

Assignment
Roll: 1603108

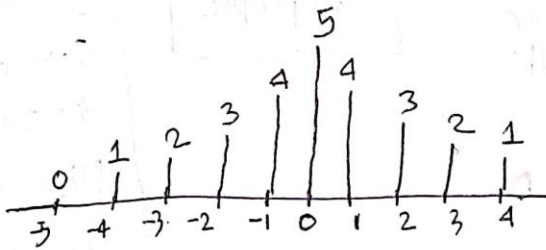
Given that,

$$x(n) = \{ \dots, 0, 1, 2, 3, 4, 5, 4, 3, 2, 1 \}$$

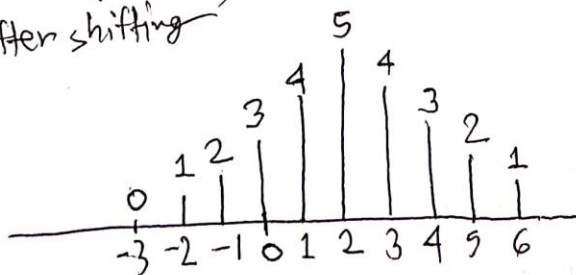
↑

(i) $y(n) = x(n-2) + x(n+3)$

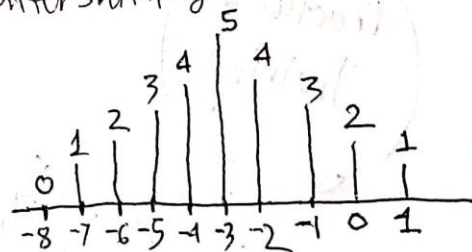
for from $x(n)$



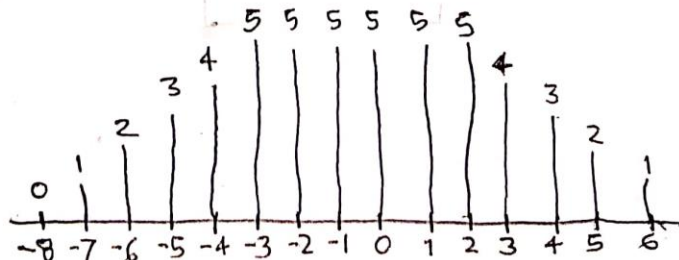
for, $x(n-2)$,
after shifting



for, $x(n+3)$
after shifting



Adding the signals we get,



Codes:

imseq.m

```
function [x,n] = imseq(k, lr, ur)
n=[lr:ur]
x = [(n-k)==0]
```

sigshift.m

```
function [y,n] = sigshift(x,m,k)
n = m+k
y = x
```

signaladd.m

```
function [y,n] = signaladd(x1,n1,x2,n2)

n = min(min(n1),min(n2)):max(max(n1),max(n2));
y1 = zeros(1,length(n));
y2 = y1;
y1(find((n>=min(n1)) & (n<=max(n1))==1))=x1;
y2(find((n>=min(n2)) & (n<=max(n2))==1))=x2;
y = y1+y2;
```

