Problem 1

The electric potential for the charge density, $\rho(x, y) = sin(2\pi x)sin^2(\pi y)$, is given by this plot below:
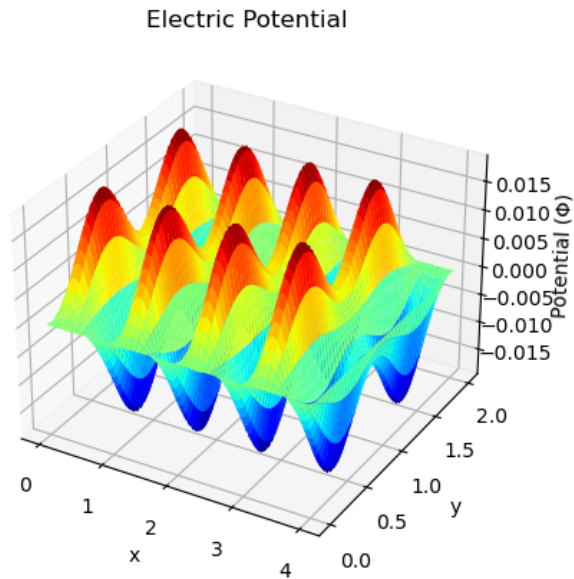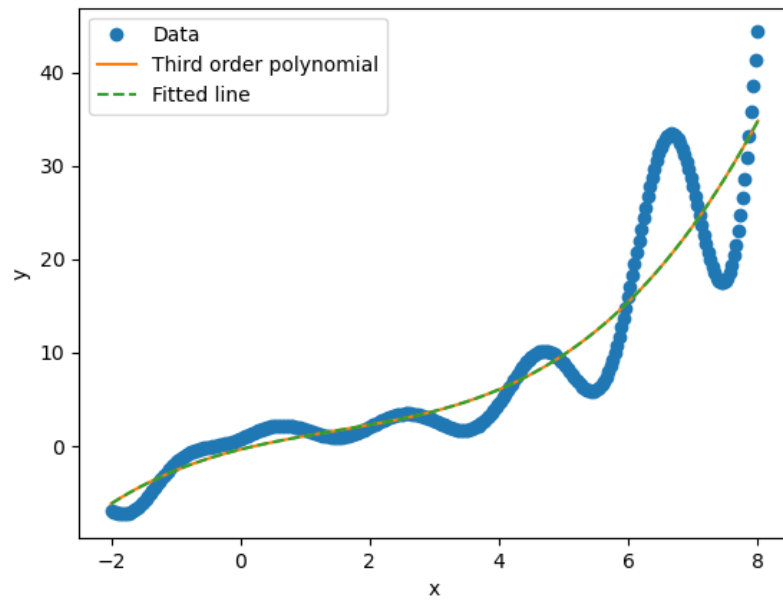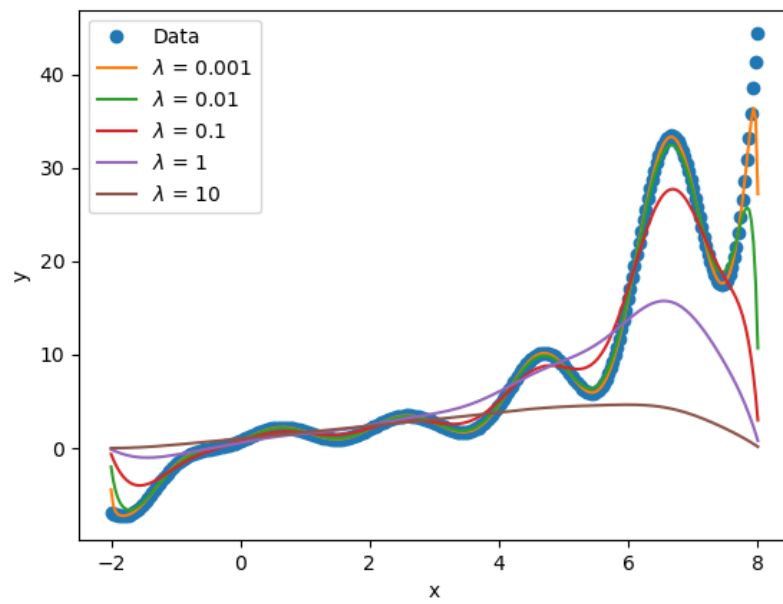

Figure 1: Electric Potential

Problem 2 and 3

I made a third order polynomial fit using a custom-made function `FitDatatoLine` and the `numpy` function `polyfit`. The results are shown below:

I also made a plot with different λ values to fit the data and smaller λ values seem to fit the data better. The results are shown below:

Problem 4

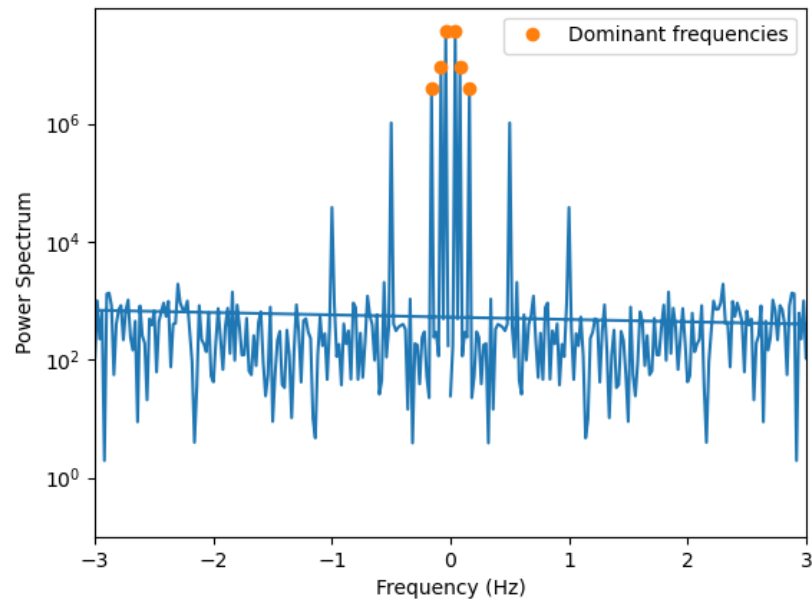Here is the power spectrum of the data:

Figure 2: Power Spectrum

The three most dominant frequencies are: 1. 0.15992 Hz 2. 0.07996 Hz 3. 0.03998 Hz