**Name: Session:**

**Programming I**

**Lab Exercise 10.3.2024**

For each of these problems, you are to submit your documented source code.

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.