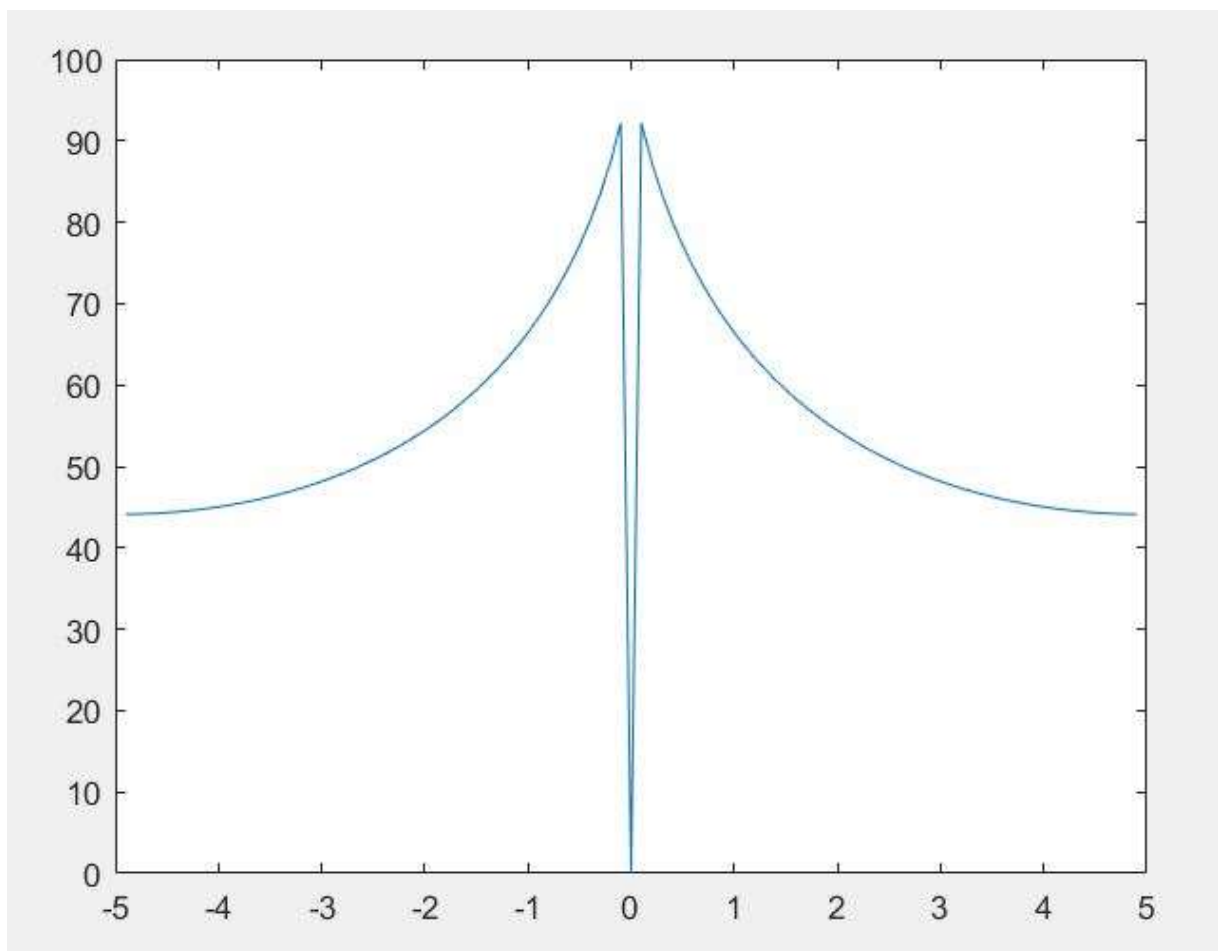# Computer Assignment 5

Question 1

Ques 1a:
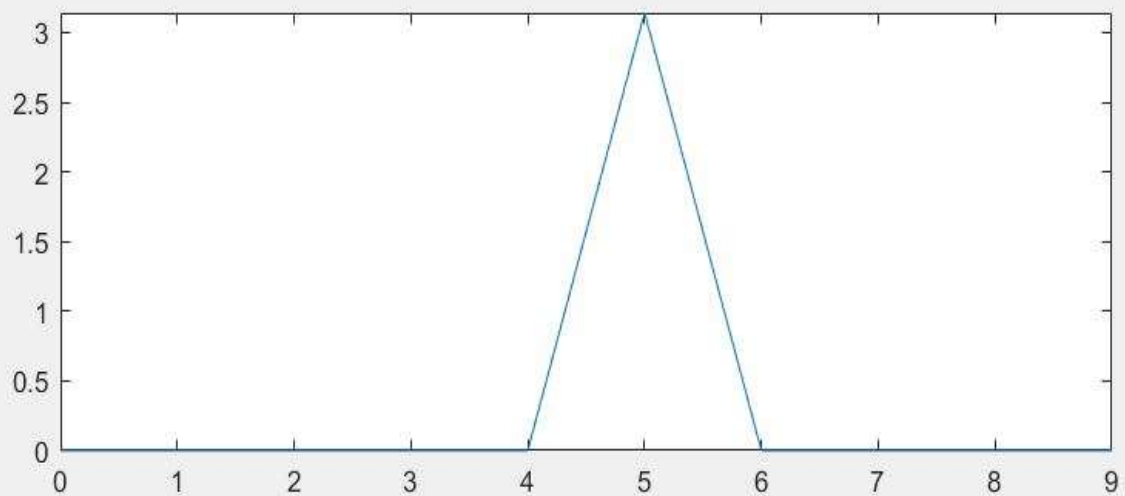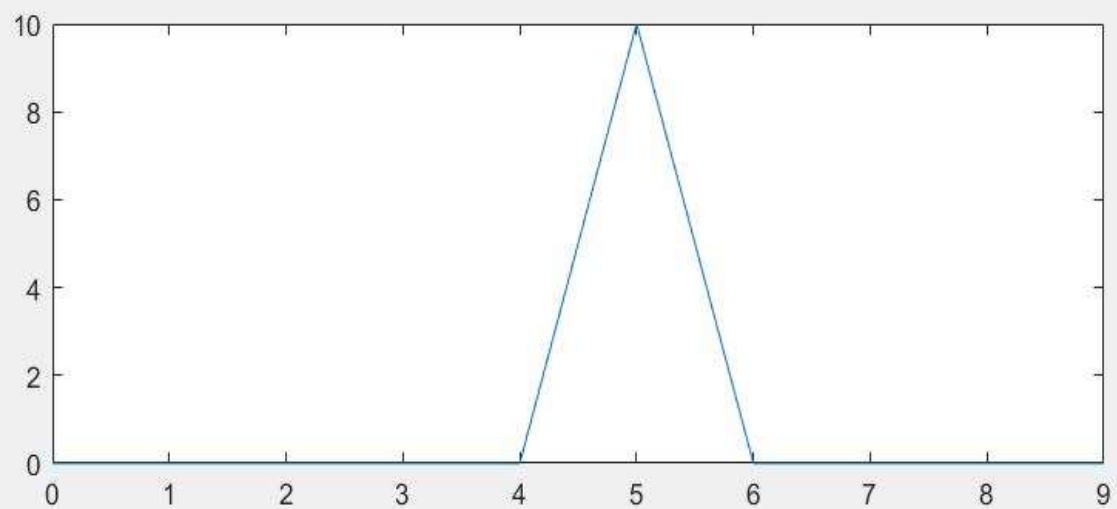
```
t = -20:0.1:20;
x = zeros(size(t));
t1 = t>=-10 & t<=10;
x(t1) = tan((t(t1)*pi)/10);
x(t==-5) = -100;
x(t==5) = 100;

X = fftshift(fft(x(abs(t)<5)));
plot(t(abs(t)<5), abs(X));
```

Ques 1b:

```
n = 10;
k = 5;
t = 0:n-1;
i = sqrt(-1);
x = zeros(size(t));
x(1:end) = exp(i*2*pi*k/n);

X = fftshift(fft(x));
subplot(2,1,1);
plot(t, abs(X));
subplot(2,1,2);
plot(t, angle(X));
```

Question 2

Ques 2a:

```
x1 = [0 1 2 3 4];
X1 = fft(x1,5);
disp(X1);
```

10.0000 + 0.0000i -2.5000 + 3.4410i -2.5000 + 0.8123i -2.5000 - 0.8123i - 2.5000 - 3.4410i

```
x2 = [0 1 0 0 0];
X2 = fft(x2,5);
disp(X2);
```

1.0000 + 0.0000i 0.3090 - 0.9511i -0.8090 - 0.5878i -0.8090 + 0.5878i 0.3090 + 0.9511i

```
s = [1 0 0 0 0];
S = fft(s,5);
disp(S);
```

1   1   1   1   1

Ques 2b:

```
x1 = [0 1 2 3 4];
x2 = [0 1 0 0 0];
X1 = fft(x1,5);
X2 = fft(x2,5);
Y = X1.*X2;
y = ifft(Y);
disp(y);
4.0000    0   1.0000   2.0000   3.0000
```

Ques 2c:

```
p = cconv(x1, x2, 5);
disp(p);

Y = X2.*X1;
y = ifft(Y);
disp(y);
```

4.0000   0   1.0000   2.0000   3.0000

4.0000   0   1.0000   2.0000   3.0000

Yes, they do match

Ques 2d:

```
x1 = [0 1 2 3 4];
s = [1 0 0 0 0];
X1 = fft(x1,5);
S = fft(s,5);
X3 = S./X1;
x3 = ifft(X3);
disp(x3);
```

-0.1800   0.2200   0.0200   0.0200   0.0200