Proof SLE-2

Accepted **Not Accepted**

I affirm this work abides by the university's Academic Honesty Policy.

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Print Name, then Sign

- First due date **Thursday, September 24**
- Turn in your work on a separate sheet of paper with this page stapled in front.
- Do not include scratch work in your submission.
- There is to be **no collaboration** on any aspect of developing and presenting your proof. Your only resources are: you, the course textbook, me, and pertinent discussions that occur **during class.**
- Follow the Writing Guidelines of the Grading Rubric in the course information sheet.
- Retry: Only use material from the relevant section or earlier.
- Retry: Start over using a new sheet of paper.
- Retry: Restaple with new attempts first and this page on top.

"*It is by logic that we prove but by intuition that we discover.*" (Henri Poincaré)

SLE-2 (Section HSE) Let A be an $m \times n$ matrix and $LS\left(A, \vec{0}\right)$ be the corresponding homogeneous linear system of equations. Let $\vec{b}$ be a constant vector for which the system of linear equations $LS\left(A, \vec{b}\right)$ has a non-empty solution set S with the specific vector $\begin{bmatrix} \beta_1 \\ \beta_2 \\ \vdots \\ \beta_n \end{bmatrix}$ as one element of S. Finally, let $N(A)$ denote the null space of the matrix A.

Prove that $S = T$, where $T = \left\{ \begin{bmatrix} a_1 + \beta_1 \\ a_2 + \beta_2 \\ \vdots \\ a_n + \beta_n \end{bmatrix} \in \mathbf{C}^n : \begin{bmatrix} a_1 \\ a_2 \\ \vdots \\ a_n \end{bmatrix} \in N(A) \right\}$.
