MATH 3511

Name: _____

Date: _____

Collaborators:

(Collaborators submit their individually written assignments together)

Question:	1	2	3	Total
Points:	25	25	10	60
Score:				

Instructor/grader comments:

Finite difference

1. (25 points) Use finite differences to solve the following boundary value problem:

 $x u'' + u' + x u = -x[4\sin(x) + 5x\cos(x)], \qquad u(0) = 0, \quad u(\pi/2) = -\pi^2/4.$

Plot your solution for n = 100 nodes along with the exact solution $u(x) = -x^2 \sin(x)$. Plot the error of your solution on another graph.

Provide axes labels, grids, legends, and titles for your graphs.

Place the commands clear, clf at the top of your script.

Place the code you wrote for this part of the homework into a matlab file hw07p1.m

2. (25 points) Use finite differences to solve the following boundary value problem:

$$-u'' + u = -8 + 16x^2 - x^4, \qquad u(0) = 0, \quad u(1) = 3.$$

Plot your solution for n = 100 nodes along with the exact solution $u(x) = x^2(4 - x^2)$. Plot the error of your solution on another graph.

Provide axes labels, grids, legends, and titles for your graphs.

Place the commands clear, clf at the top of your script.

Place the code you wrote for this part of the homework into a matlab file hw07p2.m

Gitlab

3. (10 points) Create a gitlab project called **hw07** (name it exactly as shown). Upload **all** Matlab files that are needed to run your code.

Share the project with the instructor and the grader and grant them **Reporter** privileges.