MAU11S02 third Friday quiz, week 4
Friday 18/2/22 due 4pm Monday 21/2/22

Rules and procedures.
1. Attempt 3 questions. Only *your first three answers* will be marked. **2.** Each question carries 20 marks, so the maximum quiz mark is 60. **3.** If a particular method of solution is stipulated, you get no marks if you don't use it. **4.** ***Show all work.*** No marks will be given for answers which do not show the calculations. **5.** Your answers should be scanned and submitted to Blackboard as a 'Friday assignment.'

Question 1. Calculate the following determinant by cofactor expansion along the second column.

$$\begin{vmatrix} -1 & 2 & 2 & -2 \\ 2 & -5 & -4 & 6 \\ 3 & -9 & -6 & 11 \\ 1 & -1 & 0 & 2 \end{vmatrix}$$

Question 2. Calculate the same determinant again, by bringing the matrix to upper triangular form.

Question 3. Calculate a basis for the plane $2x + 7y + z = 0$. That is, find column vectors S and T such that the general solution to $2x + 7y + z = 0$ is $[x, y, z]^T = sS + tT,\ s, t \in \mathbb{R}$.

Question 4. The vectors $P = (1, 2, -2)$, $Q = (1, 2, -4)$, and $R = (0, -2, 2)$, are a basis for $\mathbb{R}^3$.

Find the unique α, β, γ such that $(3, 0, -2) = \alpha P + \beta Q + \gamma R$.

Question 5. Let A be a square matrix such that $\det(A) = 5$. (i) What is $\det(A^{-1})$? (ii) If A is a 2×2 matrix, with determinant 5, what is $\det(\mathrm{Adj}(A))$?