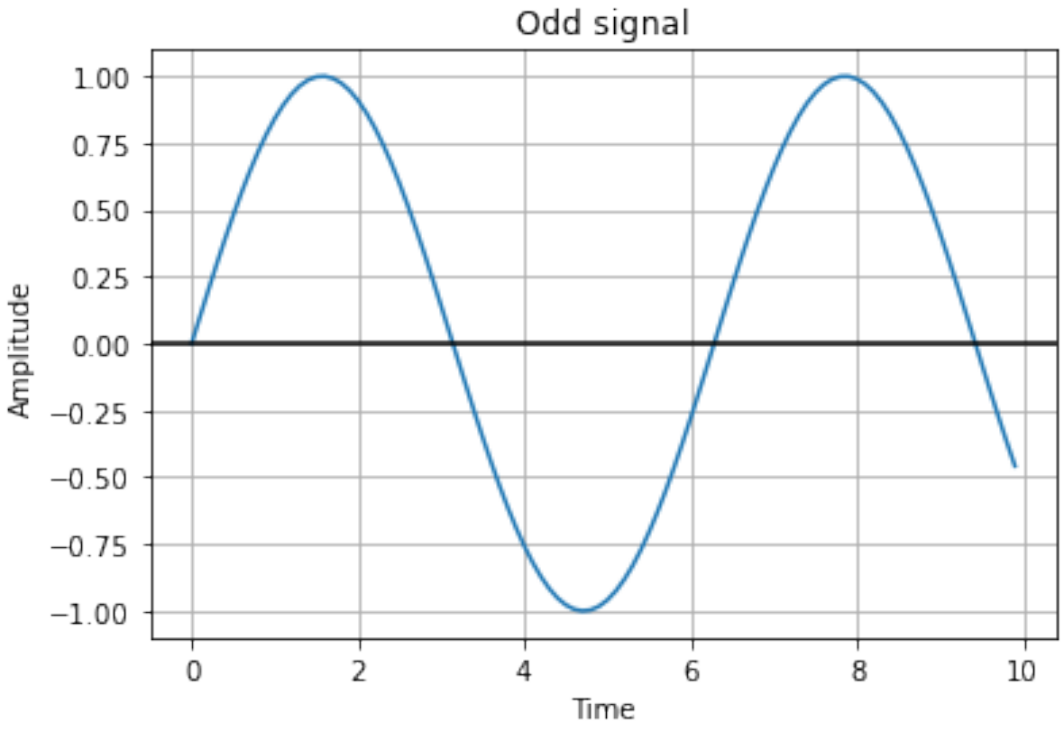
1 a) Odd Signal

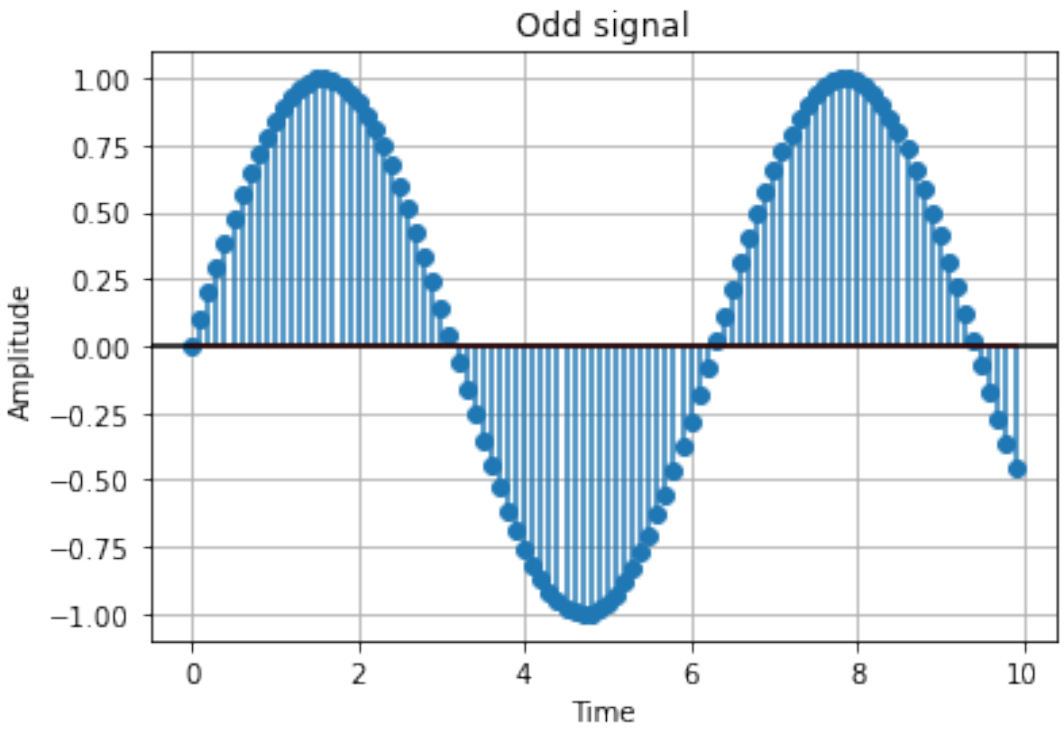
```
import matplotlib.pyplot as plt
import numpy as np

time = np.arange(0, 10, 0.1)
amplitude = np.sin(time)

plt.plot(time, amplitude)
plt.title('Odd signal')
plt.xlabel('Time')
plt.ylabel('Amplitude')
plt.grid(True, which='both')
plt.axhline(y=0, color='k')
plt.show()

plt.stem(time, amplitude,use_line_collection = 'true')
plt.title('Odd signal')
plt.xlabel('Time')
plt.ylabel('Amplitude')
plt.grid(True, which='both')
plt.axhline(y=0, color='k')
plt.show()
```





