
Table of Contents

.....	1
Exercício 1	1
Exercício 2	2
Exercício 3	2
Exercício 4	3
Exercício 5	8
Exercício 6	13

```
% Nome: Gustavo Cousseau
% Curso: Engenharia de Computação
% Disciplina: Sistemas Lineares
% Período: 4
```

```
clear all;
close all;
clc;
```

Exercício 1

```
a = [6 3 -5 0];
b = [1 0 0 4 0 0 1];
c = conv([1 0 2 -10],[2 -10 0]);
ar = roots(a)
br = roots(b)
cr = roots(c)
```

ar =

```
0
-1.1965
0.6965
```

br =

```
0.7756 + 1.3433i
0.7756 - 1.3433i
-1.5511 + 0.0000i
0.3223 + 0.5583i
0.3223 - 0.5583i
-0.6447 + 0.0000i
```

cr =

```
0.0000 + 0.0000i
5.0000 + 0.0000i
-0.9237 + 2.1353i
```

$$\begin{aligned} & -0.9237 - 2.1353i \\ & 1.8474 + 0.0000i \end{aligned}$$

Exercício 2

```
a = [-3 -8];
b = [-4 5 2];
c = [-5 -6+9i -6-9i];
s1 = poly(a)
s2 = poly(b)
s3 = poly(c)
```

s1 =

1 11 24

s2 =

1 -3 -18 40

s3 =

1 17 177 585

Exercício 3

```
B1 = [128];
A1 = [4 32 64];
[r1,p1,k1] = residue(B1, A1)

B2 = [1 8];
A2 = conv(conv([1 2], [1 2]), conv([1 2], [1, 2]));
[r2,p2,k2] = residue(B2, A2)

B3 = conv([1 -1],[1 3]);
A3 = conv(conv([1 6],[1 5]), [1 2]);
[r3,p3,k3] = residue(B3, A3)
```

r1 =

0
32

p1 =

-4

-4

k1 =

[]

r2 =

0
0
1.0000
6.0000

p2 =

-2.0000
-2.0000
-2.0000
-2.0000

k2 =

[]

r3 =

5.2500
-4.0000
-0.2500

p3 =

-6.0000
-5.0000
-2.0000

k3 =

[]

