Smith **Math 290** **Fall 2008**

Proof V-2 (Tightened Version)

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, October** 9.
- Turn in the the final version of your work on a separate sheet of paper with this page stapled in front.
- Do not include scratch work in your submission.
- Follow the Writing Guidelines of the Grading Rubric.
  (http://math.ups.edu/~bryans/Current/Fall_2008/290inf_Fall2008.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.

"'Know thyself?' If I knew myself, I'd run away." – Johann von Goethe

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V-1 (Section LI) You will need to read (and understand) the material in Proof Technique I (Mathematical Induction) on page 728 to comlete this problem.
First a definition.
Definition LIR, Linearly Independent Rows: Given a matrix A let S be the set of column vectors for the transpose of A, A^t.If the set S is linearly independent then we say the **rows of** A are **linearly independent.**
Prove the following Theorem

Theorem 1 *If the rows of a matrix A are linearly independent, then the rows of any matrix B that is row-equivalent to A must also be linearly independent.*

Notes:

1. The matrix B does not need to be in reduced row-echelon form.
2. First prove the theorem when B is obtained from A by a single elementary row operation. This will establish the base case.
3. Be careful with this problem. It is tempting to think as follows: the matrices A and B both row-reduce to the same matrix C which is in reduced row-echelon form. And if the column vectors of C are linearly independent, we have a theorem that tells us the **columns** of any matrix that row-reduces to C are also linearly independent. Note, however, that we do not have any theorems at all that tell us when **rows** of a matrix are linearly independent.