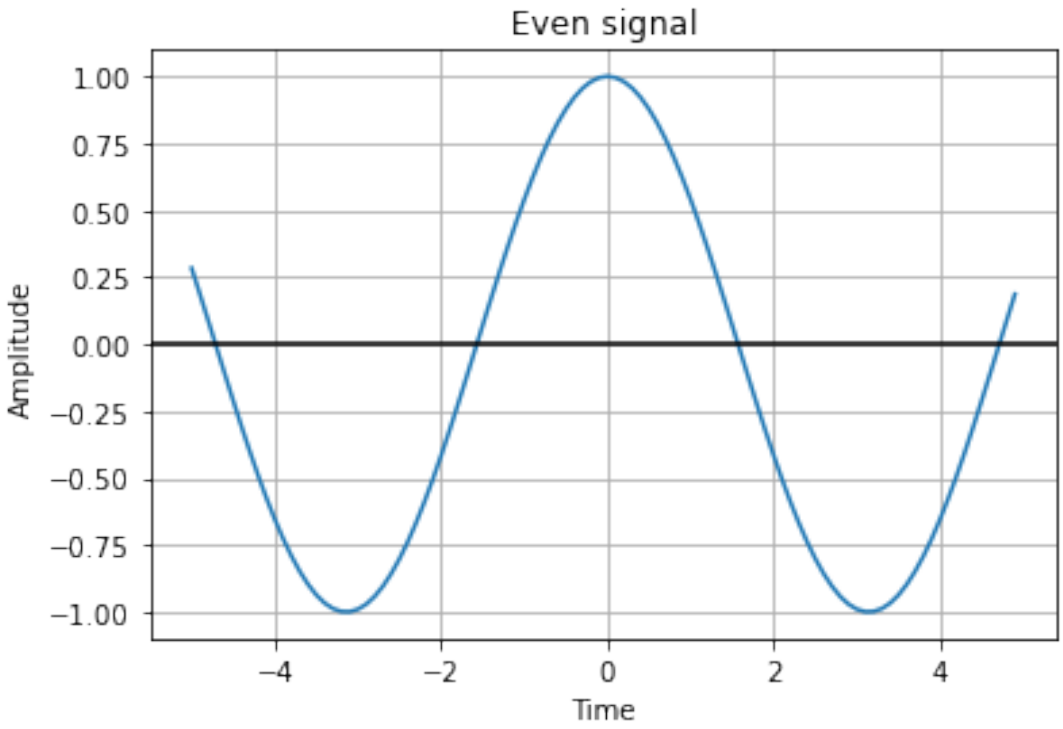
b) Even Signal

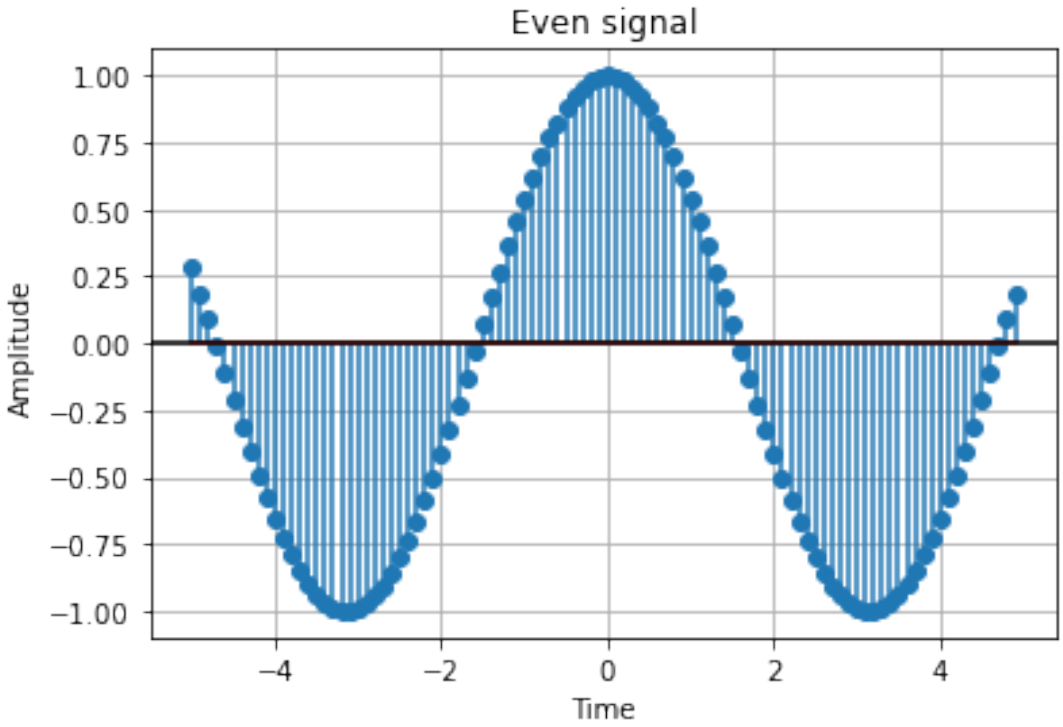
```
import matplotlib.pyplot as plt
import numpy as np

time = np.arange(-5, 5, 0.1)
amplitude = np.cos(time)

plt.plot(time, amplitude)
plt.title('Even signal')
plt.xlabel('Time')
plt.ylabel('Amplitude')
plt.grid(True, which='both')
plt.axhline(y=0, color='k')
plt.show()

plt.stem(time, amplitude,use_line_collection = 'true')
plt.title('Even signal')
plt.xlabel('Time')
plt.ylabel('Amplitude')
plt.grid(True, which='both')
plt.axhline(y=0, color='k')
plt.show()
```