Exercício 4

```
T1 = 1/30;  
t=-0.1:0.001:0.1;  
x1 = 40*sin(2*pi*t/T1);
```

```
figure;
plot(t, x1);
title('Sinal x1');
grid;

T2 = 1/40;
x2 = 5*sin(2*pi*t/T2);
figure;
plot(t, x2);
title('Sinal x2');
grid;

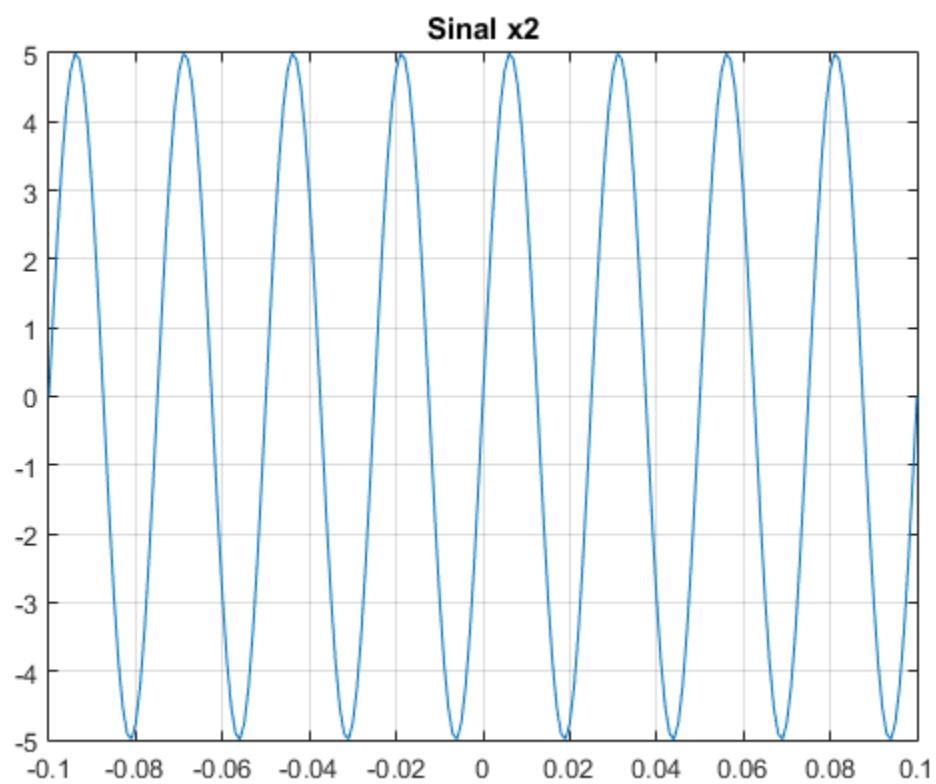
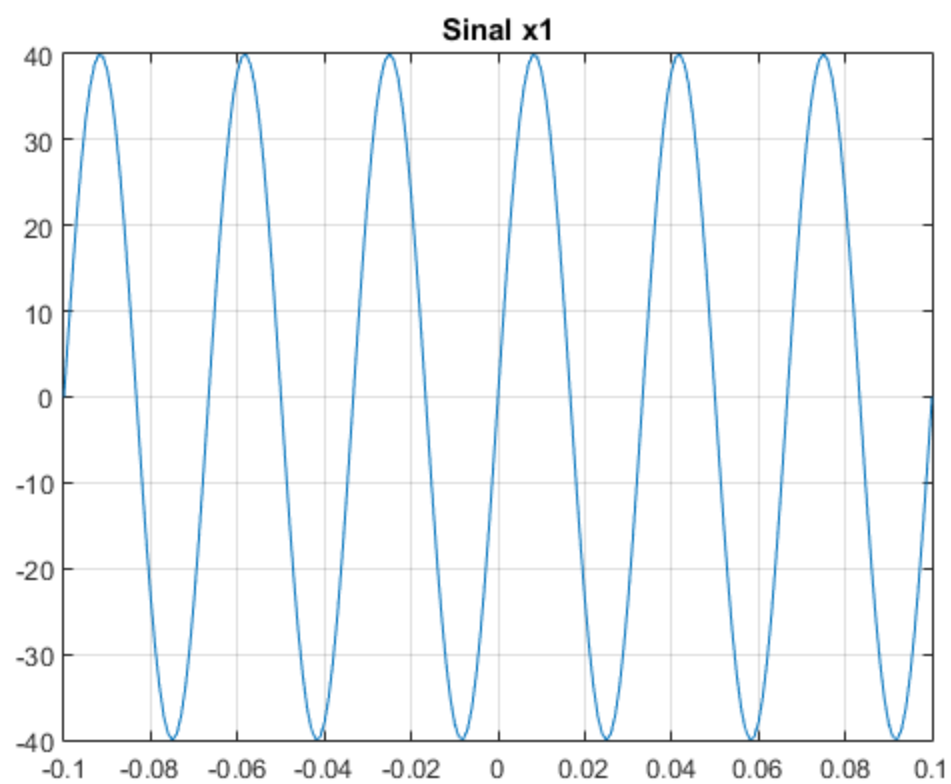
% a)
x1 = 40*sin(2*pi*(t - pi/4)/T1);
