**Proof M-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 **Friday, October** 16.
- 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.
  (http://math.ups.edu/ bryans/Current/Fall_2009/290inf_Fall2009.html#tth_sEc5.1)
- 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.

"*Often you must turn your stylus to erase, if you hope to write anything worth a second reading*". -Horace, poet and satirist (65-8 BCE)

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M-1 (Section MISLE)

1. Given an $m \times n$ matrix $A$ and an $n \times m$ matrix $B$ where $m > n$, prove that it is impossible to have the product $AB = I_m$.
2. Show that the order of multiplication is important by finding a specific $6 \times 4$ matrix $A$ and a specific $4 \times 6$ matrix $B$ where $BA = I_4$.
3. For bonus points, generalize your answer in part 2. That is, prove that for any positive integers $m$ and $n$ with $m > n$, then there is an $m \times n$ matrix $A$ and an $n \times m$ matrice $B$ with $BA = I_n$.

**Notes:**

- These matrices are not square so don't use results that require square matrices.
- One way to approach part 1 is to think about null spaces.
- For parts 2 and 3, consider $[2 \quad 0] \begin{bmatrix} \frac{1}{2} \\ 0 \end{bmatrix} = [1] = I_1$

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