MAU11S02 fourth Friday quiz, week 5
Friday 25/2/22 due 4pm Monday 28/2/22

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. Find bases for the row space and column space of the following matrix.

$$\begin{bmatrix} 0 & 1 & 1 & 3 & 9 \\ 1 & 3 & 4 & 12 & 35 \\ 3 & 6 & 9 & 28 & 80 \\ -3 & -6 & -9 & -27 & -78 \end{bmatrix}$$

Question 2. Find a basis for the nullspace (kernel) of the matrix in Question 1.
Question 3. (i) Calculate the (perpendicular) projection of the point $(2, 1, 1)$ onto the line OW where $W = (2, -3, 6)$ (not a unit vector).

(ii) Calculate the projection of the point $(2, 1, 1)$ onto the plane through O perpendicular to OW.
Question 4. Calculate the point obtained by rotating the point $(2, 1, 1)$ through $45°$ around the line OW, where $W = (2, -3, 6)$.
Question 5. Calculate the point obtained by rotating the point $(2, 1, 1)$ through $60°$ around the line OW, where $W = (2, -3, 6)$.