ya = 2*x1;
figure;
plot(t, ya);
title('Sinal a');
grid;

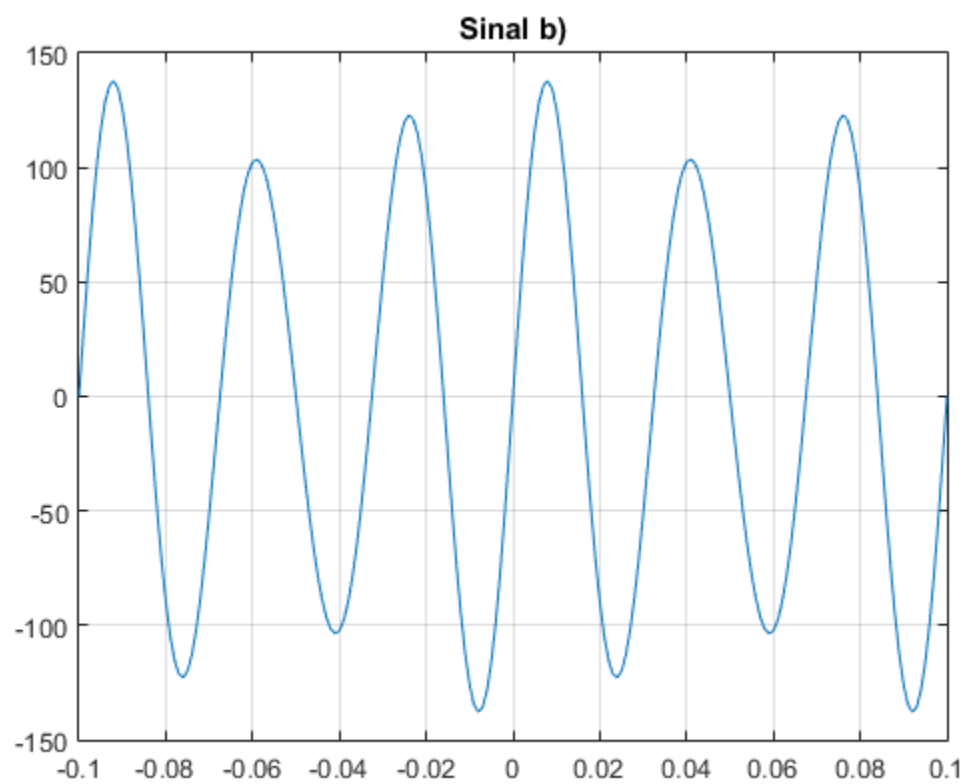
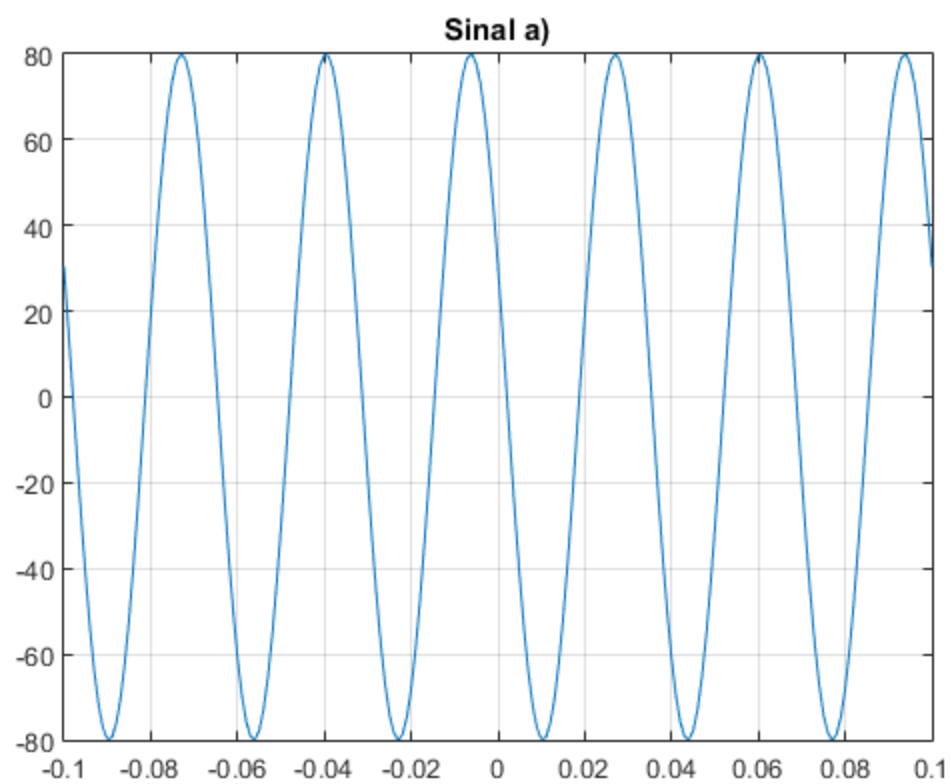
% b)
x1 = 40*sin(2*pi*t/T1);
yb = 3*x1 + 4*x2;
figure;
plot(t, yb);
title('Sinal b');
grid;

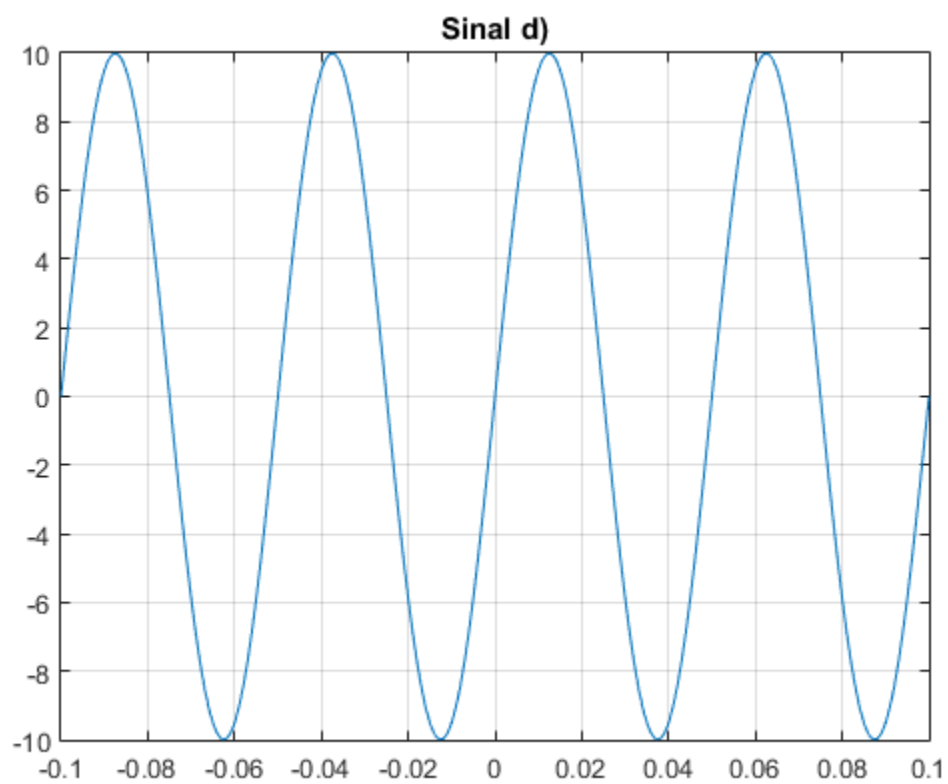
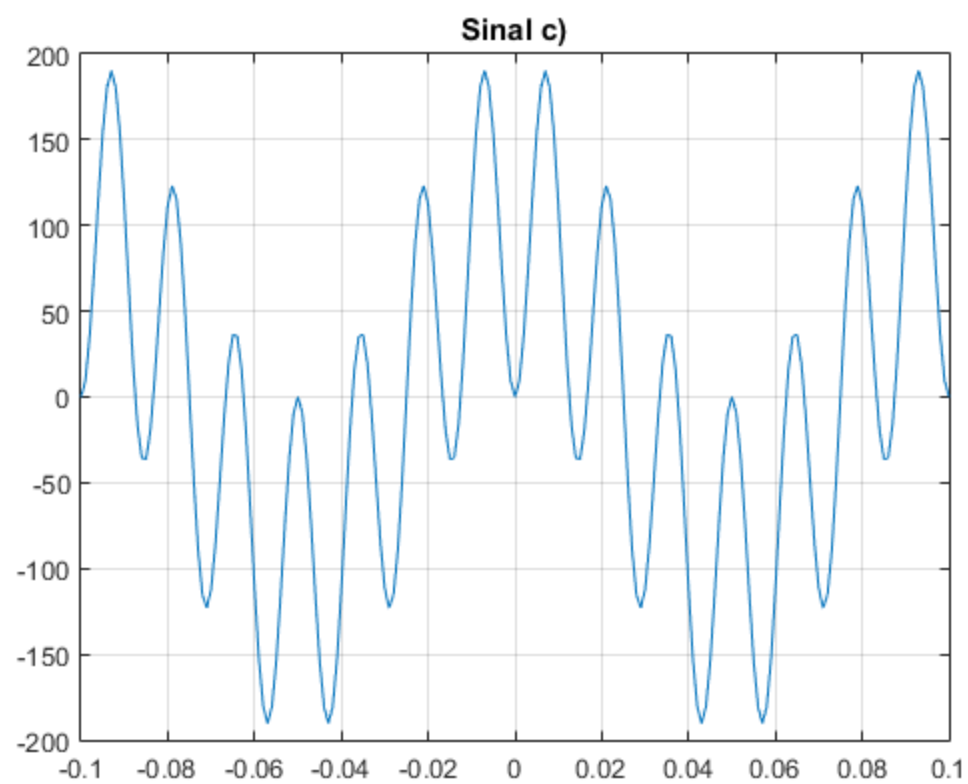
