Plotting in Python - Using Matplotlib Pyplot Taught by examples:

import Numpy and the plotting module as:

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

1. Plot a single curve with axis labels, a title and a legend

```
# a single graph
x = np.linspace(-1,1,1000)  # generate the x-data

# doing this the hard way first ...
y=np.zeros_like(x)  # create storage for y
for i in range(len(x)):  y[i]=x[i]*np.exp(x[i])

# or do this the numpy easy way ...
y = x*np.exp(x)

plt.plot(x,y,label='y=x*exp(x)')  #plot the data
plt.xlabel('x')  # x-axis label
plt.ylabel('f(x)')  # y-axis label
plt.title('Plotting a single curve on a graph')
plt.legend(loc='upper left') # location of the legend
plt.show()  #show it
```

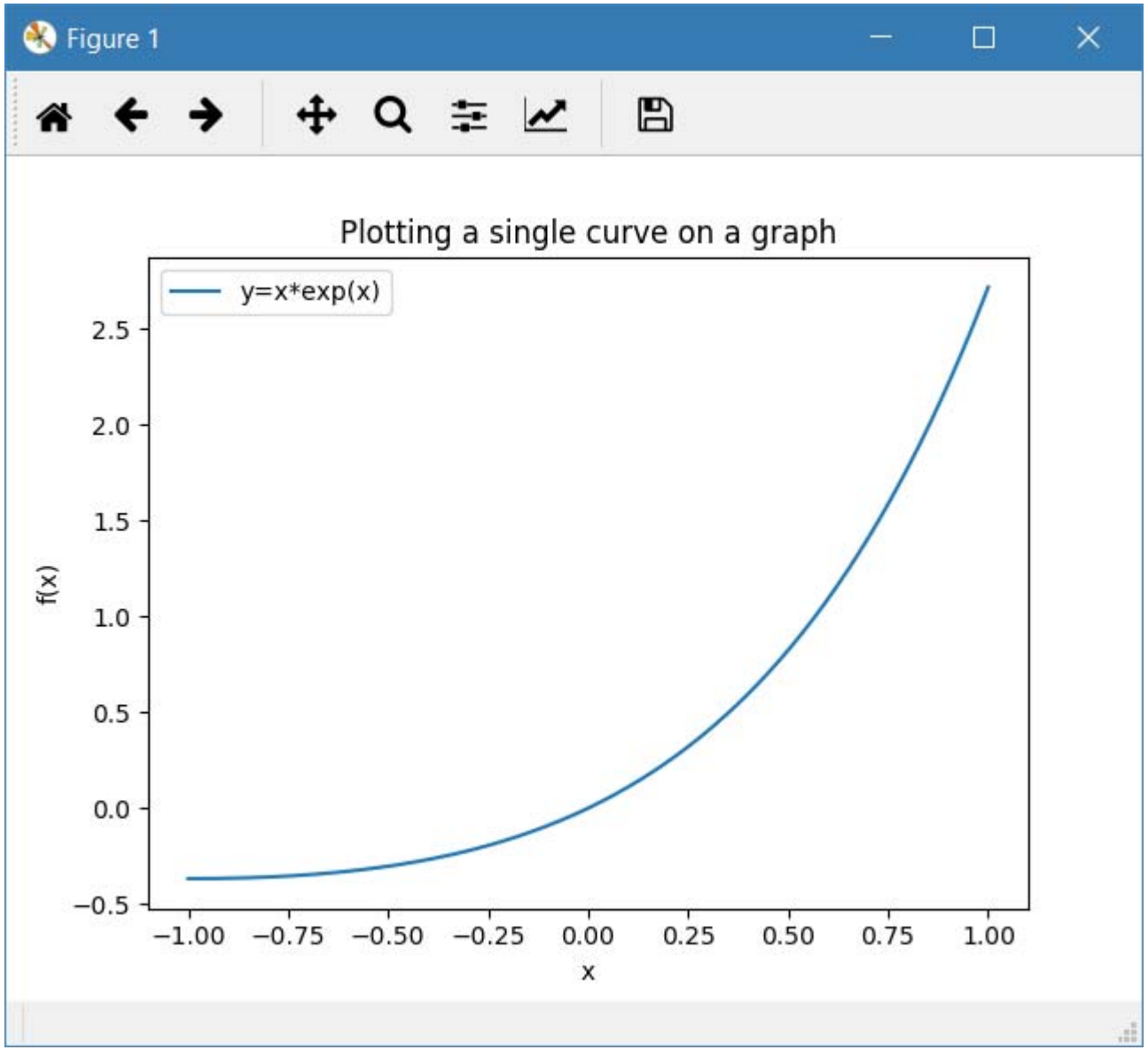
Figure 1
Plotting a single curve on a graph
y=x*exp(x)
2.5
2.0
1.5
1.0
0.5
0.0
−0.5
f(x)
−1.00
−0.75
−0.50
−0.25
0.00
0.25
0.50
0.75
1.00
x

