MAU11S02 Group A1 Quiz 04 9am 20/2/19

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 10 marks, so the maximum quiz mark is 30. **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.

Question 1. Give bases for the row and column spaces of the following matrix

$$\begin{bmatrix} -2 & 2 & 0 & -2 \\ 1 & 1 & 4 & 5 \\ -3 & 2 & -2 & -5 \end{bmatrix}$$

Question 2. Give a basis for the nullspace (kernel) of the above matrix. **Note** The example in the notes is correct, but it was written incorrectly on the board last Thursday. The column-vectors in the nullspace should have had 6 entries, but only 5 were given.

Question 3. Show that

$$\begin{bmatrix} 7 \\ 6 \\ 6 \end{bmatrix}, \quad \begin{bmatrix} 1 \\ 2 \\ 2 \end{bmatrix}, \quad \begin{bmatrix} 2 \\ 3 \\ 2 \end{bmatrix}$$

is a basis for $\mathbb{R}^3$.

Question 4. Given that the basis in Question 3 is the 'new' basis, convert the column vector $[3\ 1\ 4]^T$ given in 'new' coordinates, to 'old' coordinates.

Question 5. Given that the basis in Question 3 is the 'new' basis, convert the column vector $[3\ 1\ 4]^T$ given in 'old' coordinates, to 'new' coordinates.