MATH 280-01 (122)
HW # 2

Q1. Let A and B be symmetric matrices. Determine whether the following matrices must be symmetric or could be non-symmetric:
$D = AB + BA$
$G = AB - BA$

Q2. Let A and B be n x n matrices. Show that if $AB = A$ and $B \neq I$ then A must be singular.

Q3. A matrix A is said to be *idempotent* if $A^2 = A$. Give an example of a nonzero (not the identity) 2 X 2 idempotent matrix.

Q4. Show that if A is an idempotent matrix then $I - A$ is also idembpotent.

Q5. Let

$$A = \begin{bmatrix} A_{11} & A_{12} \\ O & A_{22} \end{bmatrix}$$

be a partitioned matrix. If A_{11} and A_{22} are nonsingular, show that A is nonsingular and find an expression for A^{-1}