

Name:

Collaborators:

Instructions: Worksheets are graded mostly on completion, and partially on correctness. Please write complete solutions showing explanations and key steps to the following problems, unless it says otherwise.

Types of Solutions

1. Unique Solution

A linear system with a *unique solution* has a solution set with one element.

Use Gaussian elimination to show that the following system has a unique solution (you do not need to apply back substitution):

$$x + y + z = 1$$

$$2x + 3y = 2$$

$$y + z = 3$$

Show each step clearly, including the operations you apply.

2. No Solution

A linear system with *no solution* has a solution set that is empty.

Use Gaussian elimination to show that the following system has no solution:

$$x + y + z = 1$$

$$2x + 2y + 2z = 1$$

$$x - y + z = 1$$

Show each step clearly, including the operations you apply.

3. Infinite Solutions

A linear system with *infinite solutions* has a solution set with many elements.

- a. Use Gaussian elimination to show that the following system has infinite solutions:

$$\begin{aligned}x + 2y - z &= 4 \\2x + 4y - 2z &= 8 \\3x + 6y - 3z &= 12\end{aligned}$$

Show each step clearly, including the operations you apply.

- b. Show the solution set in Part (a) in parametric form.