MAU11S02 third Monday quiz, week 4
Monday 14/2/22 due 12 noon Thursday 17/2/22

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 'Monday assignment.'

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

$$\begin{bmatrix} -1 & 1 & -1 & 3 \\ 1 & -3 & 7 & -13 \\ 3 & 0 & -4 & 4 \\ 2 & -1 & -1 & -3 \end{bmatrix}$$

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

Question 3. Calculate a basis for the plane $3x + 4y + z = 0$. That is, find column vectors S and T such that the general solution to $3x + 4y + z = 0$ is $[x, y, z]^T = sS + tT,\ s, t \in \mathbb{R}$.

Question 4. The vectors $P = (1, 3, 2)$, $Q = (2, 5, 4)$, and $R = (1, 2, 2)$, are a basis for $\mathbb{R}^3$.

Find the unique α, β, γ such that $(1, 3, 4) = \alpha P + \beta Q + \gamma R$.

Question 5.

If $\det A = 5$, what is $\det((A^{-1})^5)$? Note: the identity matrix has determinant 1. Give the answer as a decimal number.