Please show **all** your work! Answers without supporting work will not be given credit.
Clearly mention what theorem(s), if any, you are using.
Write answers in spaces provided.
You have 25 minutes to complete this Quiz.
You can get MAXIMUM $((5+1+2+2)+5+5=)20$ marks.

Name:

1. Consider the system of linear equation

$$x_4 + 2x_5 - x_6 = 2$$
$$x_1 + 2x_2 + x_5 - x_6 = 0$$
$$x_1 + 2x_2 + 2x_3 - x_5 + x_6 = 2$$

   (a) Write down the augmented matrix and transform it into its Reduced Row-Echelon Form. Show all the operations performed.

   (b) What is the rank of the coefficient matrix?

   (c) Which ones are the leading variables and which ones are free variables?

   (d) Find the set of solutions.

2. Find the matrix A corresponding to the linear transformation

$$T\left(\begin{bmatrix} a \\ b \\ c \end{bmatrix}\right) = \begin{bmatrix} 2a + b - 2c \\ 3b - c \end{bmatrix}$$

3. Compute the following matrix product

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