

Week 2 Conceptual Quiz

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Tim Palacios (timpalacios)

Section: MATH301 001

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Problem 1. (1 point)

Consider the following linear system:

$$\begin{aligned}4x + 1y - 1z &= 0 \\3x - 6y + 1z &= 0 \\-3x - 10y + 6z &= 0 \\-4x + 9y + 7z &= 0\end{aligned}$$

Without performing any calculations or graphing anything, what can we say about the number of solutions to this system? Choose the best answer.

- A. Since this is a homogeneous linear system it has either one solution or infinitely many solutions.
- B. This system has more equations than variables, so it does not have any solutions.
- C. Since this is a homogeneous linear system it has exactly one solution.
- D. This system has more equations than variables, so it could have no solutions, one solution, or infinitely many solutions.

Correct Answers:

- A

Problem 2. (1 point)

Consider the following linear system:

$$\begin{aligned}-9x - 7y + 5z &= 0 \\4x - 3y + 6z &= 0\end{aligned}$$

Without performing any calculations or graphing anything, what can we say about the number of solutions to this system? Choose the best answer.

- A. This system has fewer equations than variables, so it could have no solutions or infinitely many solutions.
- B. This system has fewer equations than variables, so it has infinitely many solutions.
- C. Since this is a homogeneous linear system it has either one solution or infinitely many solutions.
- D. Since this is a homogeneous linear system with fewer equations than variables it has infinitely many solutions.

Correct Answers:

- D

Problem 3. (1 point)

Consider the following linear system:

$$\begin{aligned} -8x_1 - 7x_3 + 6x_4 &= -1 \\ -1x_1 + x_2 - 5x_3 - 7x_4 &= 7 \\ -6x_1 + 2x_2 + 10x_4 &= -10 \\ -x_1 + 5x_2 - 10x_3 + 9x_4 &= -4 \end{aligned}$$

What is the augmented matrix of this system?

- A. $\left[\begin{array}{cccc|c} 0 & -1 & 0 & 0 & -1 \\ -8 & 1 & -6 & 0 & 5 \\ -7 & -5 & 2 & 0 & -10 \\ 6 & -7 & 10 & 0 & 9 \\ -1 & 7 & -10 & 0 & -4 \end{array} \right]$
- B. $\left[\begin{array}{cccc|c} 0 & -8 & -7 & 6 & -1 \\ -1 & 1 & -5 & -7 & 7 \\ 0 & -6 & 2 & 10 & -10 \\ -1 & 5 & -10 & 9 & -4 \end{array} \right]$
- C. $\left[\begin{array}{cccc|c} -8 & -1 & -6 & 0 & -1 \\ 0 & 1 & 2 & 0 & 5 \\ -7 & -5 & 0 & 0 & -10 \\ 6 & -7 & 10 & 0 & 9 \\ -1 & 7 & -10 & 0 & -4 \end{array} \right]$
- D. $\left[\begin{array}{cccc|c} -8 & 0 & -7 & 6 & -1 \\ -1 & 1 & -5 & -7 & 7 \\ -6 & 2 & 0 & 10 & -10 \\ -1 & 5 & -10 & 9 & -4 \end{array} \right]$

Correct Answers:

- D

Problem 4. (1 point)

A linear system in the variables x_1 , x_2 , x_3 , x_4 , and x_5 has the following augmented matrix:

$$\left[\begin{array}{ccccc|c} 1 & -1 & 0 & -2 & 0 & 17 \\ 0 & 0 & 1 & 15 & 0 & 9 \\ 0 & 0 & 0 & 0 & 1 & -8 \end{array} \right]$$

What is the solution set for this system?

- A.
- B.
- C.
- D.

Correct Answers:

- D

Problem 5. (1 point)

Which of the following describe elementary row operations? Select all that apply.

- A. Adding Row 5 to Row 4
- B. Replacing Row 2 with $4(\text{Row } 1) + \text{Row } 3$
- C. Multiplying Row 1 by 0
- D. Dividing Row 5 by 6
- E. Adding Row 1 to Row 4 and also adding Row 4 to Row 1
- F. Replacing Row 2 with $3(\text{Row } 1) + \text{Row } 2$
- G. Switching Row 3 and Row 4
- H. None of the above

Correct Answers:

- ADFG