% c)
yc = x1.*x2;
figure;
plot(t, yc);
title('Sinal c');
grid;

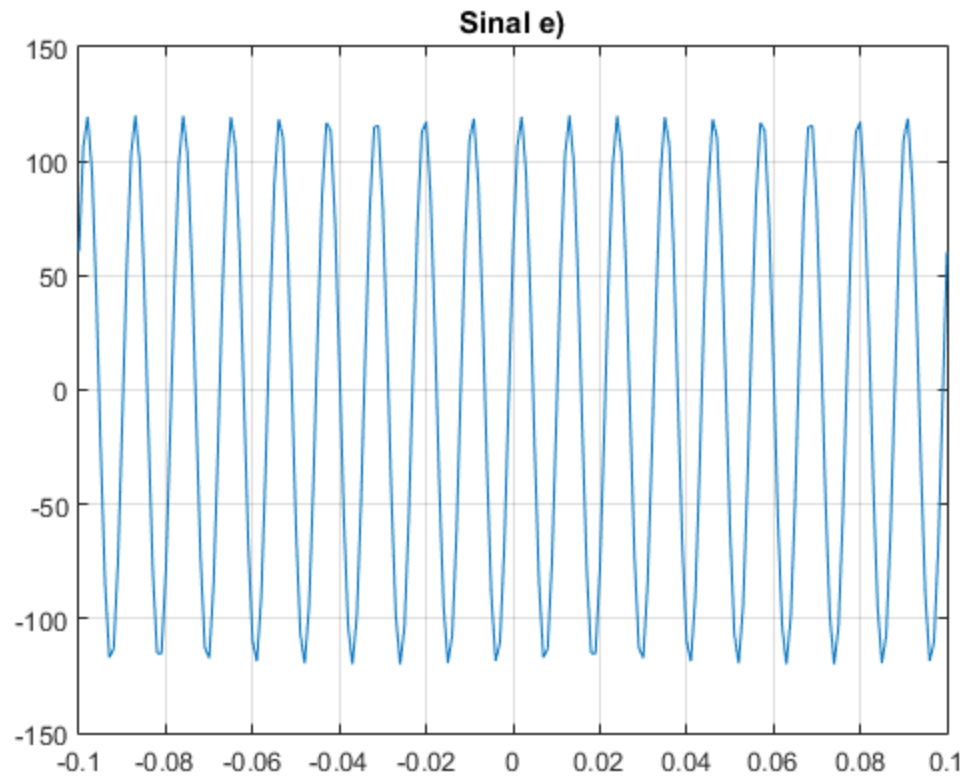
% d)
x2 = 5*sin(2*pi*(-t)/(2*T2));
yd = -2*x2;
figure;
plot(t, yd);
title('Sinal d');
grid;

% e)
x1 = 40*sin(2*pi*(-3*t + pi/3)/T1);
ye = 3*x1;
figure;
plot(t, ye);
title('Sinal e');
grid;
```









