Midterm 1
APPM/MATH 4650 Fall '20 Numerical Analysis

Due date: Saturday, September 26, before 3 PM, via Gradescope and Canvas. **Instructor**: Prof. Becker

Instructions There are **two components** to this midterm, with separate rules:

50 points The online Canvas "quiz" which is true/false or multiple choice. You have up to **45 minutes** to complete this. Please do this *before* doing the second component of the test. This component of the test is **closed note, closed book, closed computer/calculator/phone**, meaning that you should not use any resource other than your mind and scratch paper.

100 points The written part (with questions listed below on this document). You have up to **2 hours** to complete this. This component of the test is **open note**, and you **can use the Burden and Faires textbook** (9th or 10th edition), and you can **use Matlab/python or a calculator for simple things** (i.e., for programming things from scratch, and using low-level functionality like core Numpy routines). You may *not* use Matlab/python's builtin root-finders, for example. You **cannot use the internet** other than for uploading to Gradescope, or checking Canvas/Piazza, or connecting to `colab` or something similar. In particular, you may **not use wikipedia or stackexchange websites** with the exceptions of looking up trigonometric identities.

This exam only works if you follow the CU Honor Code. Violating the rules of the exam are simply not fair to your fellow students. Do not discuss any aspect of this exam with other students until after 3 PM Saturday.

Have questions? Please ask on Piazza (and use your judgment about whether to make it a private or public post). Prof. Becker will be actively answering questions from 3–5 PM Friday. After that, he will check for questions infrequently, though TAs may occasionally check too.

On neither portion of the exam are you allowed to use a symbolic math program (graphing calculator, Mathematica, Maple, Desmos, Sage, Wolfram Alpha, Matlab/Python with symbolic packages, etc.). You *can* use a calculator if you want. You *can* write your answers on a tablet if you like (alternatively, write on paper and take a picture or scan it).

Problem 1: [25 points]

Problem 2: [25 points]

Problem 3: [25 points]

Problem 4: [25 points]