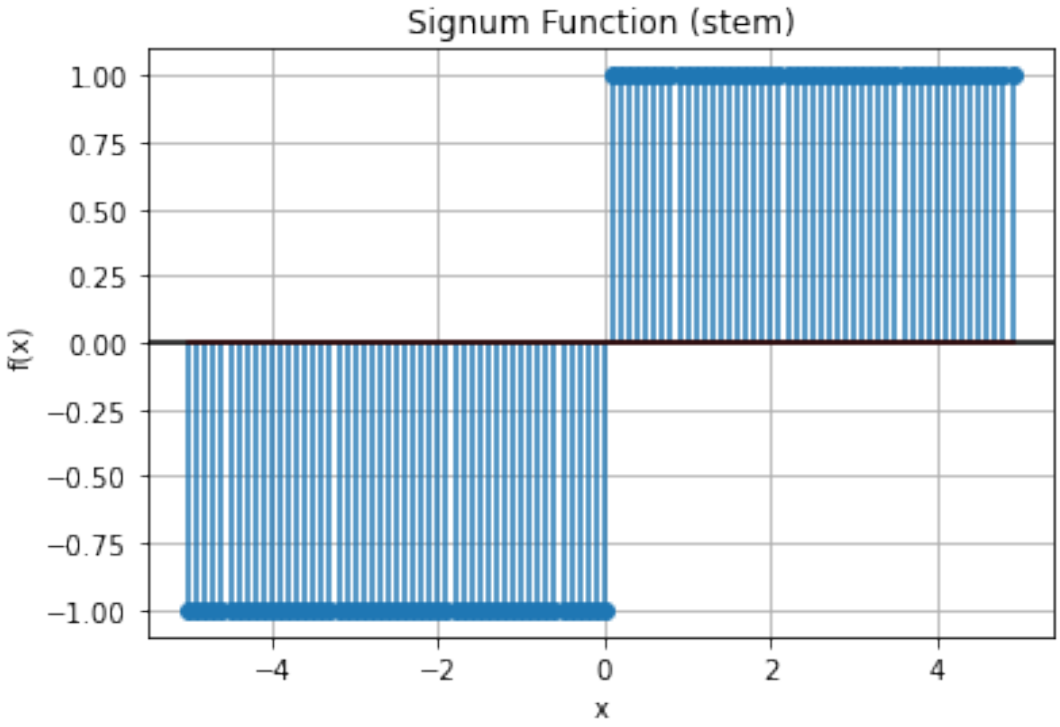
c) Signum Function

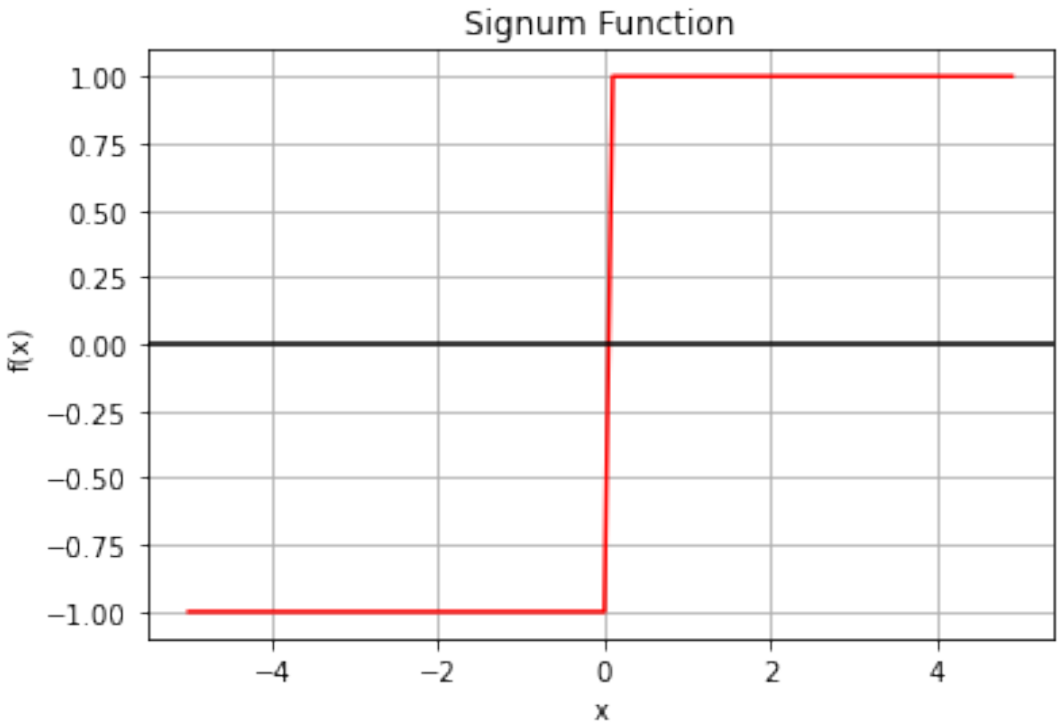
```
import matplotlib.pyplot as plt
import numpy as np
```

```
time = np.arange(-5, 5, 0.1)
f = (np.sign(time))

plt.stem(time,f,use_line_collection = 'true')
plt.title('Signum Function (stem)')
plt.xlabel('x')
plt.ylabel('f(x)')
plt.grid(True, which='both')
plt.axhline(y=0, color='k')
plt.show()

plt.plot(time,f,color='red')
plt.title('Signum Function')
plt.xlabel('x')
plt.ylabel('f(x)')
plt.grid(True, which='both')
plt.axhline(y=0, color='k')
plt.show()
```





