University of Technology Sydney
Department of Mathematical and Physical Sciences

37233 Linear Algebra
Tutorial Assignment 7

Question 1.

Find a basis of the column space of matrix $\mathbf{A}$

$$\mathbf{A} = \begin{pmatrix} 1 & -2 & 7 & 5 \\ -2 & -1 & -9 & -7 \\ 1 & 13 & -8 & -4 \end{pmatrix}.$$

Question 2.

Find a basis of the null space of matrix $\mathbf{B}$

$$\mathbf{B} = \begin{pmatrix} 1 & -2 & 3 & 0 & -1 \\ 2 & -4 & 7 & -3 & 3 \\ 3 & -6 & 8 & 3 & -8 \end{pmatrix}.$$

Question 3.

Illustrate the effects of the linear transformation T with the standard matrix $\mathbf{R}$

$$\mathbf{R} = \begin{pmatrix} 1 & 0 \\ 0 & -1 \end{pmatrix}$$

by mapping its action on unit square in R^2.

Question 4.

Let T be the linear transformation whose standard matrix is given by the matrix $\mathbf{A}$ (see **Question 1**). Is this transformation one-to-one? Justify your answer.

Question 5.

Let T be the linear transformation whose standard matrix is given by the matrix $\mathbf{B}$ (see **Question 2**). Is this transformation onto? Justify your answer.