Student Name	Student ID

Question Number	I	II	III	IV	Total
Mark					

Instructions

- Use any trusted source of information with proper citation and no plagiarism
- Work on this assignment as groups of three or four

[I] (a) What is MATLAB?

(b) Use MATLAB to define and plot the function $f(x,y) = \cos(x^2 + 3y) + 2\sin(e^y + 4x)$.

[II] (a) Write a MATLAB function for Newton's Algorithm (Program 2.3, Page 35 in [1]).

(b) Use the function in (a) to find the root of $2\sqrt{x} - 5^{-x}$ on $[0,1]$ with accuracy 10^{-4}.

[III] For $A = \begin{bmatrix} 1 & 1 & 3 & 0 \\ 2 & 5 & 6 & 2 \\ 0 & 0 & 5 & 2 \\ 1 & 4 & 3 & 2 \end{bmatrix}$ and $b = \begin{bmatrix} 1 \\ 0 \\ 1 \\ -1 \end{bmatrix}$, use MATLAB functions to compute

(a) The Reduced Row Echelon Form of the augmented matrix $[A|b]$.

(b) $\det(A)$, A^{-1}, A^2, A^T.

(c) The solution x of the linear system $Ax = b$.

[IV] (a) Use any Built-in MATLAB function to find the roots of $x^4 - 2x^2 + 5x - 8$.

(b) What are the numerical techniques behind the function you used in (i)?

[1] An Introduction to Numerical Methods and Analysis Using MATLAB, Rizwan Butt, 2021.

Good Luck ☺