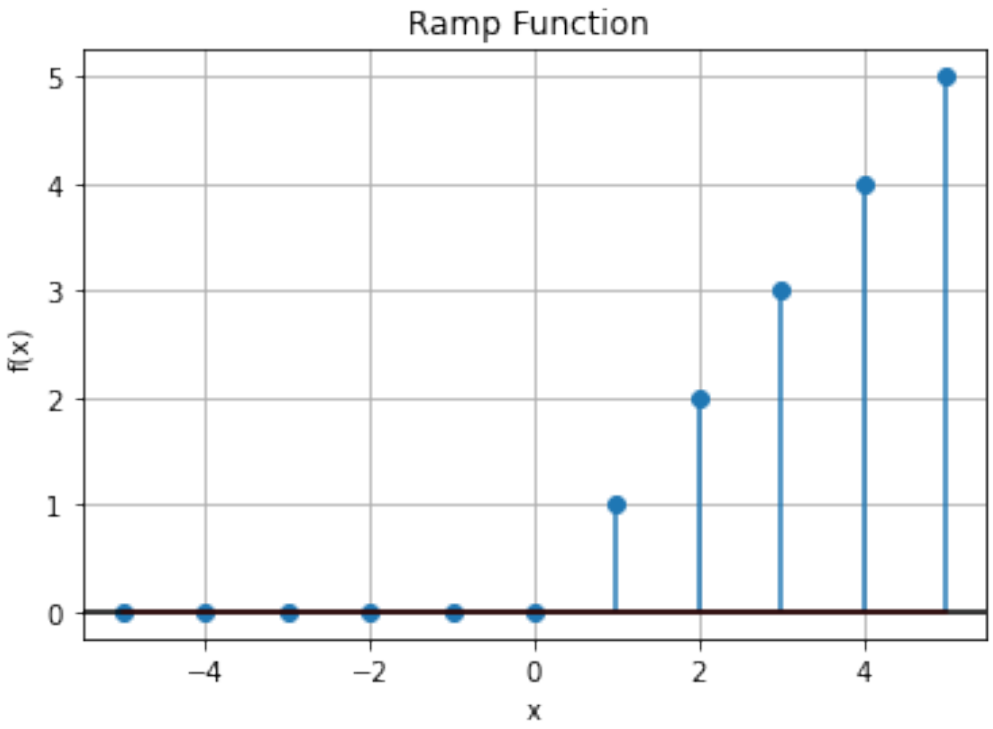
d) Unit Ramp Function

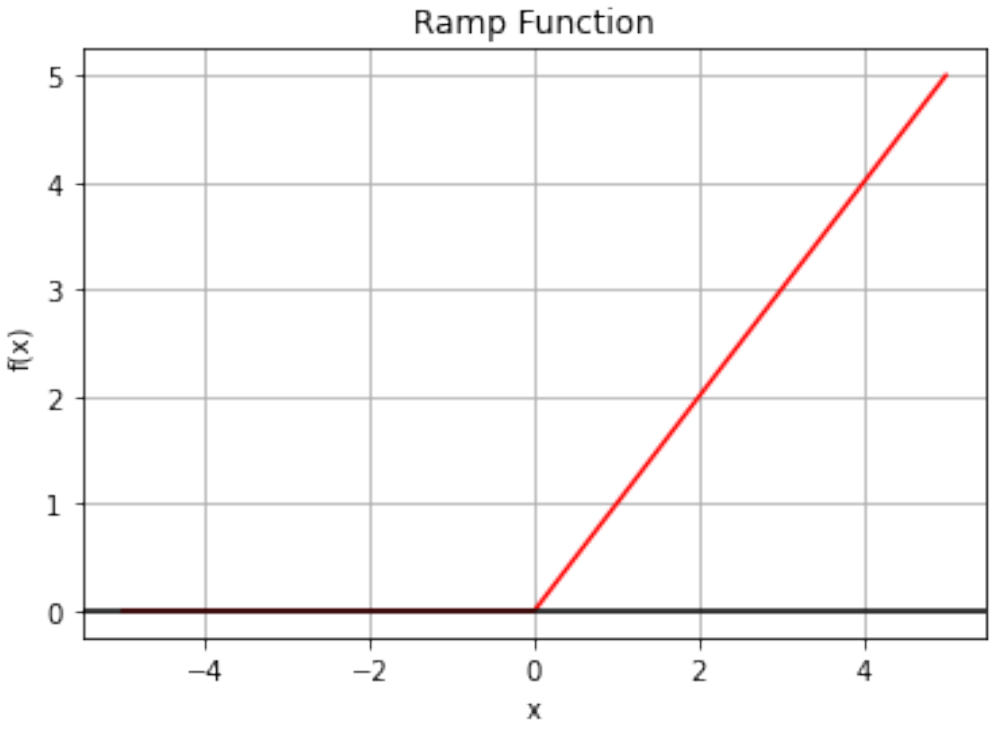
```
import matplotlib.pyplot as plt
import numpy as np

time = np.arange(-5, 6, 1)
f = (time + abs(time))/2

plt.stem(time,f,use_line_collection = 'true')
plt.title('Ramp Function ')
plt.xlabel('x')
plt.ylabel('f(x)')
plt.grid(True, which='both')
plt.axhline(y=0, color='k')
plt.show()

plt.plot(time,f,color='red')
plt.title('Ramp Function')
plt.xlabel('x')
plt.ylabel('f(x)')
plt.grid(True, which='both')
plt.axhline(y=0, color='k')
plt.show()
```