Exercício 5

```
n = -16:16;
T1 = 15;
x1 = 20*sin(2*pi*n/T1);
figure;
stem(n,x1);
title('Sinal x1');
grid;

T2 = 10;
x2 = 2*sin(2*pi*n/T2);
figure;
stem(n,x2);
title('Sinal x2');
grid;

% a)
ya = 3*x1;
figure;
stem(n,ya);
title('Sinal a');
grid;

% b)
```

```

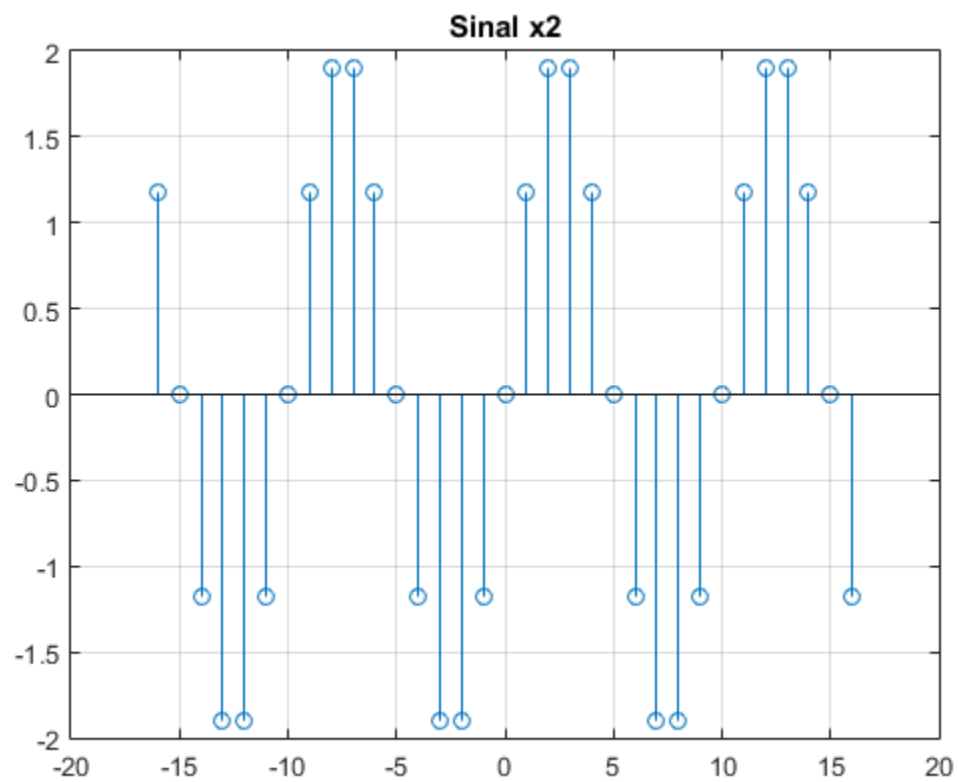
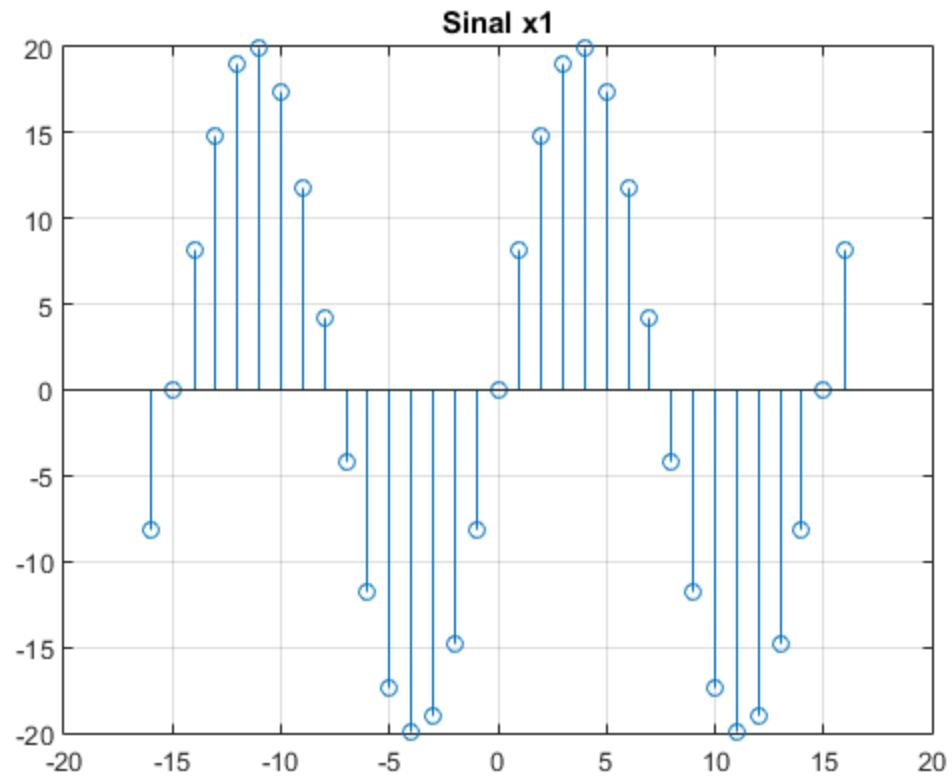
yb = 4*x1 - 2*x2;
figure;
stem(n,yb);
grid;
title('Sinal b');

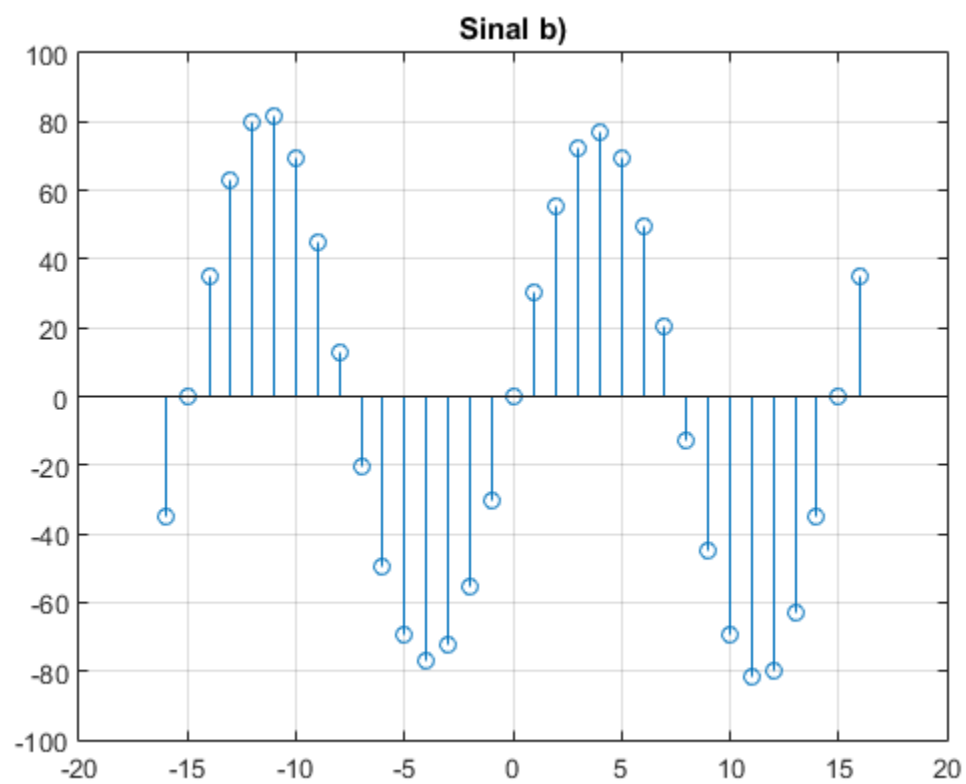
