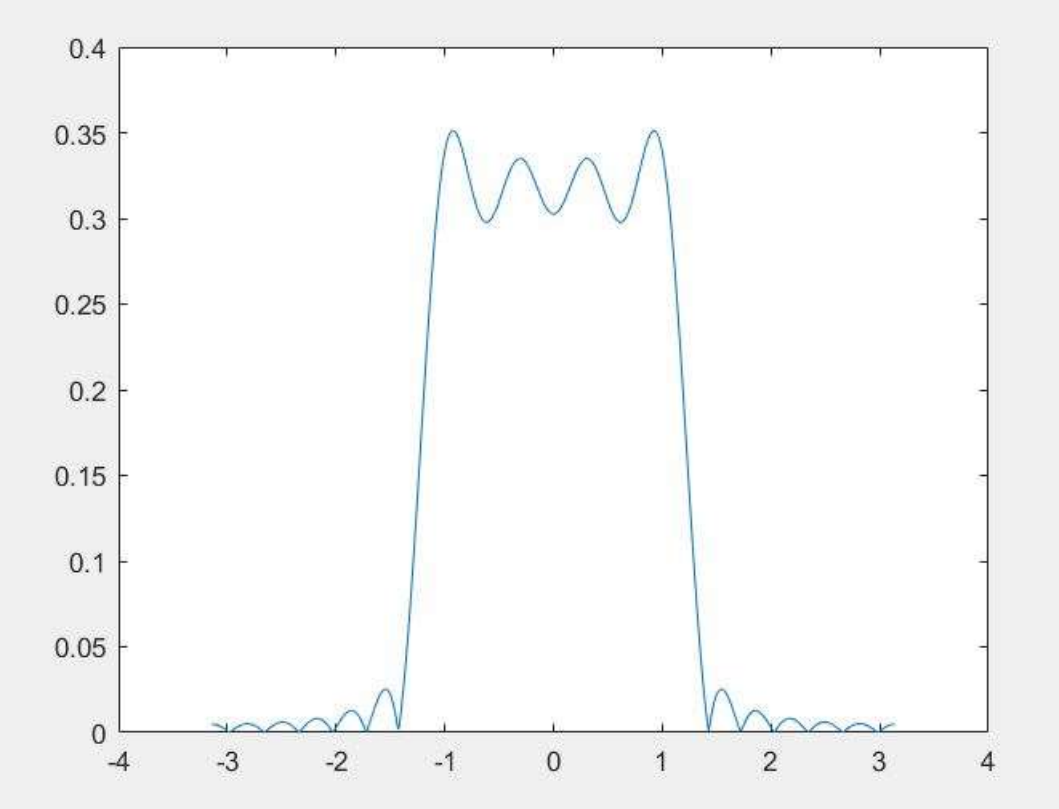
Computer Assignment 4

Ques 1a:

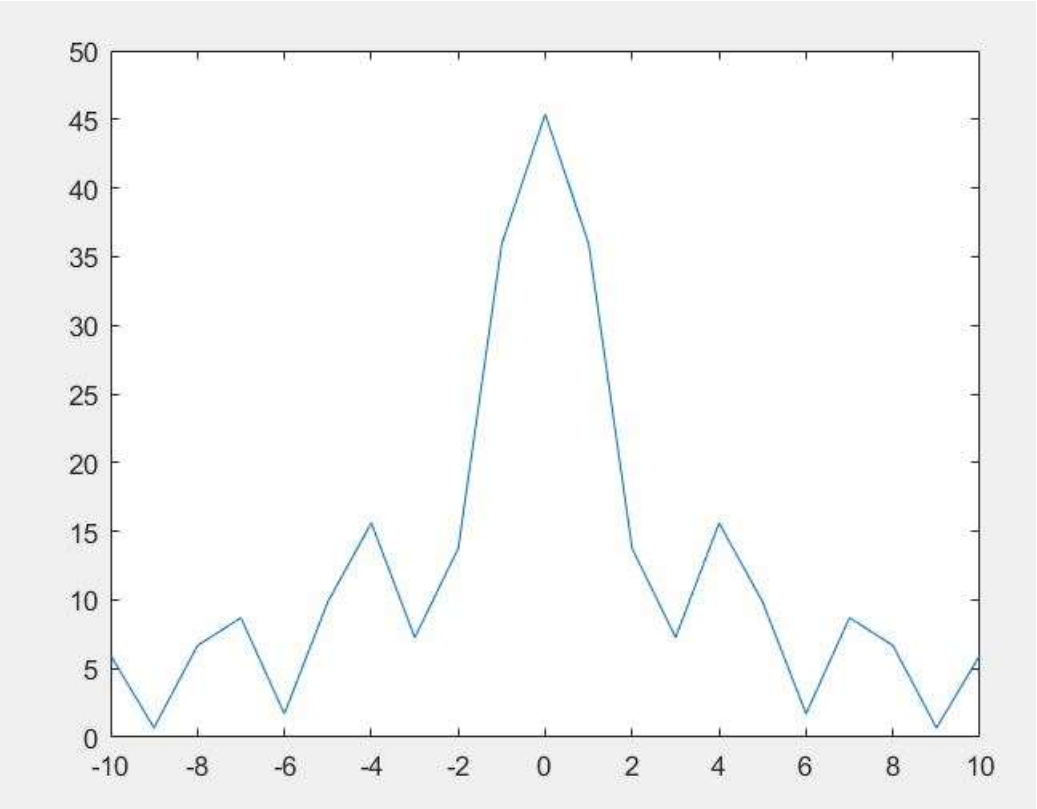
```
t = -20:20;
x = zeros(size(t));
t1 = t>=-10 & t<=10;
x(t1) = sinc(pi*t(t1)/8)/8;

w = -pi:0.01:pi;
X = zeros(size(w));
for k=1:length(w)
    X(k) = sum(x.*exp(-1i*w(k)*t));
end
plot(w, abs(X));
```