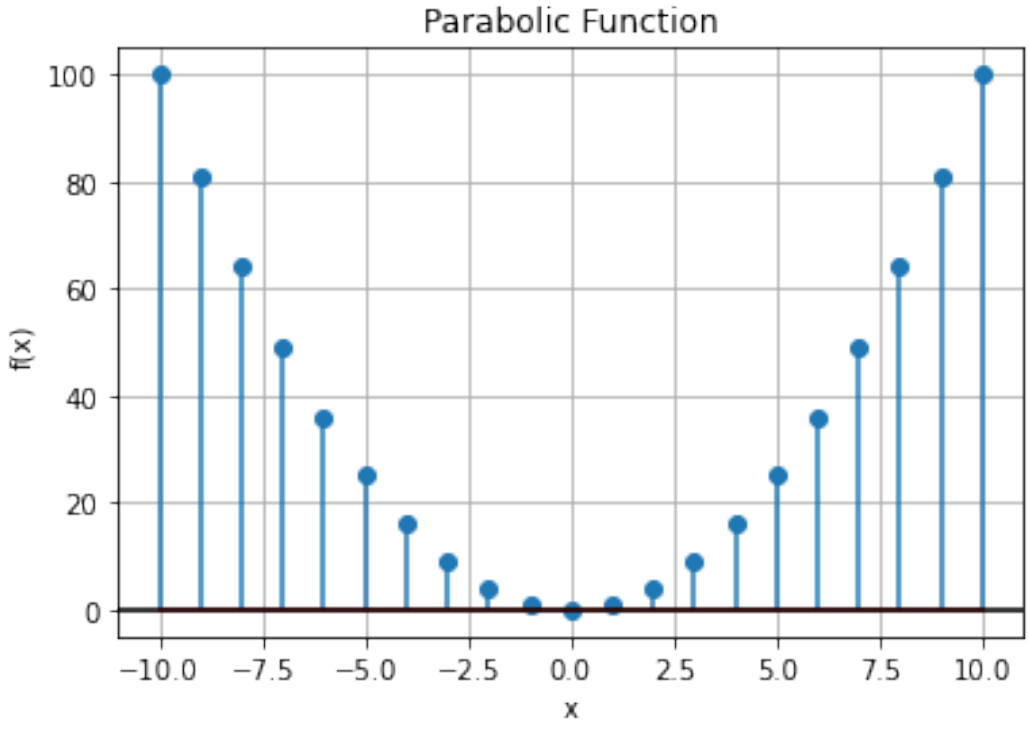
e) Parabolic Function

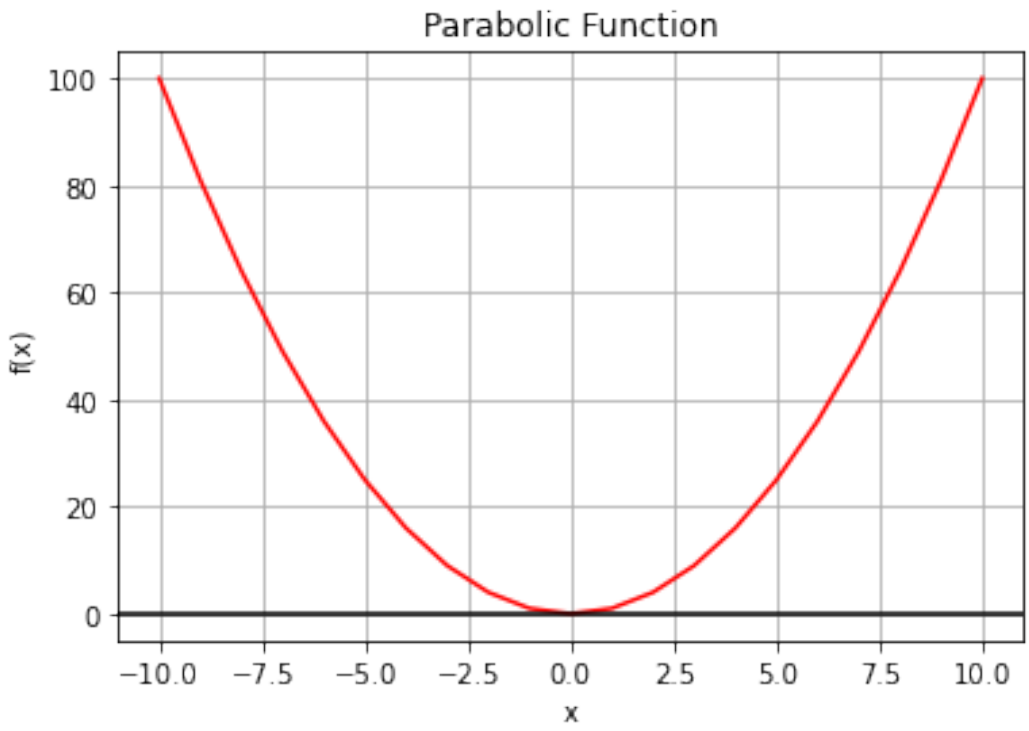
```
import matplotlib.pyplot as plt
import numpy as np
```

```
time = np.arange(-10, 11, 1)
f = time**2

plt.stem(time,f,use_line_collection = 'true')
plt.title('Parabolic Function')
plt.xlabel('x')
plt.ylabel('f(x)')
plt.grid(True, which='both')
plt.axhline(y=0, color='k')
plt.show()

plt.plot(time,f,color='red')
plt.title('Parabolic Function')
plt.xlabel('x')
plt.ylabel('f(x)')
plt.grid(True, which='both')
plt.axhline(y=0, color='k')
plt.show()
```