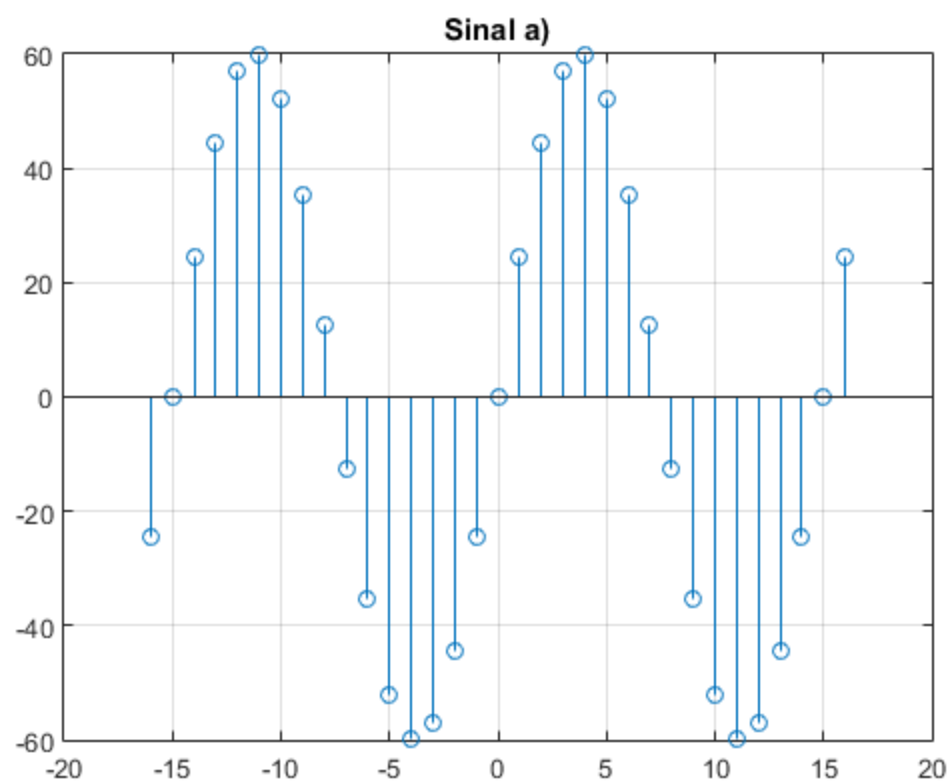
% c)
x1 = 20*sin(2*pi*(-n)/T1);
x2 = 2*sin(2*pi*(-n)/T2);
yc = (2*x1).*x2;
figure;
stem(n,yc);
title('Sinal c');
grid;

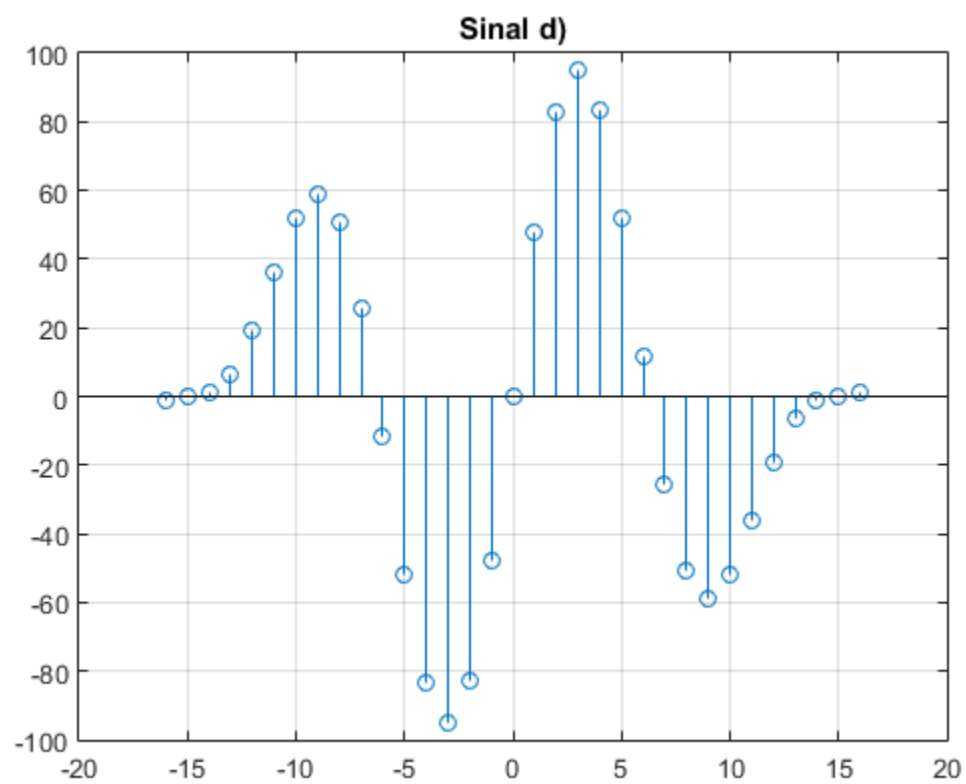
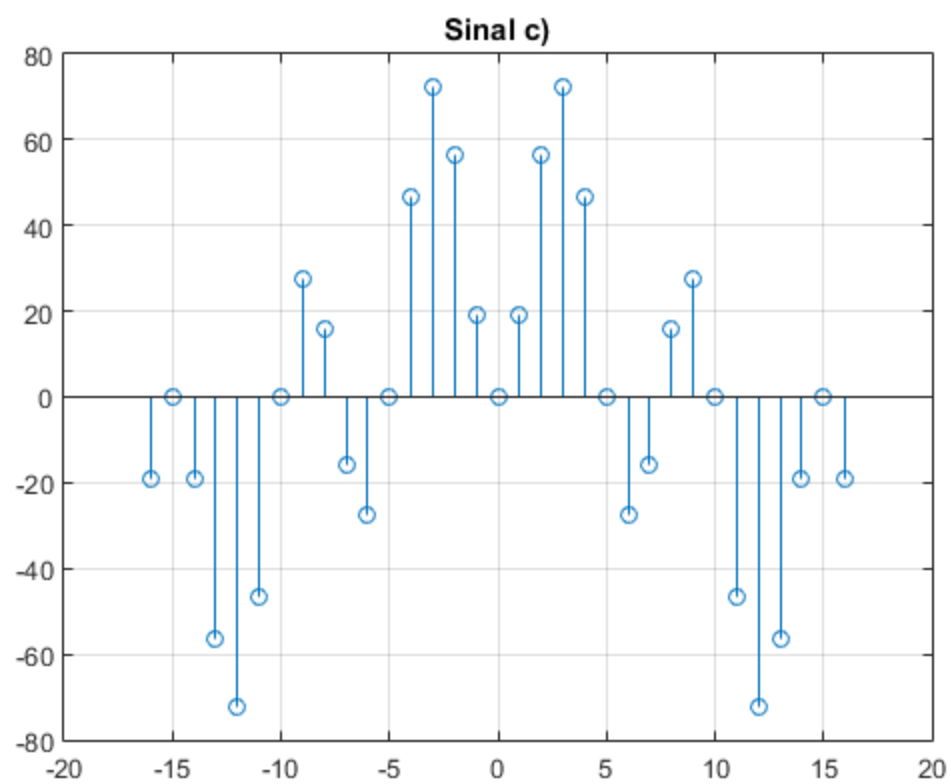
% d)
x2 = 20*sin(2*pi*n/T2);
yd = -3*x1 + 2*x2;
figure;
stem(n,yd);
title('Sinal d');
grid;

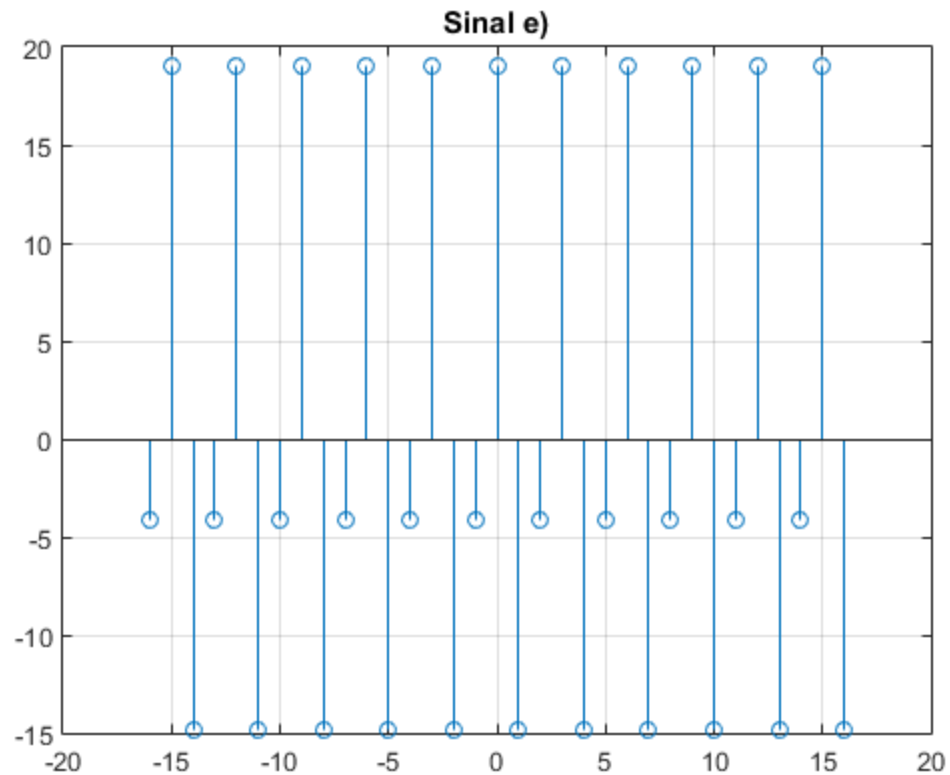
% e)
x1 = 20*sin(2*pi*(-5*n + 3)/T1);
ye = x1;
figure;
stem(n,ye);
title('Sinal e');
grid;

