

First draft due Sept 9

1. (5 points) $A = (a_{ij})_{m \times n}$ is an $m \times n$ matrix. Is it true that the reduced row echelon form of A is unique? Explain your reasoning completely.

2. (15 points)

a. Prove that the inverse of a matrix if it exists is unique. Identify the properties of matrix multiplication that you used in proving this.

b. If a symmetric matrix is invertible, is the inverse also symmetric? Why?

c. If a triangular matrix is invertible, is the inverse also triangular? Why?

d. If an integer matrix (a matrix whose entries are all whole integers) is invertible, is the inverse also an integer matrix? Why?

3. (5 points) "For two square matrices A and B , the product AB is invertible if and only if both A and B are. "

Give a proof of this statement to some one who does not know anything about determinants.

4. (3 points) Prove or Disprove: If A is row equivalent to B then A^T is row equivalent to B^T .

(A^T denotes the transpose of A .)

5. (2 points) Give an example of an invertible matrix C which is not elementary, symmetric or triangular. Justify your example.