Ques 1b:

```
w = -pi:0.01:pi;
x = zeros(size(w));
```

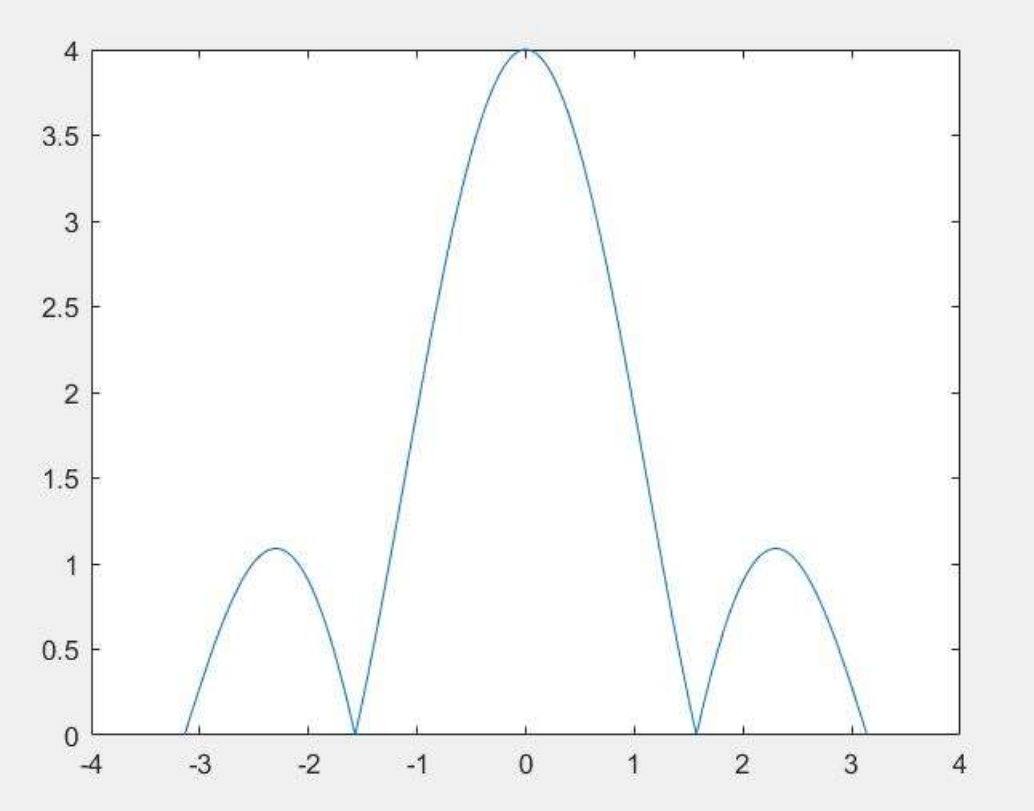
```
w1 = w>=-pi/3 & w<=pi/3;
x(w1) = 1 + w(w1).*w(w1);

t = -10:10;
X = zeros(size(t));
for k=1:length(t)
    X(k) = sum(x.*exp(1i*t(k)*w))*1/(2*pi);
end
plot(t, abs(X));
```



Ques 2a:

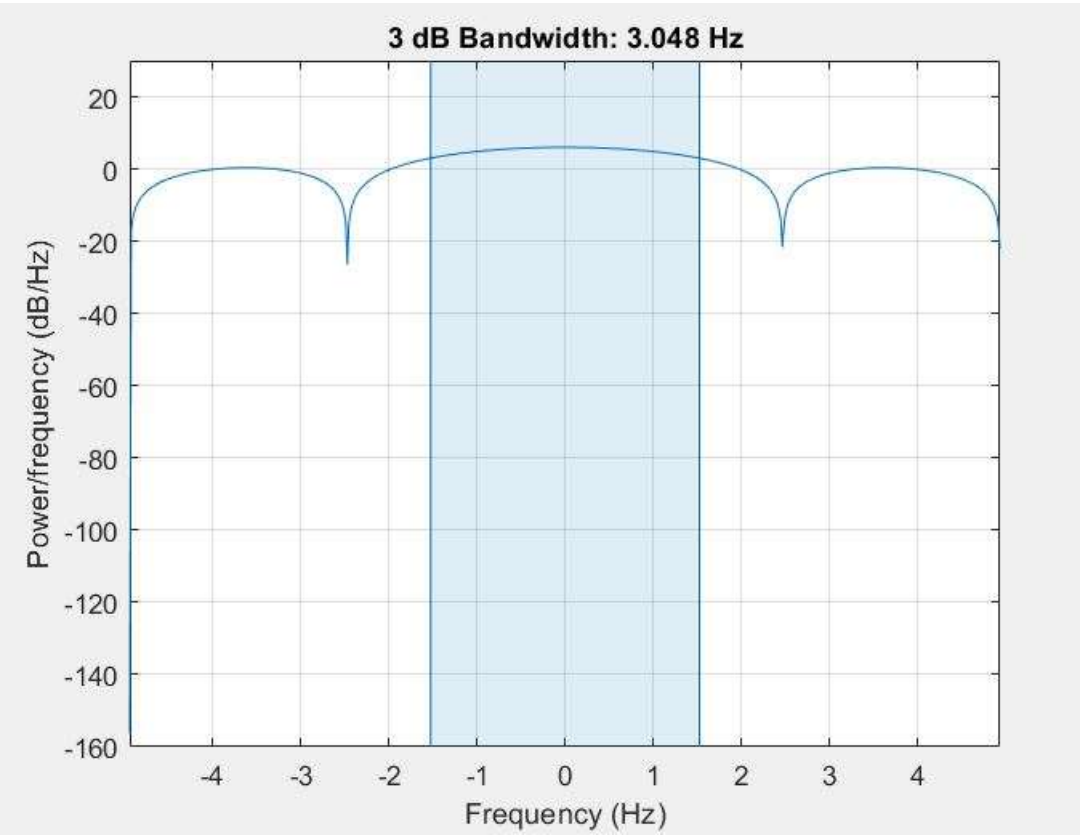
```
t = -10:10;
x = zeros(size(t));
t1 = t>0 & t<5;
x(t1) = power(t(t1), 0);
w = -pi:0.01:pi;
X = zeros(size(w));
for k=1:length(w)
    X(k) = sum(x.*exp(-1i*w(k)*t));
end
```

```
plot(w, abs(X));
```