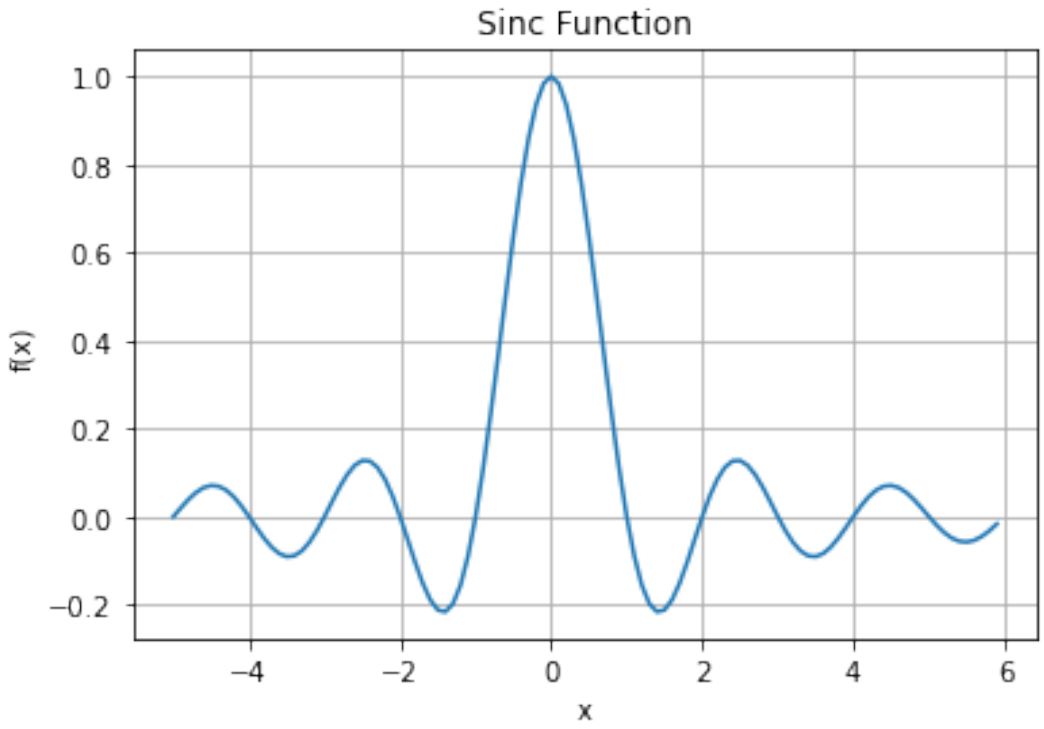
f) Sinc Function

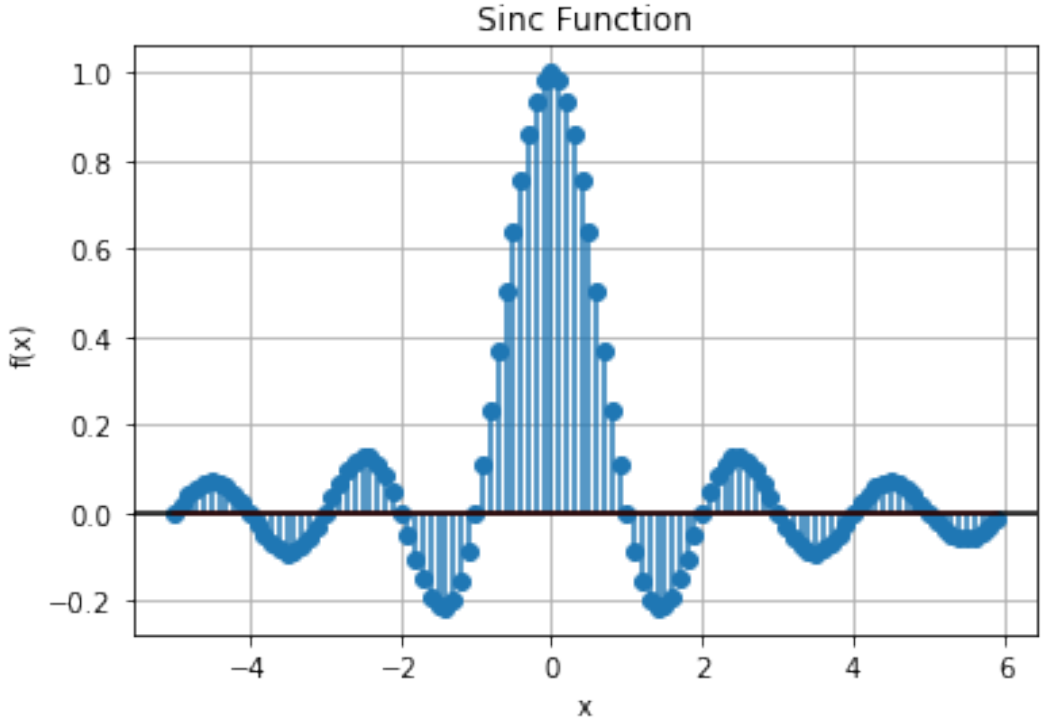
```
import matplotlib.pyplot as plt
import numpy as np

time = np.arange(-5, 6, 0.1)
amp = np.sinc(time)

plt.plot(time,amp)
plt.title("Sinc Function")
plt.xlabel('x')
plt.ylabel('f(x)')
plt.grid(True, which='both')
plt.show()

plt.stem(time, amp,use_line_collection = 'true')
plt.title("Sinc Function")
plt.xlabel('x')
plt.ylabel('f(x)')
plt.grid(True, which='both')
plt.axhline(y=0, color='k')
plt.show()
```





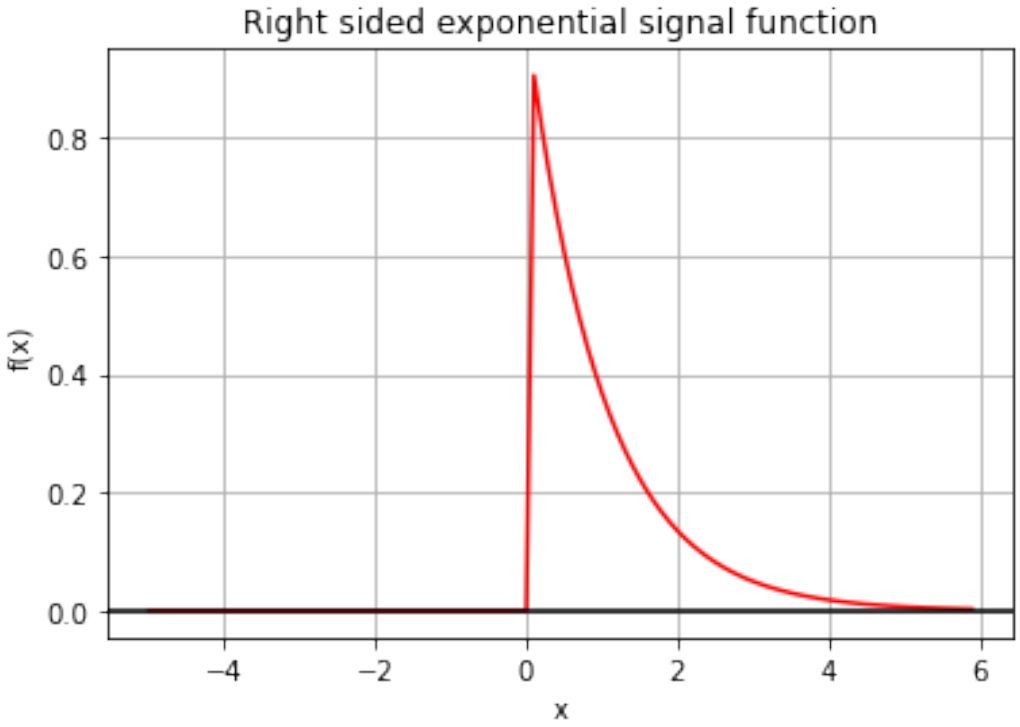
g) Right Sided Exponential Signal Function

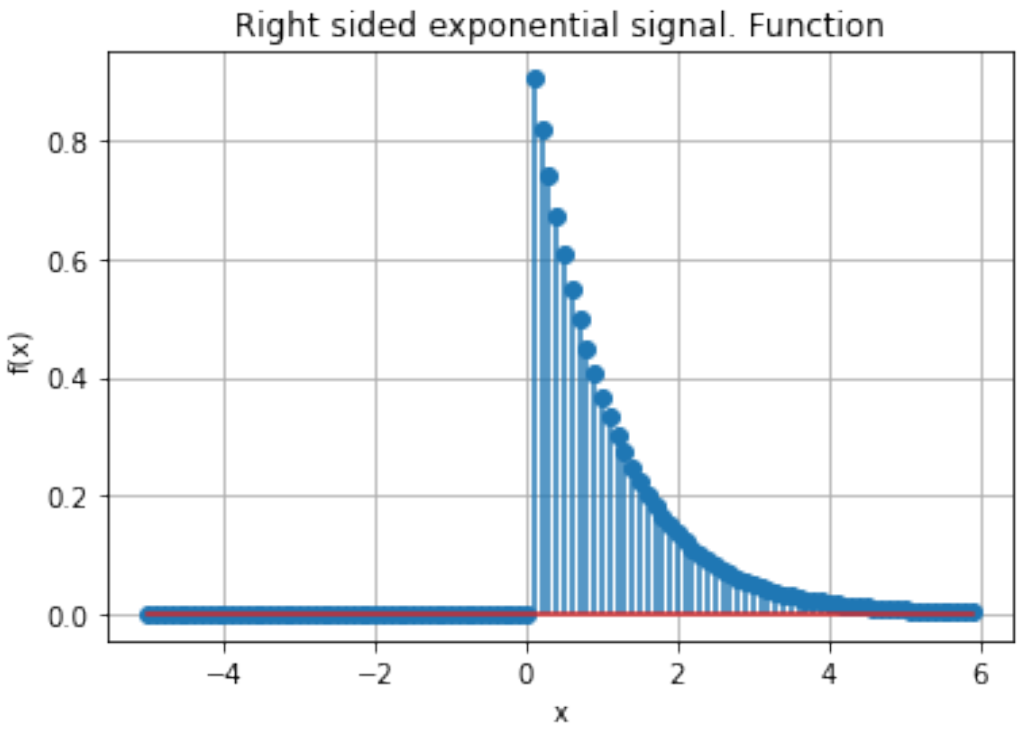
```
import matplotlib.pyplot as plt
import numpy as np
```

```
time = np.arange(-5, 6, 0.1)
amp = np.where(time>= 0, np.exp(-time), 0)

plt.plot(time,amp,color='red')
plt.title("Right sided exponential signal function")
plt.xlabel('x')
plt.ylabel('f(x)')
plt.grid(True, which='both')
plt.axhline(y=0, color='k')
plt.show()

plt.stem(time, amp, use_line_collection=True)
plt.title("Right sided exponential signal. Function")
plt.xlabel('x')
plt.ylabel('f(x)')
plt.grid(True, which='both')
```