```









Exercício 6

a)

```
t = -1:0.001:7;
x = heaviside(t) + (t-1).*heaviside(t-1) - 3*(t-2).*heaviside(t-2) +
    2*(t-3).*heaviside(t-3) - heaviside(t-3) + (t-3).*heaviside(t-3) -
    (t-5).*heaviside(t-5) - heaviside(t-5);
figure;
plot(t,x);
title('Sinal x');
grid;

y = 2*heaviside(t-1) - 2*(t-1).*heaviside(t-1) +
    2*(t-2).*heaviside(t-2) - heaviside(t-2) + (3/2)*(t-3).*heaviside(t-3)
    - (3/2)*(t-5).*heaviside(t-5) - 2*heaviside(t-5);
figure;
plot(t,y);
title('Sinal y');
grid;

% b)
xb = heaviside((2*t - 1)) + ((2*t - 1)-1).*heaviside((2*t -
    1)-1) - 3*((2*t - 1)-2).*heaviside((2*t - 1)-2) + 2*((2*t -
    1)-3).*heaviside((2*t - 1)-3) - heaviside((2*t - 1)-3) + ((2*t -
```

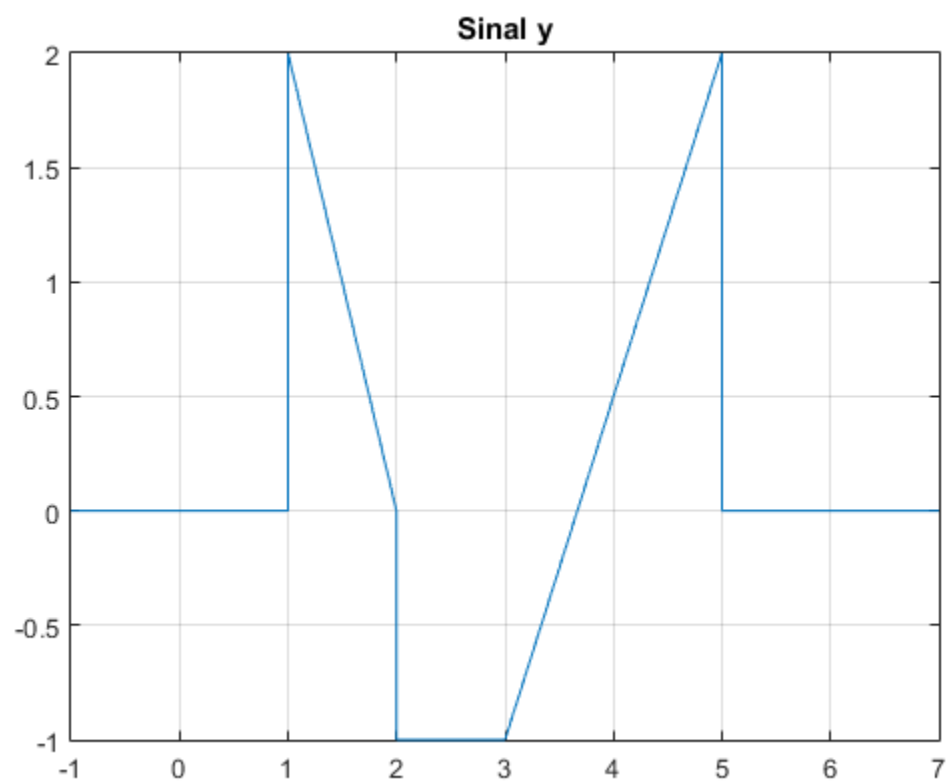
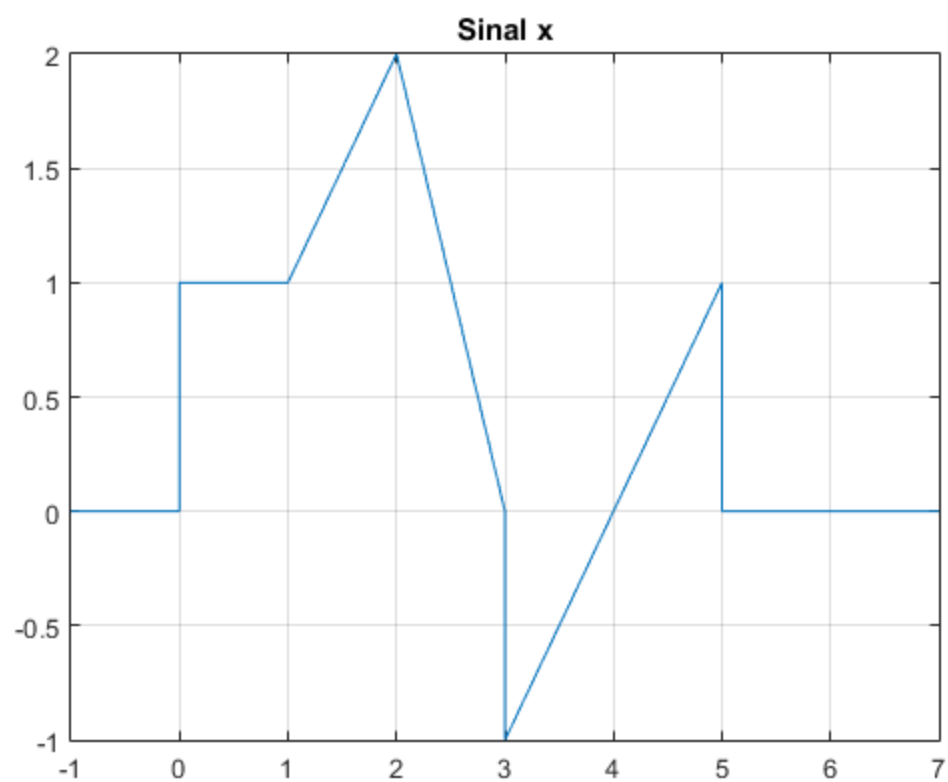
```

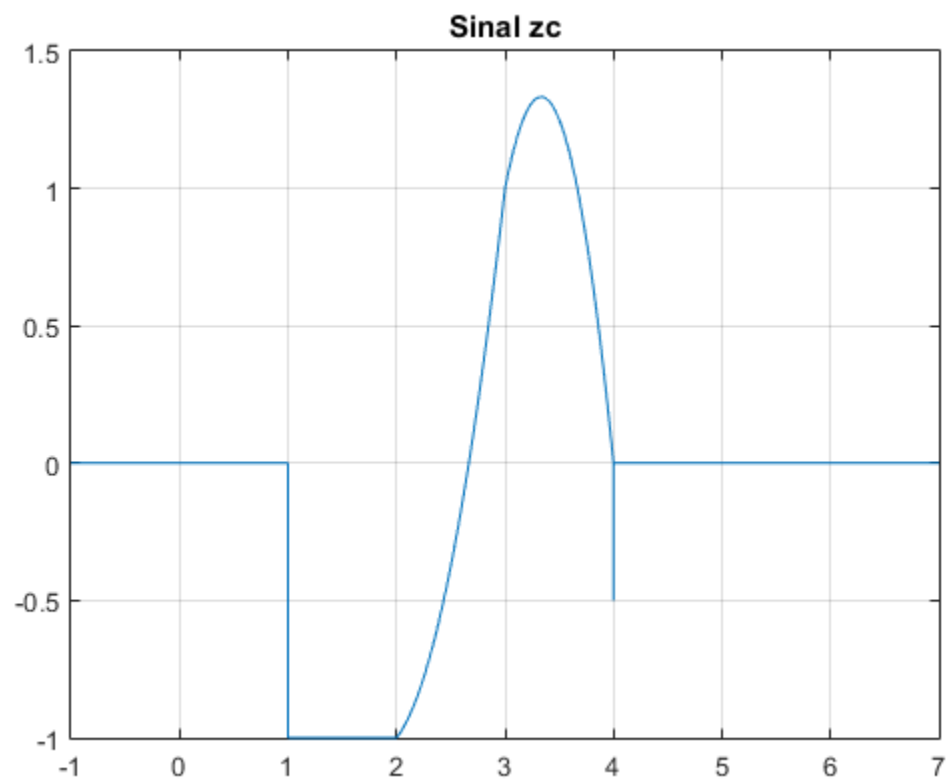
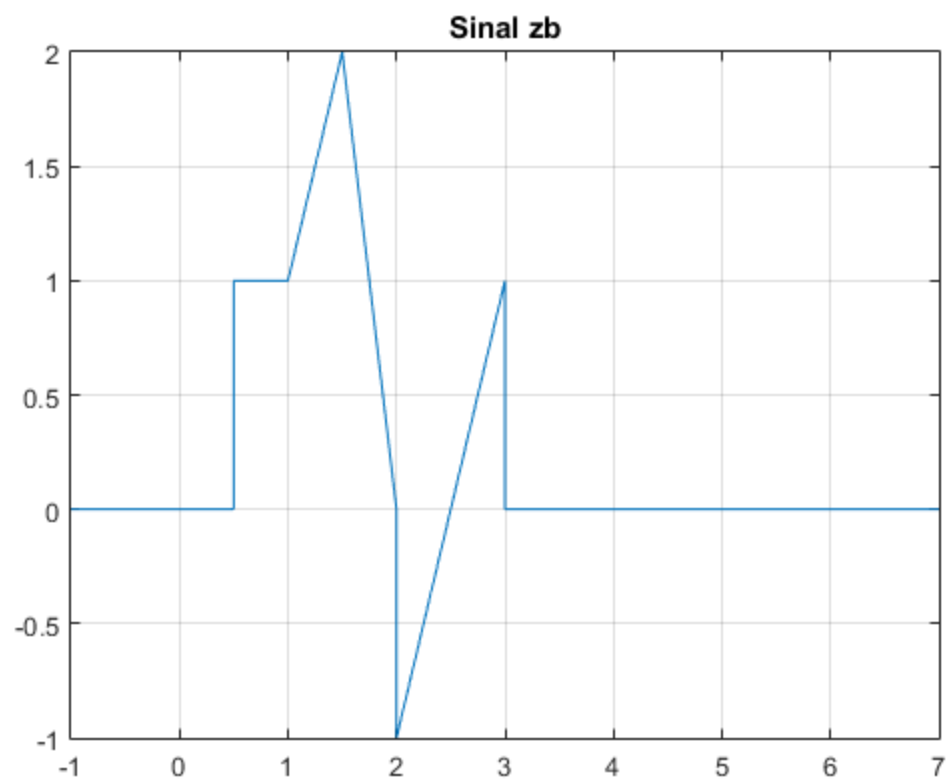
    1)-3).*heaviside((2*t - 1)-3) - ((2*t - 1)-5).*heaviside((2*t - 1)-5)
    - heaviside((2*t - 1)-5);
zb = xb;
figure;
plot(t,zb);
title('Sinal zb');
grid;

