MAU11S02 fourth Monday quiz, week 4
Monday 21/2/22 due 12 noon Thursday 24/2/22

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

$$\begin{bmatrix} -1 & -1 & -5 & 5 & 7 \\ -3 & -5 & -21 & 19 & 25 \\ 3 & 4 & 18 & -16 & -21 \\ 1 & -1 & -1 & -3 & -7 \end{bmatrix}$$

Question 2. Find a basis for the nullspace (kernel) of the matrix in Question 1.

Question 3. (i) Calculate the projection of the point $(2, 1, 4)$ onto the line OW where $W = (1, 2, 2)$ (not a unit vector).

(ii) Calculate the projection of the point $(2, 1, 4)$ onto the plane through O perpendicular to OW.

Question 4. Calculate the point obtained by rotating the point $(2, 1, 4)$ through $45°$ around the line OW, where $W = (1, 2, 2)$.

Question 5. Calculate the point obtained by rotating the point $(1, 2, 3)$ through $60°$ around the line OW, where $W = (1, -1, 2)$.