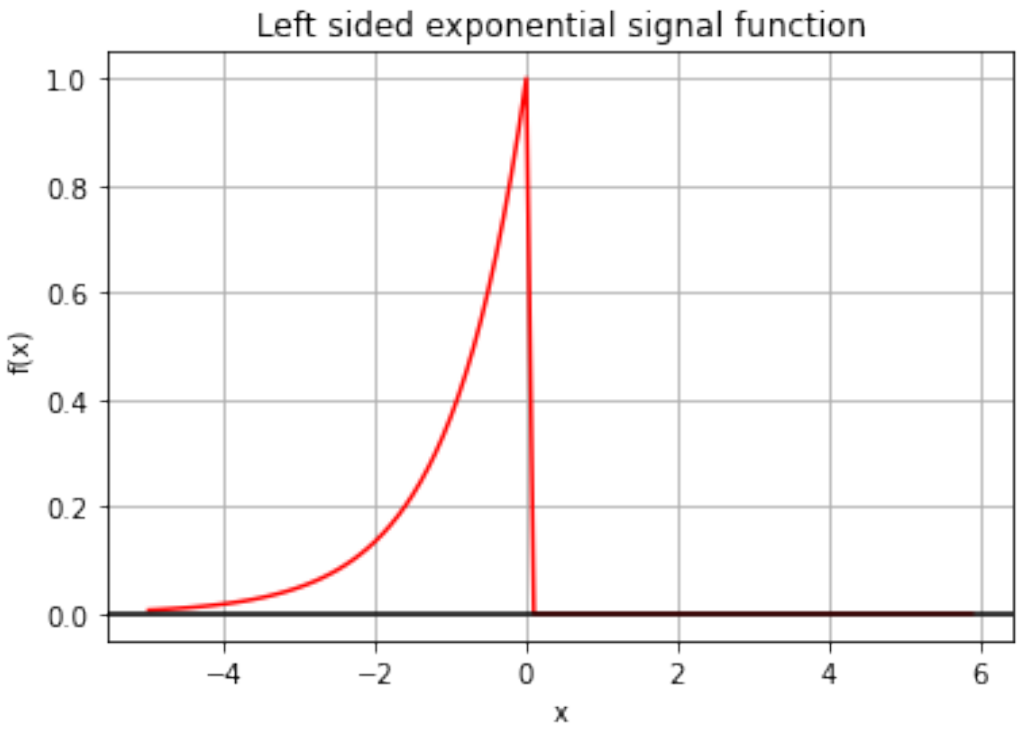
h) Left sided exponential signal function

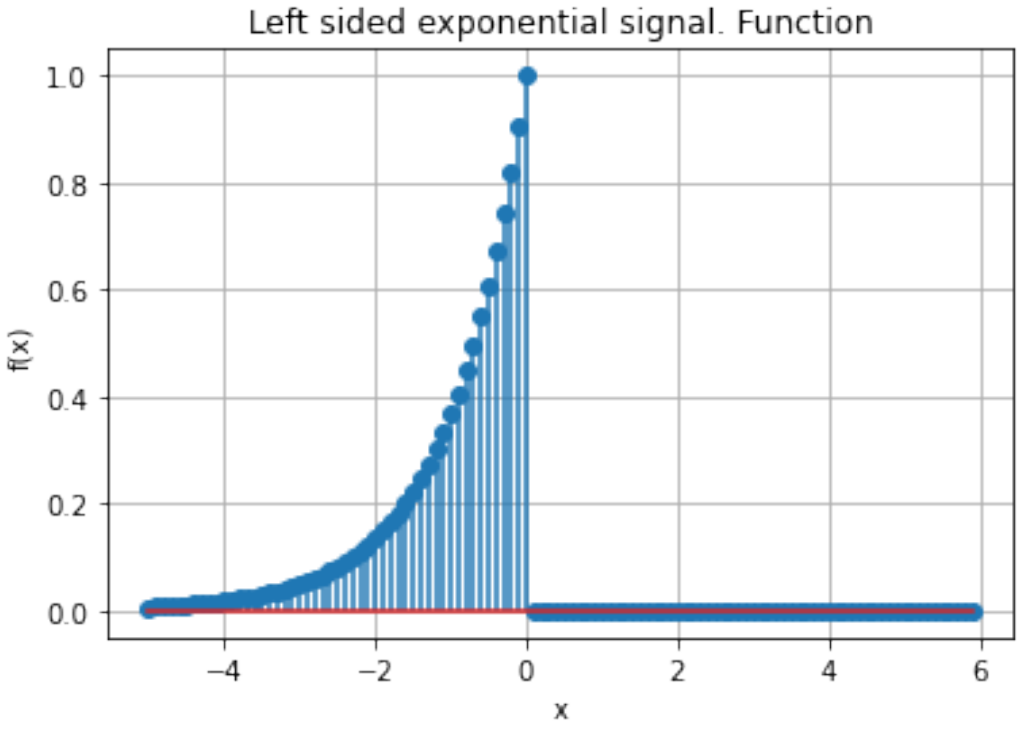
```
import matplotlib.pyplot as plt
import numpy as np

time = np.arange(-5, 6, 0.1)
amp = np.where(time<= 0, np.exp(time), 0)

plt.plot(time,amp,color='red')
plt.title("Left sided exponential signal function")
plt.xlabel('x')
plt.ylabel('f(x)')
plt.grid(True, which='both')
plt.axhline(y=0, color='k')
plt.show()

plt.stem(time, amp, use_line_collection=True)
plt.title("Left sided exponential signal. Function")
plt.xlabel('x')
plt.ylabel('f(x)')
plt.grid(True, which='both')
```





