Name: ______________________

Quiz 5

This quiz is graded out of 10 marks. No books, calculators, notes or cell phones are allowed. You must show all your work, the correct answer is worth 1 mark the remaining marks are given for the work. If you need more space for your answer use the back of the page.

Question 1. §1.7 #TF *(2 marks)* Determine whether the statement is true or false, and justify your answer.
If A and B are $n \times n$ matrices such that $A+B$ is symmetric, then A and B are symmetric.

Question 2. §1.7 #TF *(2 marks)* Determine whether the statement is true or false, and justify your answer.
If A^2 is a symmetric matrix, then A is a symmetric matrix.

Question 3. §1.6 #TF *(2 marks)* Determine whether the statement is true or false, and justify your answer.
If A and B are row equivalent matrices, then the linear systems $Ax = 0$ and $Bx = 0$ have the same solution set.

Question 4. §1.6 #TF *(2 marks)* Determine whether the statement is true or false, and justify your answer.
If A is an $n \times n$ matrix and S is an $n \times n$ invertible matrix, then if x is a solution to the linear system $(S^{-1}AS)x = b$, then Sx is a solution to the linear system $Ay = Sb$.

Question 5. §1.6 #TF *(2 marks)* Determine whether the statement is true or false, and justify your answer.
Let A be an $n \times n$ matrix. The linear system $Ax = 4x$ has a unique solution if and only if $A - 4I$ is an invertible matrix.

Question 6. *(3 marks)* Prove: If E_i are elementary matrices and $E_n \cdots E_2 E_1 A$ is invertible then A is invertible.

Question 7. *(3 marks)* Given a matrix A which satisfy $A^3 + 3A^2 + A + I = 0$ find the inverse of A in terms of A and the identity.