

Name: _____
Student ID: _____

Quiz 3

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. §1.3 Consider the matrices

$$A = \begin{bmatrix} 3 & 0 \\ -1 & 2 \\ 1 & 1 \end{bmatrix}, B = \begin{bmatrix} 4 & -1 \\ 0 & 2 \end{bmatrix}, C = \begin{bmatrix} 1 & 4 & 2 \\ 3 & 1 & 5 \end{bmatrix}, D = \begin{bmatrix} 1 & 5 & 2 \\ -1 & 0 & 1 \\ 3 & 2 & 4 \end{bmatrix}, E = \begin{bmatrix} 6 & 1 & 3 \\ -1 & 1 & 2 \\ 4 & 1 & 3 \end{bmatrix}$$

In each part, compute the given expression (where possible).

#4h. (2 marks) $(2E^T - 3D^T)^T$

#4d. (3 marks) $\text{tr}(C^T A^T + 2E^T)$

Question 2. §1.4 #54 A square matrix A is said to be *idempotent* if $A^2 = A$.

1. a. (2 marks) Show that if A is idempotent, then so is $I - A$.

2. b. (3 marks) Show that if A is idempotent, then $2A - I$ is invertible and is its own inverse.