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.

Gaussian Elimination

1. Gauss's Method

Gaussian elimination is a systematic method for solving systems of linear equations by simplifying the equations step by step. It relies on three key operations:

- **(1) Swapping two equations**, which helps position a more convenient equation at the top, especially when the leading coefficient is one;
- **(2) Multiplying an equation by a non-zero constant**, which allows for easier manipulation and normalization of coefficients; and
- **(3) Adding or subtracting a multiple of one equation to another**, which is used to eliminate variables and simplify the system.

These rules are applied repeatedly to transform the system into a form where the solution becomes clear through back-substitution.

Use Gauss's method to solve the system of equations:

$$\begin{aligned} 2x - y + 3z &= 1 \\ -x + 4y + z &= 2 \\ x + y + z &= 0 \end{aligned}$$

Show each step clearly, including the operations you apply.

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