Proof D-1

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, Nov 18**.

- 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 of the text or earlier.

- Retry: Start over using a new sheet of paper.

- Retry: Restaple with new attempts first and this page on top.

"By relieving the brain of all unnecessary work, a good notation sets it free to concentrate on more advanced problems, and, in effect, increases the mental power of the race." – Alfred North Whitehead

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D-1 (Section PDM)

Definition 1 _If A is an $n \times p$ matrix and $\vec{b}$ is a vector in $\mathbf{C}^n$ then the matrix M_k is the matrix obtained by replacing the kth column of A with the vector $\vec{b}$_

Prove the following theorem.

Theorem 1 _If A is a nonsingular matrix of size n then the unique solution to the system of equations $A\vec{x} = \vec{b}$ is the vector $\vec{x}$ whose kth component is $[\vec{x}]_k = \frac{\det(M_k)}{\det(A)}$_

Hint: Consider the matrix X_k obtained by replacing the kth column of the identity matrix with the vector $\vec{x}$.