2. Plot a single curve with axis labels, a title and a legend - with slight differences from the previous plot

```
# put the label in the legend statement
x = np.linspace(0,1,1000)
y = np.exp(-x)*np.sin(20*x)
plt.plot(x,y, '--r')  # set the color, no label
plt.xlabel('x')
plt.ylabel('f(x)')
plt.title('Plotting a single curve on a graph')

# define the label in the legend statement
plt.legend(['y=exp(-x)*sin(10x)'],loc='upper right')
plt.show() # show the plot
```

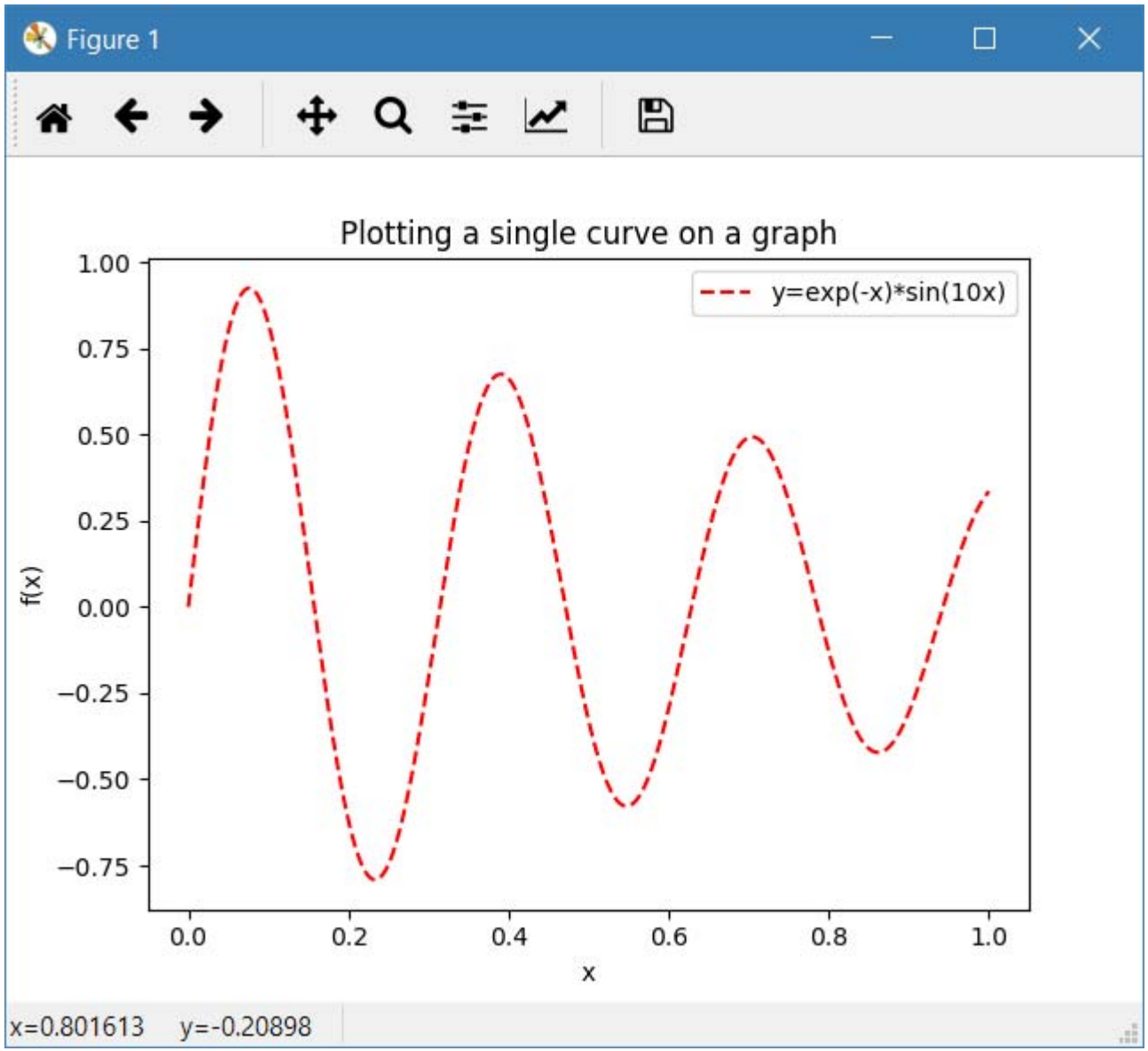
Figure 1
Plotting a single curve on a graph
y=exp(-x)*sin(10x)
1.00
0.75
0.50
0.25
0.00
−0.25
−0.50
−0.75
f(x)
0.0
0.2
0.4
0.6
0.8
1.0
x
x=0.801613 y=-0.20898

