New York City College of Technology
MAT 3770/D676 - Fall 2019
Homework 4

Homework 4 consists of two problems. It is due on **12/16 at 10:00 am**.
Make sure to follow the instructions:

- The collection will be done on CoCalc only.
- E-mail submission will not be accepted.
- Go to the course project (not the shared project) and look for the folder named Homework 4. In this folder you will find a file named "yourlastname_hw4". Rename it by changing "yourlastname" to your actual last name. This file is ready for your to run newton.sage. This is where you will work on.
- When you are done, leave a pdf version of your homework in the same folder.
- No late submission will be accepted.

1. (Exercise 1, 3.5) Reconsider the pig problem of Example 1.1, but now suppose that the price for pigs after t days is $p = 0.65e^{-(.01/.65)t}$ dollars/pound.
   (a) Find the optimal time to sell the pig using Newton's method. Use the five-step method, and model as a one-variable optimization problem. Graph the profit function to justify your choice for the initial point.
   (b) The parameter 0.01 represents the rate at which price is falling at time $t = 0$. Perform a sensitivity analysis on this parameter by considering an increase of 1%. Consider both the best time to sell and the resulting net profit. Graph the profit function to justify your choice for the initial point.
2. (Exercise 3, 1.4) Reconsider the pig problem of Example 1.1, but now assume that the price for pigs is starting to level off. Let $p = 0.65 - 0.01t + 0.00004t^2$ represent the price for pigs (cents/lb) after t days. The parameter 0.00004 represents the rate at which price is leveling off. Conduct a sensitivity analysis on this parameter. Consider both the optimal time to sell and the resulting profit.