

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:

$$\left[\begin{array}{cccc} 1 & 2 & 3 & 4 \\ 0 & 1 & 4 & 5 \\ 0 & 0 & 0 & 1 \end{array} \right]$$

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) $\emptyset$

 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) $\emptyset$
- 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
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