3. Plot two curves on the same graph with axis labels, a title and a legend

```
# two curves on the same graph
x = np.linspace(0,4*np.pi,1000) # notice np.pi
y1 = np.cos(x) # notice np.cos() and np.sin()
y2 = np.sin(x)
plt.xlabel('x')
plt.ylabel('f(x)')
plt.plot(x,y1,'--r')  # red dashed line
plt.plot(x,y2,'g')  #solid green line
plt.legend(['y = x*exp(x)','y = sin(x)'],loc='upper right')
plt.show()
```

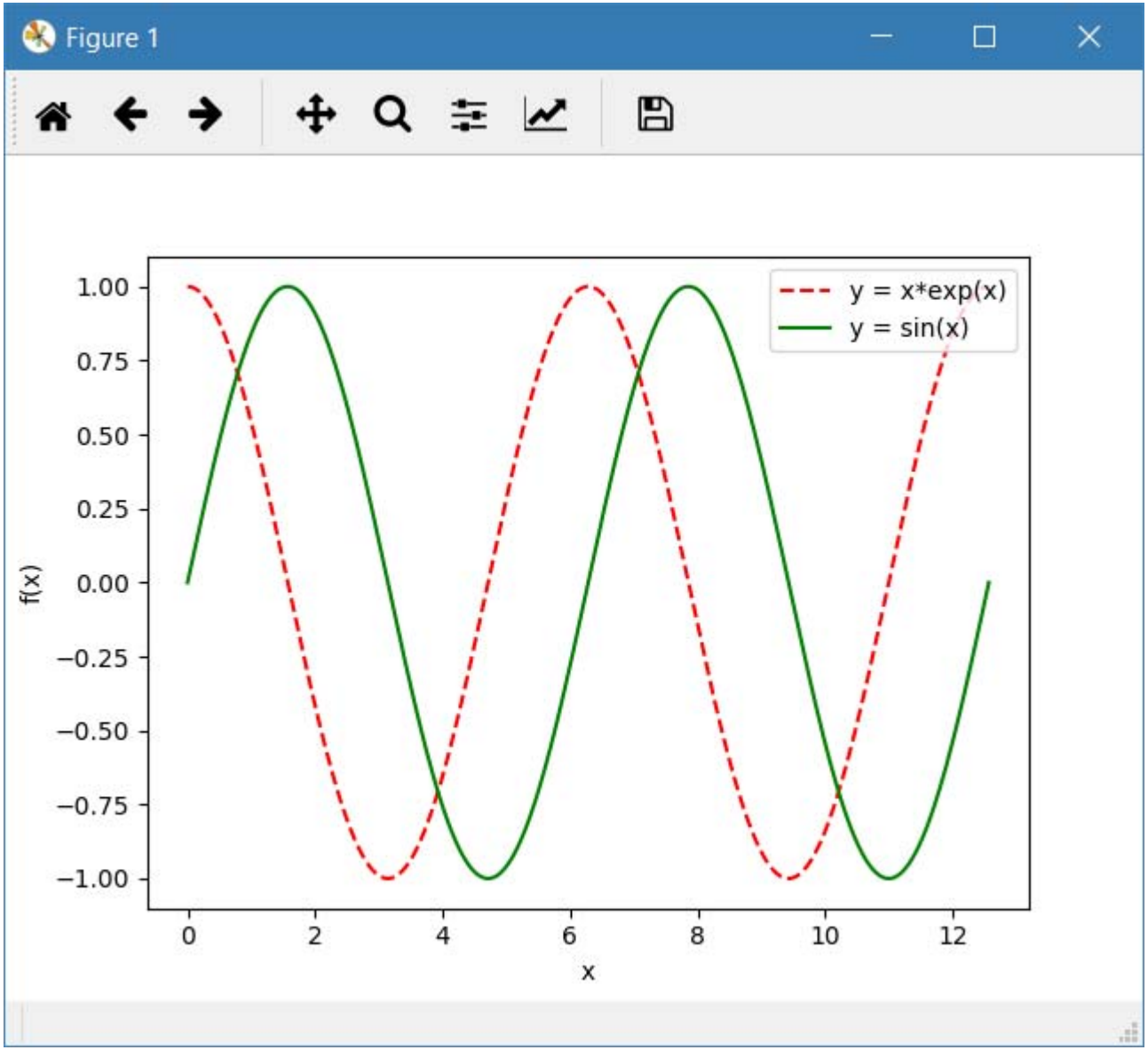
Figure 1
y = x*exp(x)
y = sin(x)
1.00
0.75
0.50
0.25
0.00
−0.25
−0.50
−0.75
−1.00
f(x)
0
2
4
6
8
10
12
x