

Books, watches, notes or cell phones are **not** allowed. The **only** calculators allowed are the Sharp EL-531***. You **must** show all your work, the correct answer is worth 1 mark the remaining marks are given for the work.

Question 1. (4 marks) Let A and B be two 3×3 matrices such that $\det(A) = 4$ and $\det(B) = -2$. Find $\det(4B^{-1}A^{-1} + \text{adj}(AB))$.

Question 2. (3 marks) Let A be a $n \times n$ matrix, such that n is odd if $A^2A^T + A^TA^2 = 0$, show that the system $A\mathbf{x} = \mathbf{0}$ has non-trivial solutions.

Question 3. (3 marks) Given $P(2, 3, -2)$ and $Q(7, -4, 1)$. Find the point on the line segment connecting the points P and Q that is $\frac{3}{4}$ of the way from P to Q .