Tasks for 29/08/2022:

***Root finding 2:** Solve the equation $f(x) = x^3 - 0.165x^2 + 3.993 \times 10^{-4}$ using Newton-Raphson method for a given error limit of *e=0.0001*.

1) With initial guess of *x(0) = 0.05*.
2) With initial guess of *x(0)=0.11*,

Why does the 2nd case do not offer any solution? You may start of by plotting the function.

3) Can you find another initial guess which will lead to no solution? Explain why.
4) Now take e = [0.1 0.01 0.001 0.0001 0.00001 0.000001 …] and plot *e vs* the number of steps needed for convergence (*N*).

Root finding 3: Now find the roots for the polynomial of last problem (root finding 2) by method of bisection. See if choosing *x(0)=0.11* as one of the initial bound work. Compare the number of iterations it takes to converge to a root. Also check *x*= 1.8 as the starting point

***Newton-Raphson for finding reciprocal of a number:** The reciprocal of a real number *a* is defined as a zero of the function: $f(x) = 1/x - a$.

The function converges for an initial estimate in the range $0 < x_0 < 2/a$.

a) Write a matlab code that will be able to find the reciprocal of any real number using Newton-Raphson method. Do not set an error limit. Rather let the code run for a fixed number of 50 iterations

b) Plot the error propagation (by comparing the outcome of the code and 1/*a*) and plot is as a function of the iteration

***Diagonal dominance of matrix:** Consider the square matrices:

A =[-6 2 1 2 1;

3 8 -4 1 0;

-1 1 4 10 1;

3 -4 1 9 2;

2 0 1 3 10]

B=[18 3 6 -3;

9 13 -5 2;

-3 -2 4 9;

6 0 11 3]

Write a code to see is the matrices A and B are diagonally dominant. In case if they are not, make the code display a message like “Not strictly diagonally dominant on row (row number)”