Take home homeworkNameMATH 3100.101Linear Algebra etcUSA30 April 2022

Due date: 9 May 2022.

Working together is OK. Using matrix algebra calculators is also OK. However, turn your *own* version of work in in *handwritten* form. Give exact answers where possible, no approximations unless explicitly stated. So 1/3 is OK where 0.3333333 may be wrong.

## 1.

(a) Find the diagonalization decomposition of the matrix (so-called 'diagonalize the matrix')

 $\begin{bmatrix} 1 & x \\ x & 1 \end{bmatrix}$ 

where x is an arbitrary real number.

(b) Find the diagonalization decomposition of the matrix (so-called 'diagonalize the matrix')

 $\begin{bmatrix} 1 & 0 & -1 \\ 0 & 1 & 0 \\ x & 0 & 1 \end{bmatrix}$ 

where x < 0 is an arbitrary real number.

(c) What happens in case (b) above when x > 0? What happens in case (b) above when x = 0?