Name: _____

Quiz 5

This quiz is graded out of 15 marks. No books, watches, 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. *(3 marks)* Prove that if A is an invertible matrix and B is row equivalent to A, then B is also invertible.

Question 2. *(5 marks)* Let $Ax = 0$ be a homogeneous system of n linear equations in n unknowns, and let Q be an invertible $n \times n$ matrix. Prove that $Ax = 0$ has only the trivial solution if and only if $(QA)x = 0$ has only the trivial solution.

Question 3. *(3 marks)* We showed in class that the product of symmetric matrices is symmetric if and only if the matrices commute. Is the product of commuting skew-symmetric and symmetric matrices skew-symmetric? Explain.

Question 4. Determine whether the following statements are true or false for any $n \times n$ matrix A. If the statement is false provide a counterexample. If the statement is true provide a proof of the statement.

  a. *(2 marks)* If A^2 is a symmetric matrix, then A is a symmetric matrix.

  b. *(2 marks)* Elementary matrices are not row equivalent to the identity.