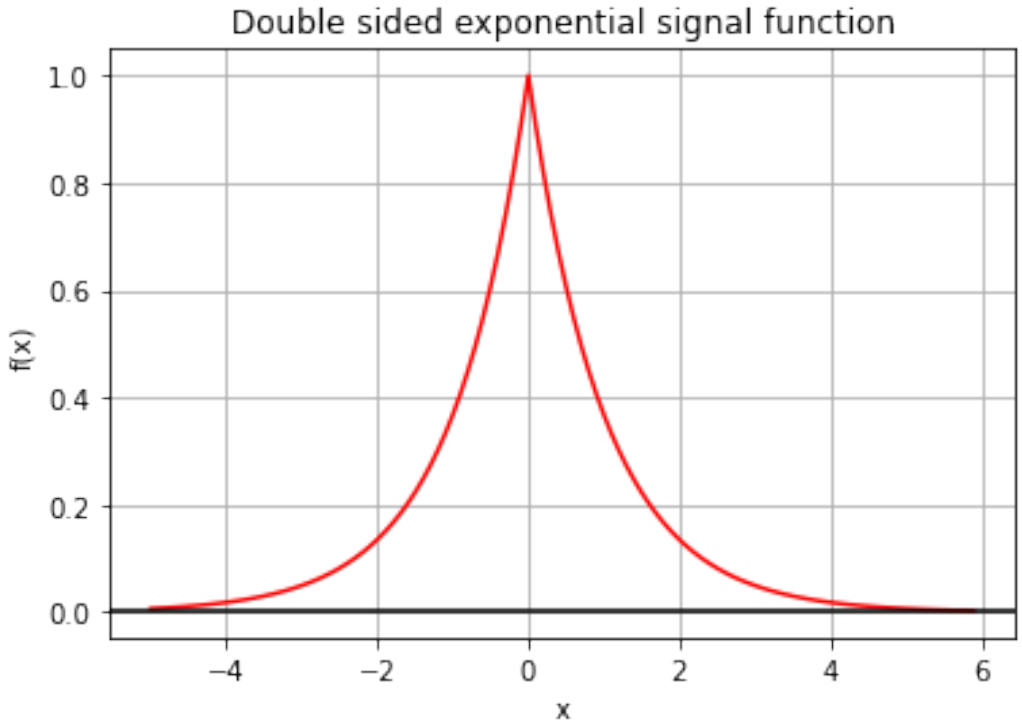
i) Double sided exponential signal function

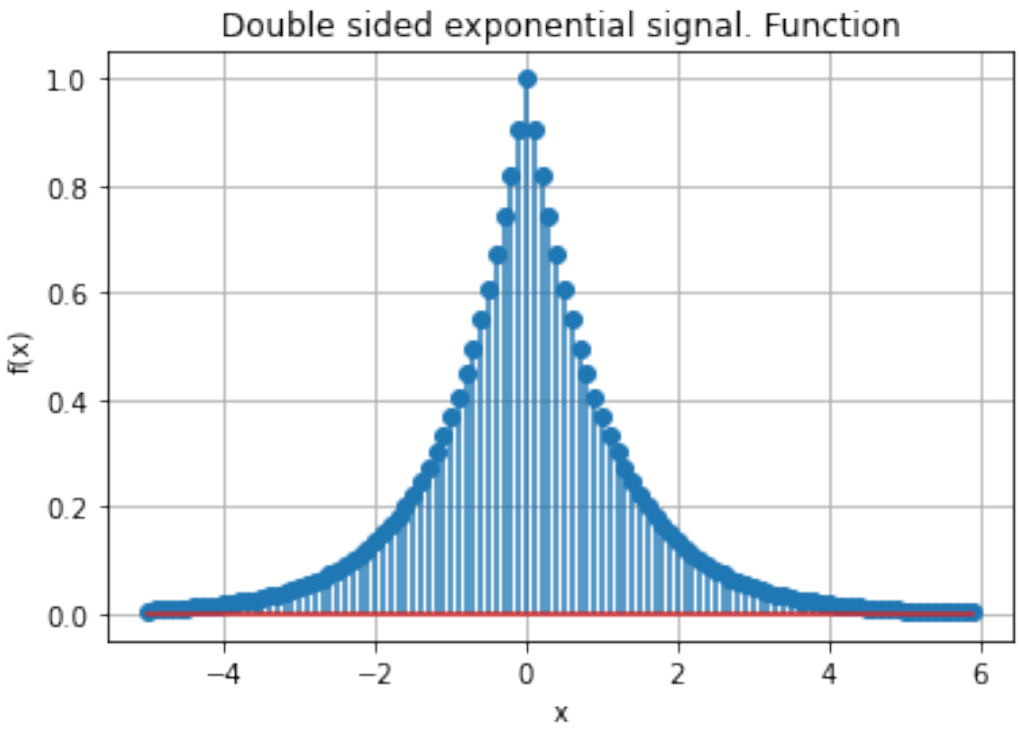
```
import matplotlib.pyplot as plt
import numpy as np
```

```
time = np.arange(-5, 6, 0.1)
amp =  np.where(time>= 0, np.exp(-time), 0) + np.where(time<= 0,
np.exp(time), 0)

plt.plot(time,amp,color='red')
plt.title("Double sided exponential signal function")
plt.xlabel('x')
plt.ylabel('f(x)')
plt.grid(True, which='both')
plt.axhline(y=0, color='k')
plt.show()

plt.stem(time, amp, use_line_collection=True)
plt.title("Double sided exponential signal. Function")
plt.xlabel('x')
plt.ylabel('f(x)')
plt.grid(True, which='both')
```




Double sided exponential signal. Function
1.0
0.8
0.6
0.4
0.2
0.0
f(x)
−4
−2
0
2
4
6
x