

## Quiz 6

This quiz is graded out of 13 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) Find the determinant of the matrix  $A$  by first using a cofactor expansion.

$$A = \begin{bmatrix} 2 + 2\text{tr}(A) & \det(A) & 1 \\ -2 & 3 & 1 \\ 2 & 5 & 0 \end{bmatrix}$$

**Question 2.**<sup>1</sup> Given  $\det \begin{pmatrix} \begin{bmatrix} a & b & c \\ d & e & f \\ 1 & 1 & 1 \end{bmatrix} \end{pmatrix} = 3$ , compute the following determinants.

a. (3 marks)  $\begin{vmatrix} 2 & 2 & 2 \\ a & b & c \\ d-3 & e-3 & f-3 \end{vmatrix}$

b. (3 marks)  $\begin{vmatrix} 0 & 0 & 5 & 10 \\ a & d & 2 & 5 \\ b & e & 2 & 5 \\ c & f & 2 & 5 \end{vmatrix}$

**Question 3.** (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.

$$\det(A+B) = \det(A) + \det(B)$$

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<sup>1</sup>From a John Abbott Final Examination