

Quiz 4

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. §1.4 #TF (2 marks) Determine whether the statement is true or false, and justify your answer.
The sum of two invertible matrices of the same size must be invertible.

Question 2. §1.4 #TF (2 marks) Determine whether the statement is true or false, and justify your answer.
For all square matrices A and B of the same size it is true that $(A - B)^2 = A^2 - B^2$.

Question 3. §1.4 #31 (3 marks) Assuming that all matrices are $n \times n$ and invertible, solve for D .

$$C^T B^{-1} A^2 B A C^{-1} D A^{-2} B^T C^{-2} = C^T$$

Question 4. §1.4 #54b (3 marks) A square matrix A is said to be *idempotent* if $A^2 = A$. Show that if A is idempotent, then $2A - I$ is invertible and is its own inverse.