitely many solutions.

D) It has no solutions.

Multiple Choice

Which of the following is not a valid row operation?

A) Swapping two rows.

B) Adding a multiple of one row to another row.

C) Multiplying a row by zero.

D) Multiplying a row by a nonzero scalar.

Multiple Choice

Which of the following matrices is in row echelon form?

A) $\begin{bmatrix} 1 & 2 & 0 \\ 0 & 3 & 1 \\ 1 & 0 & 4 \end{bmatrix}$

B) $\begin{bmatrix} 1 & 2 & 0 \\ 0 & 1 & 1 \\ 0 & 0 & 1 \end{bmatrix}$

C) $\begin{bmatrix} 1 & 2 & 3 \\ 0 & 0 & 1 \\ 0 & 4 & 5 \end{bmatrix}$

D) $\begin{bmatrix} 0 & 1 & 2 \\ 1 & 0 & 3 \\ 0 & 0 & 1 \end{bmatrix}$

Multiple Choice

A system of linear equations is represented by the augmented matrix:

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

What can you conclude?

A) The system has no solution.

B) The system has a unique solution.

C) The system has infinitely many solutions.

D) The system has a free variable.

Multiple Choice

A system has been reduced to:

$$\begin{bmatrix} 1 & 2 & 3 & 0 \\ 0 & 1 & 4 & 0 \\ 0 & 0 & 0 & 0 \end{bmatrix}$$

How many solutions does the system have?

A) No solution

B) Unique solution

C) Infinitely many solutions

D) Cannot be determined

Multiple Choice

If a consistent system has more variables than equations, what can you conclude?

A) The system has no solution.

B) The system has a unique solution.

C) The system has infinitely many solutions.

D) The system must be inconsistent.

Multiple Choice

The reduced row echelon form (RREF) of the augmented matrix for a system of equations is:

$$\begin{bmatrix} 1 & 0 & 0 & 3 \\ 0 & 1 & 0 & -2 \\ 0 & 0 & 1 & 4 \end{bmatrix}.$$

What is the solution set of the system?

A) $\{(3+t, -2, 4-t) \mid t \in \mathbb{R}\}$

B) $\{(3, -2+t, 4) \mid t \in \mathbb{R}\}$

C) $\{(3, -2, 4)\}$

D) Infinitely many solutions

Multiple Choice

The reduced row echelon form (RREF) of the augmented matrix for a system of equations is:

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

What is the solution set of the system?

A) $\{(2, -3, 0)\}$

B) $\{(2 + t, -3 + 2t, t) \mid t \in \mathbb{R}\}$

C) $\{(2 - t, -3 + 2t, t) \mid t \in \mathbb{R}\}$

D) $\varnothing$

Multiple Choice

The reduced row echelon form (RREF) of the augmented matrix for a system of equations is:

$$\begin{bmatrix} 1 & 2 & -1 & 4 \\ 0 & 1 & 3 & -1 \\ 0 & 0 & 0 & 1 \end{bmatrix}.$$

What is the solution set of the system?

A) $\varnothing$

B) $\{(x_1, x_2, x_3) \mid x_1, x_2, x_3 \in \mathbb{R}\}$

C) $\{(4, -1, 1)\}$

D) $\{(4 + t, -1, 3t) \mid t \in \mathbb{R}\}$

Multiple Choice

The solution set of a system of equations is given by:

$$\{(1-2s, 3+s, s) \mid s \in \mathbb{R}\}.$$

Which of the following reduced row echelon forms (RREF) corresponds to this solution set?

A)

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

B)

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

C)

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

D)

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

Multiple Choice

The solution set of a system of equations is given by:

$$\{(2, -1 + t, t) \mid t \in \mathbb{R}\}.$$

Which of the following reduced row echelon forms (RREF) corresponds to this solution set?

A)

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

B)

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

C)

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

D)

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

Multiple Choice

The solution set of a system of equations is given by:

$$\{(4, 3, t) \mid t \in \mathbb{R}\}.$$

Which of the following reduced row echelon forms (RREF) corresponds to this solution set?

A)

$$\begin{bmatrix} 1 & 0 & 1 & 4 \\ 0 & 1 & -1 & 3 \\ 0 & 0 & 0 & 0 \end{bmatrix}$$

B)

$$\begin{bmatrix} 1 & 0 & 1 & 4 \\ 0 & 1 & 0 & 3 \\ 0 & 0 & 0 & 0 \end{bmatrix}$$

C)

$$\begin{bmatrix} 1 & 1 & 0 & 4 \\ 0 & 1 & 1 & 3 \\ 0 & 0 & 0 & 0 \end{bmatrix}$$

D)

$$\begin{bmatrix} 1 & 0 & 0 & 4 \\ 0 & 1 & 0 & 3 \\ 0 & 0 & 0 & 0 \end{bmatrix}$$

Multiple Choice

The augmented matrix of a system is:

$$\begin{bmatrix} 1 & a & 0 & 3 \\ 0 & 1 & b & 4 \\ 0 & 0 & c & d \end{bmatrix}.$$

For which values of a, b, c, and d does the system have no solution?

A) $c \neq 0, d = 0$

B) $a = 0, c = 0, d = 0$

C) $c = 0, d \neq 0$

D) $b = 0, c = 0, d = 0$

Multiple Choice

Q1	Q2	Q3	Q4	Q5	Q6	Q7	Q8	Q9	Q10	Q11	Q12	Q13	Q14	Q15	Q16	Q17
★☆☆	★☆☆	★☆☆	★☆☆	★☆☆	★☆☆	★☆☆	★☆☆	★☆☆	★☆☆	★☆☆	★☆☆	★☆☆	★☆☆	★☆☆	★☆☆	★☆☆
B	B	A	B	B	C	B	A	C	C	A	C	A	A	A	D	C