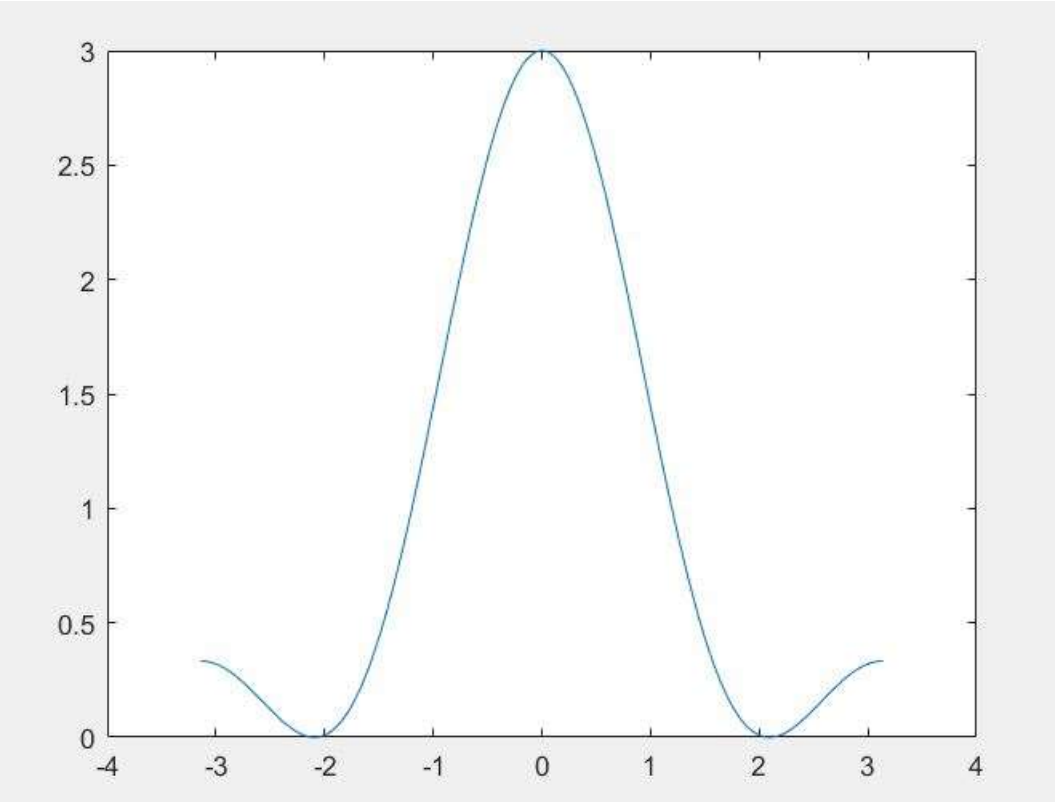

```
powerbw(abs(X), w./2*pi);
```

Nyquist rate = 3.048/2*pi = 0.485 rad



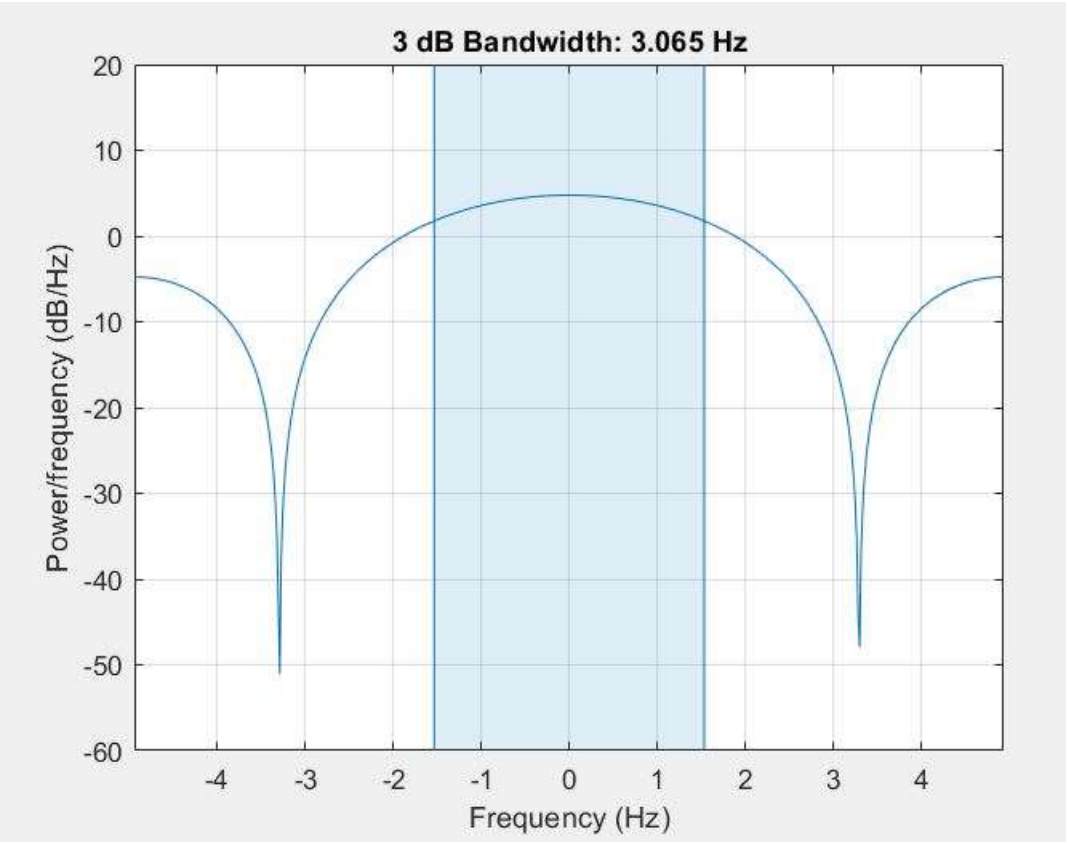
Ques 2b:

```
t = -10:10;
x = zeros(size(t));
t1 = t>-3 & t<3;
x(t1) = 1 - abs(t(t1))/3;
w = -pi:0.01:pi;
X = zeros(size(w));
for k=1:length(w)
    X(k) = sum(x.*exp(-1i*w(k)*t));
end
plot(w, abs(X));
```




```
powerbw(abs(X), w./2*pi);
```

Nyquist rate = 3.065/2*pi = 0.487 rad


3 dB Bandwidth: 3.065 Hz
Power/frequency (dB/Hz)
Frequency (Hz)
20
10
0
-10
-20
-30
-40
-50
-60
-4
-3
-2
-1
0
1
2
3
4