

Quiz 3

This quiz is graded out of 12 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 the product CAC^T is defined, then the matrix A must be a square matrix.

Question 2. Determine whether the following statements are true or false for any $n \times n$ matrices A and B . If the statement is false provide a counterexample. If the statement is true provide a proof of the statement.

1. (3 marks) If A and B are square matrices of the same order, then $\text{tr}(AB) = \text{tr}(A)\text{tr}(B)$.

2. (3 marks) If A and B are square matrices of the same order, then $(AB)^T = A^T B^T$.

3. (3 marks) If A is any matrix, then $\text{tr}(A^T A) \geq 0$.