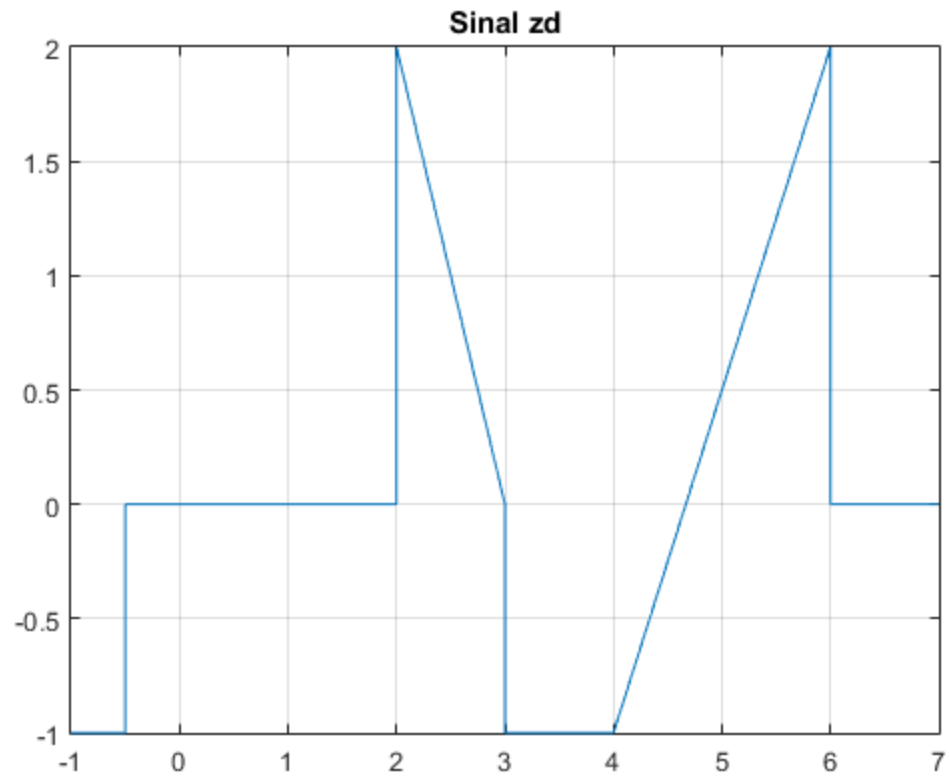
% c)
t1 = t-1;
t2 = t+1;
xc = heaviside(t1) + (t1-1).*heaviside(t1-1) -
    3*(t1-2).*heaviside(t1-2) + 2*(t1-3).*heaviside(t1-3) -
    heaviside(t1-3) + (t1-3).*heaviside(t1-3) - (t1-5).*heaviside(t1-5) -
    heaviside(t1-5);
yc = 2*heaviside(t2-1) - 2*(t2-1).*heaviside(t2-1)
    + 2*(t2-2).*heaviside(t2-2) - heaviside(t2-2)
    +(3/2)*(t2-3).*heaviside(t2-3) - (3/2)*(t2-5).*heaviside(t2-5) -
    2*heaviside(t2-5);
zc = xc.*yc;
figure;
plot(t,zc);
title('Sinal zc');
grid;

% d)
t1 = -2*t - 1;
t2 = t-1;
xd = heaviside(t1) + (t1-1).*heaviside(t1-1) -
    3*(t1-2).*heaviside(t1-2) + 2*(t1-3).*heaviside(t1-3) -
    heaviside(t1-3) + (t1-3).*heaviside(t1-3) - (t1-5).*heaviside(t1-5) -
    heaviside(t1-5);
yd = 2*heaviside(t2-1) - 2*(t2-1).*heaviside(t2-1)
    + 2*(t2-2).*heaviside(t2-2) - heaviside(t2-2)
    +(3/2)*(t2-3).*heaviside(t2-3) - (3/2)*(t2-5).*heaviside(t2-5) -
    2*heaviside(t2-5);
zd = (-xd) + yd;
figure;
plot(t,zd);
title('Sinal zd');
grid;

```







Published with MATLAB® R2015a