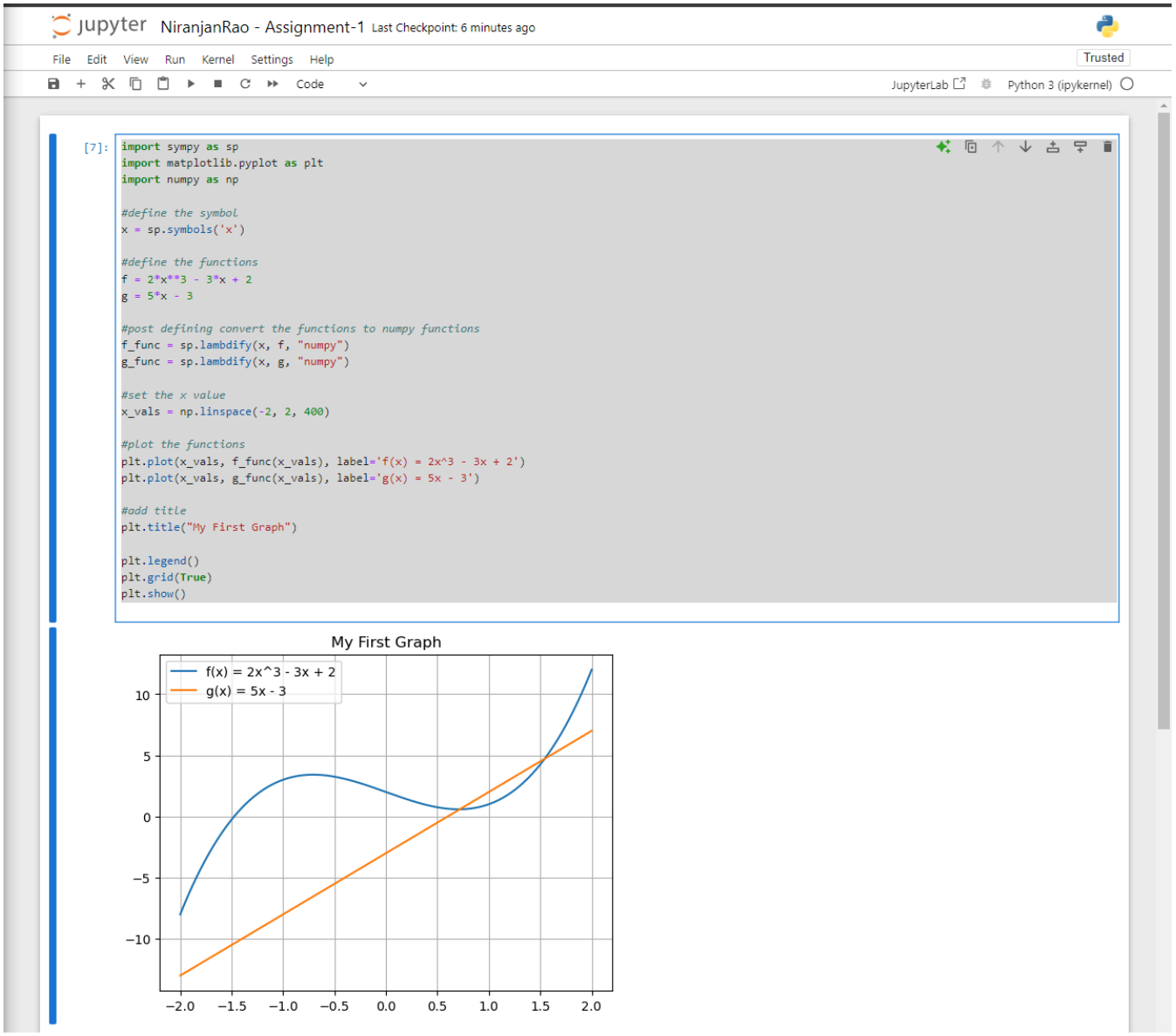
DATA 220 - ASSIGNMENT 1

a) Task was to plot two functions in one graph namely f(x) and g(x) using sympy. In order to do this I shall make use of 2 more libraries namely matplotlib in order to plot the graph and numpy inorder to convert sympy expressions into python expressions.

After importing all the 3 libraries we first define the x symbol and then define the given functions. After that we convert the given functions into numpy functions using lambdify. After this things become straightforward, we set up the x value and plot the functions using matplot lib. Using plt.title I give the title My First graph and plot the graph.



b) The second graph is a bit tricky since there are 3 variables which means it is a 3D graph. I will be using the same 3 libraries sympy, matplotlib and numpy. Similar to the first graph I first define the x and y symbol, then define the function and convert the defined function to a numpy function which will help me convert sympy expression to python expression.

Then I set the project to 3d and generate values to create a grid over which I can plot the 3d graph.

jupyter NiranjanRao - Assignment-1 Last Checkpoint: 10 minutes ago

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Code

JupyterLab Python 3 (ipykernel)

[9]:

```
import sympy as sp
import matplotlib.pyplot as plt
import numpy as np

#define symbols
x, y = sp.symbols('x y')

#define function
z = 3*x**2 - y**2

#convert the function to numpy function
z_func = sp.lambdify((x, y), z, "numpy")


fig = plt.figure()
ax = fig.add_subplot(111, projection='3d')

#generate values inorder to create a grid over which we can plot the graph
X, Y = np.linspace(-5, 5, 400), np.linspace(-5, 5, 400)
X, Y = np.meshgrid(X, Y)
ax.plot_surface(X, Y, z_func(X, Y), cmap='viridis')

plt.show()
```