Name: _____

Quiz 7

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. *(5 marks)* Consider two 4×4 matrices A and B, with $\det(A) = -2$ and $\det(B) = 3$. Find the determinant of M, knowing that $\det(2B^T MA^{-1}B) = \det(\text{adj}(A)A^2B)$. *Show every step!*

Question 2.[1] *(5 marks)* Let $\det\left(\begin{bmatrix} a & b & c \\ d & e & f \\ g & h & i \end{bmatrix}\right)$ be a nonzero value n. Use Cramer's Rule to solve for x_3 only in the system of linear equations below:

$$\begin{bmatrix} 1 & 0 & 0 & 0 \\ 0 & a & b & c \\ 0 & d & e & f \\ 0 & g & h & i \end{bmatrix} \begin{bmatrix} x_1 \\ x_2 \\ x_3 \\ x_4 \end{bmatrix} = \begin{bmatrix} 0 \\ 3b+2c \\ 3e+2f \\ 3h+2i \end{bmatrix}$$

Question 3.[2] *(2 marks)* Determine whether the following statement is true or false for any $n \times n$ matrix A and B. If the statement is false provide a counterexample. If the statement is true provide a proof of the statement.

If A is a skew-symmetric $n \times n$ matrix, i.e., $A^T = -A$, and n is odd then $\det(A) = 0$.

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[1] From a John Abbott Final Examination

[2] From a John Abbott Final Examination