Concordia University
FACULTY OF ENGINEERING AND COMPUTER SCIENCE

COURSE	NUMERICAL METHODS IN ENGINEERING – ENGR391
EXAMINATION ASSIGNMENT 1	TERM Winter 2018
Name	
ID	
Section	
Instructions:	• Solve the problem below using MATLAB. • Write your final answers in the box below. • Annotate your MATLAB code to explain it. • On Moodle, submit 2 files: one *.m* file for your Matlab code and one .pdf • Use your last name and ID as the name of the files you submit, e.g. *lastname_idnumber.m & lastname_idnumber.pdf* • Submission deadline is February 15th at 5:45 pm

Problem statement:

- Write a MATLAB user-defined function that solves for a root of a nonlinear equation $f(x) = 0$ using the Bisection method. Name the function `Xs=BisectionRoot(Fun,a,b)`. The output argument `Xs` is the solution. The input argument `Fun` is a name for the function that calculates $f(x)$ for a given x (it is a dummy name for the function that is imported in `BisectionRoot`); `a` and `b` are two points that bracket the root. The iterations should stop when the tolerance in f is smaller than 0.000001. The program should check if points `a` and `b` are on opposite sides of the solution. If not, the program should stop and display an error message.
  Note: The tolerance in f is $|f(x_{TS}) - f(x_{NS})|$, where $f(x_{TS}) = 0$
- Use $BisectionRoot$ to determine the root of $f(x) = x - 2e^{-x}$. Start with $a = 0$ and $b = 1$.

FINAL ANSWERS:

$x_{NS} =$ 0.85261
number of iterations = 18