MAU11S02 Group A1 Quiz 03 9am 12/2/20

Rules and procedures.
1. Answers must be handed up at the end of the tutorial, no other time. **2.** Attempt 3 questions. Only *your first three answers* will be marked. **3.** Each question carries 20 marks, so the maximum quiz mark is 60. **4.** Marked quizzes will be returned, and answers published, the following week. **5.** If a particular method of solution is stipulated, you get no marks if you don't use it. **6.** The (9) quizzes will contribute 20% to your overall mark. **7.** You are allowed to collaborate and compare answers during the tutorial. **8.** ***Show all work.*** No marks will be given for answers which do not show the calculations.

Question 1. Calculate the determinant of the matrix below by cofactor expansion along the 4th column. Hint: the $3,4$-cofactor is -3.

$$\begin{bmatrix} -1 & -1 & 1 & -5 \\ 2 & 2 & -1 & 9 \\ 2 & 3 & -4 & 14 \\ 1 & 4 & -9 & 17 \end{bmatrix}$$

Question 2. Calculate the above determinant by bringing to upper triangular form. Hint: the 3rd row of the UTF matrix should be $[0, 0, 1, -1]$.

Question 3. Calculate the determinant of the *inverse* matrix

$$A^{-1} = \begin{bmatrix} 1 & 2 & 3 \\ 0 & 4 & 5 \\ 0 & 0 & 6 \end{bmatrix}^{-1}$$

Question 4. Is the fifth (last) column vector in the list a linear combination of the first four? of the first three? of columns 1, 2, and 4?

$$\begin{bmatrix} -1 \\ -2 \\ 0 \end{bmatrix}, \quad \begin{bmatrix} 2 \\ 6 \\ -1 \end{bmatrix}, \quad \begin{bmatrix} 1 \\ 0 \\ -1 \end{bmatrix}, \quad \begin{bmatrix} 0 \\ -2 \\ -1 \end{bmatrix}, \quad \begin{bmatrix} 5 \\ 12 \\ -5 \end{bmatrix}$$

Question 5. Do the first three columns in Question 4 span $\mathbb{R}^3$? The first four? Columns 1,2, and 4?