Name: _____
Student ID: _____

Quiz 6

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. *(5 marks)* §2.1 #34 Show that the matrices

$$A = \begin{bmatrix} a & b \\ 0 & c \end{bmatrix}$$

and

$$B = \begin{bmatrix} d & e \\ 0 & f \end{bmatrix}$$

commute if and only if

$$\begin{vmatrix} b & a-c \\ e & d-f \end{vmatrix} = 0$$

Question 2. *(5 marks)* §2.2 #19 Decide whether the given matrix is invertible, and if so, use the adjoint method to find its inverse.

$$A = \begin{bmatrix} 2 & 5 & 5 \\ -1 & -1 & 0 \\ 2 & 4 & 3 \end{bmatrix}$$

Bonus Question.[1] A matrix X is called a *weak generalized inverse* of A if $AXA = A$

a. *(3 marks)* For what value of k is $\begin{bmatrix} k & k \\ k & k \\ k & k \end{bmatrix}$ a weak generalized inverse of $\begin{bmatrix} 1 & 1 & 1 \\ 1 & 1 & 1 \end{bmatrix}$.

b. *(2 marks)* Show that if the system $A\mathbf{x} = \mathbf{b}$ is consistent then $X\mathbf{b}$ will be a solution to this system

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[1] From a John Abbott Final Examination