Homework Plotting

Problem 1

Creat a plot of $e^{-x}sin(4x)$ and $e^{-x}cos(4x)$ from 0 to 5.

Change the line color for $e^{-x}sin(4x)$ to red, and $e^{-x}cos(4x)$ to blue. Adjust the line width to 2.0. Add legend, xlabel, ylabel, and plot title.

Problem 2

Create 4 subplots of $y_1 = x$, $y_2 = x^2$, $y_3 = x^3$, and $y_4 = x^{0.5}$. Use 10 points between $x = 0$ to $x = 10$. For $y_1 = x$ use red circles, $y_2 = x^2$ use green dashes, $y_3 = x^3$ use blue triangles, and $y_4 = x^{0.5}$ use black squares. Also give each subplot a title. Include a command to save the figure as a PNG file so that it can be imported into another program such as Microsoft Powerpoint.

Problem 3

Plot x and y, and x and z. Make the x,y points red circles and the x,z points blue squares. Change the x axis limits to 0 to 120, change the y axis limits to -300 to 300, and change the marker size of the x,y points to 10.

```
import numpy as np
import random
x=np.arange(0,100)
y=np.zeros(len(x))
z=np.zeros(len(x))

for i in range(len(x)):
    y[i] = 2.0*x[i] + 50*random.random()
    z[i] = 250*random.random() - 2.0*x[i]
```

Problem 4

The following Gross Domestic Product (GDP) data is reported for the top 8 countries by economy size for 2013-2015 in billions of dollars.

- **Country, 2014, 2015**
- United States, 17,348.1, 17,947.0
- China, 10,430.7, 10,982.8
- Japan, 4,596.2, 4,123.3
- Germany, 3,874.4, 3,357.6
- United Kingdom, 2,991.7, 2,849.3
- France, 2,833.7, 2,421.6
- India, 2,042.6, 2,090.7
- Italy, 2,141.9, 1,815.8

a) Create a bar chart to display the percentage change in economic output for 2015 from the prior year.

```
import numpy as np
years = np.array([2014,2015])
data = np.array([[17348.1, 17947.0],[10430.7, 10982.8],\
                 [4596.2, 4123.3],[3874.4, 3357.6],\
                 [2991.7, 2849.3],[2833.7, 2421.6],\
                 [2042.6, 2090.7],[2141.9, 1815.8]])
countries = ['US','China','Japan','Germany','UK','France','India','Italy']
```

b) Create a pie chart to display the 2014 data for the top 8 world economies. With a Gross World Product (GWP) of about $77,960 billion, display a 9th category that includes the combined GDP for all other countries.