mainPlot.m

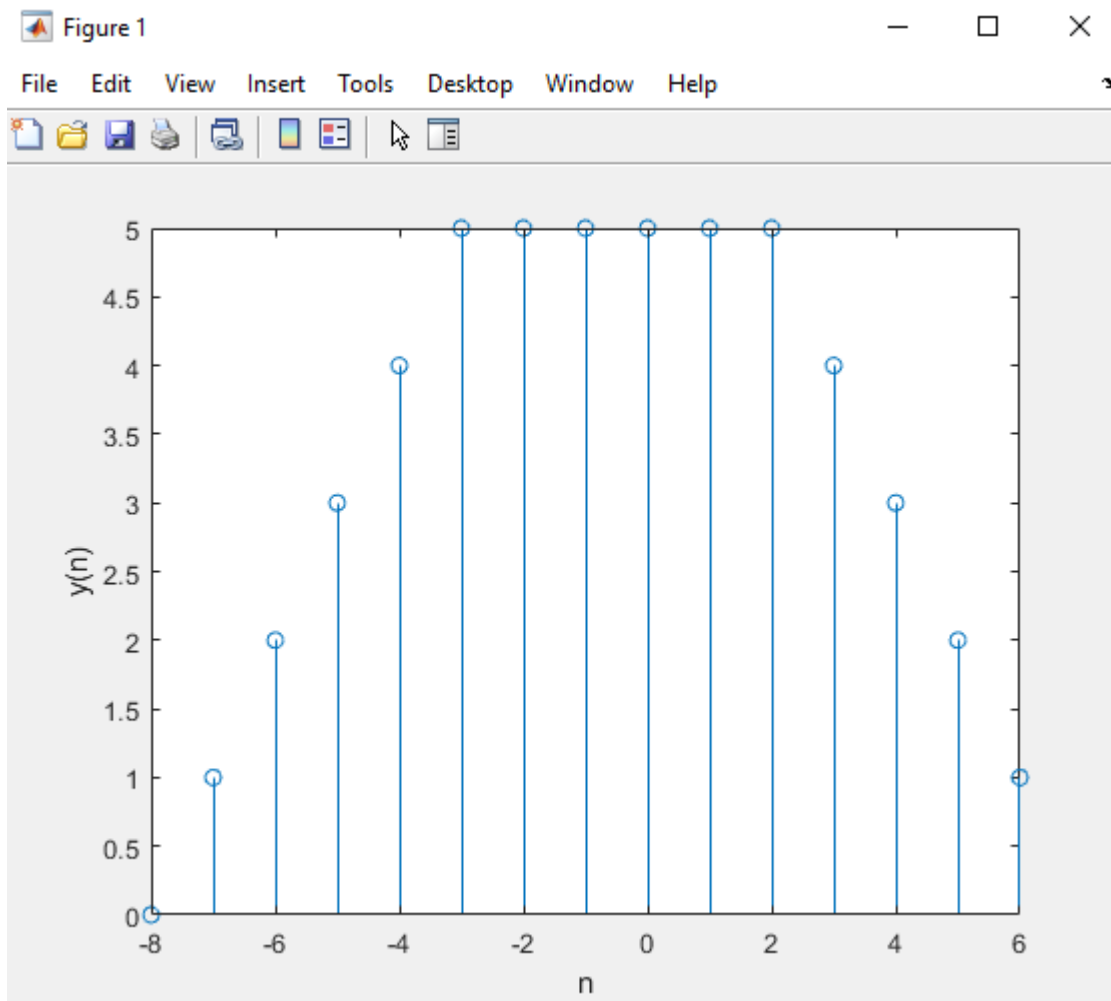
```
n = [-5:4];
x = 0*imseq(-5,-5,4)+1*imseq(-4,-5,4)+2*imseq(-3,-5,4)+3*imseq(-2,-5,4)+4*imseq(-1,-5,4)+5*imseq(0,-5,4)+4*imseq(1,-5,4)+3*imseq(2,-5,4)+2*imseq(3,-5,4)+1*imseq(4,-5,4);

[x1,n1] = sigshift(x,n,2);
[x2,n2] = sigshift(x,n,-3);

[x,n] = signaladd(x1,n1,x2,n2);

stem(n,x);
xlabel('n');
ylabel('y(n)');
```

Output:



Given that,

OPTIONAL

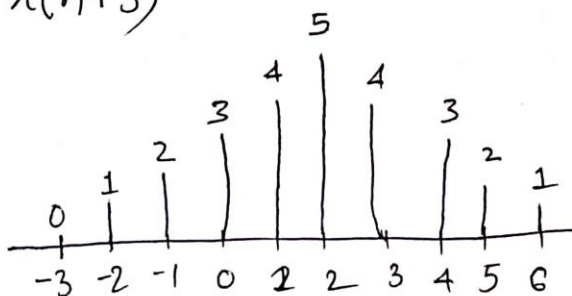
$$x(n) = \{\dots, 0, 1, 2, 3, 4, 5, 4, 3, 2, 1\}$$

