

Week 1 Conceptual Quiz

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Section: MATH301 001

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Problem 1. (1 point)

Which of the following equations are linear? Select all that apply.

- A. $3x + 6y - 4z = 9$
- B. $2x^2 + 4x - 7 = y$
- C. $7(x_1 + 6x_2) = 9(x_3 - x_2)$
- D. $(3x_1 - x_2)(5x_3 - x_4) = 9$
- E. None of the above are linear equations.

Correct Answers:

- AC

Problem 2. (1 point)

The linear system

$$\begin{aligned}-7x + 8y - 6z &= 1 \\ x + z &= 1\end{aligned}$$

has infinitely many solutions. Which of the following are solutions to this system? Select all that apply. (Note: you do not need to solve for all solutions to answer this question)

- A. $x = -1, y = 1, z = 2$
- B. $x = 1, y = 1, z = 0$
- C. $x = 1, y = \frac{7}{4}, z = 1$
- D. $x = 4, y = \frac{11}{8}, z = -3$
- E. None of the above are solutions to the system.

Correct Answers:

- BD

Problem 3. (1 point)

Consider the following linear system:

$$\begin{aligned}10x + 4y - 8z &= -8 \\10x - 3y - 2z &= -3 \\1x - 2y + 10z &= -2\end{aligned}$$

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 could have no solutions, one solution, or infinitely many solutions.
- B. This system has the same number of equations as variables, so it has either no solutions or exactly one solution.
- C. This system has the same number of equations as variables, so it has exactly one solution.
- D. This system has the same number of equations as variables, so it has at least one solution.

Correct Answers:

- A
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Problem 4. (1 point)

Consider the following linear system:

$$\begin{aligned}8x + 9y - 7z &= -7 \\-4x - 5y + 5z &= -90\end{aligned}$$

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 has either no solutions or infinitely many solutions.
- B. This system has fewer equations than variables, so it has at least one solution.
- C. This system has fewer equations than variables, so it has infinitely many solutions.
- D. This system could have no solutions, one solution, or infinitely many solutions.

Correct Answers:

- A
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Problem 5. (1 point)

Consider the following linear system:

$$\begin{aligned}3x + 1y + 1z &= -7 \\-3x - 1y - 1z &= 1 \\8x + 3y - 7z &= -1 \\-4x + 1y + 9z &= 5\end{aligned}$$

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 more equations than variables, so it has no solutions.
- B. This system has more equations than variables, so it has either no solutions or exactly one solution.
- C. This system has more equations than variables, so it has at least one solution.
- D. This system could have no solutions, one solution, or infinitely many solutions.

Correct Answers:

- D