**Name: Session:**

**Programming I**

**Lab Exercise 10.8.2019**

For each of these problems, you are to print out your documented source code, attach it to the back of this sheet and turn it in.

1. According to the Coulomb force law, the electric force between two charged particles of charge *Q*1 and *Q*2 Coulombs, that are a distance *r* meters apart, is

 Newtons, where ε = 8.854 × 10−12 Farads/meter.

Write a program that calculates and displays the force on a pair of charged particles, based on the user input of *Q*1 Coulombs, *Q*2 Coulombs, and *r* meters.

1. It is easy to draw graphs of curves with the graphics module. Simply draw 100 line segments joining the points (*x*, *f*(*x*)) and (*x* + *d*, *f*(*x* + *d*)), where *x* ranges from *x*min to *x*max and *d* = (*x*max − *x*min )/100. Draw the curve *f* (*x*) = 0.00005*x*3 − 0.03*x*2 + 4*x* + 200, where *x* ranges from 0 to 400 in this fashion.
2. Repeat problem 2 using Pylab to plot the data.
3. Having a secure password is a very important practice, when much of our information is stored online. Write a program that validates a new password, following these rules:

• The password must be at least 8 characters long.

• The password must have at least one uppercase and one lowercase letter.

• The password must have at least one digit.

Write a program that asks for a password, then asks again to confirm it. If the

passwords don’t match or the rules are not fulfilled, prompt again. Your program

should include a function that checks whether a password is valid.