↑

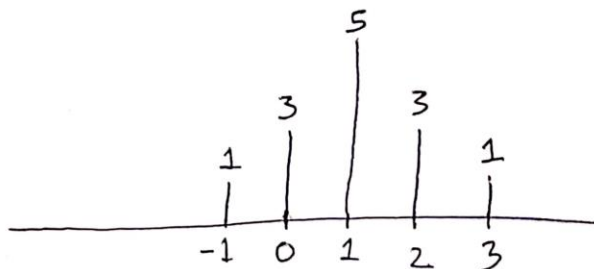
(ii) $y(n) = x(2n-2) + x(n+3)$

for $x(2n-2)$

after shifting, \rightarrow

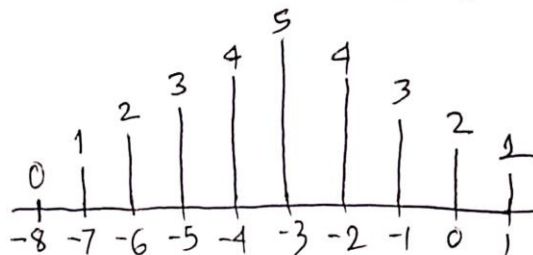


After scaling \rightarrow

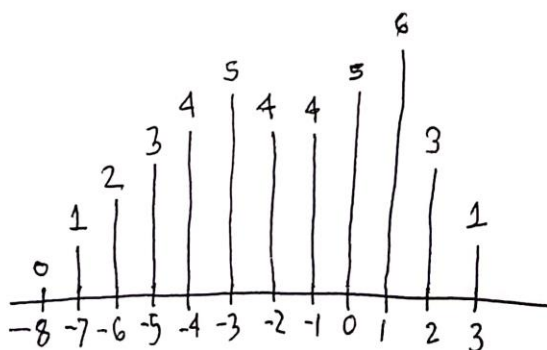


for $x(n+3)$,

after shifting, \rightarrow



After adding this two signal we get,



Codes:

imseq.m

```
function [x,n] = imseq(k, lr, ur)
n=[lr:ur]
x = [(n-k)==0]
```

sigshift.m

```
function [y,n] = sigshift(x,m,k)
n = m+k
y = x
```

sigscale.m

```
function [y,n] = sigscale(x,m,k)

n = [];
y = [];

for i = 1:length(m)
    if mod(m(i),k) == 0
        y = [y,x(i)];
        n = [n,m(i)/k];
    end
end
```

signaladd.m

```
function [y,n] = signaladd(x1,n1,x2,n2)

n = min(min(n1),min(n2)):max(max(n1),max(n2));
y1 = zeros(1,length(n));
y2 = y1;
y1(find((n>=min(n1)) & (n<=max(n1))==1))=x1;
y2(find((n>=min(n2)) & (n<=max(n2))==1))=x2;
y = y1+y2;
```

mainPlot2.m

```
n = [-5:4];  
x = 0*imseq(-5,-5,4)+1*imseq(-4,-5,4)+2*imseq(-3,-5,4)+3*imseq(-  
2,-5,4)+4*imseq(-1,-5,4)+5*imseq(0,-5,4)+4*imseq(1,-  
5,4)+3*imseq(2,-5,4)+2*imseq(3,-5,4)+1*imseq(4,-5,4);  
  
[x1,n1] = sigshift(x,n,2);  
[x11,n11] = sigscale(x1,n1,2);  
[x2,n2] = sigshift(x,n,-3);  
[x,n] = signaladd(x11,n11,x2,n2);  
  
stem(n,x);  
xlabel('n');  
ylabel('y(n)');
```

Output:

