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Subject: Signal and System
Semester: 6th

Q1 part (a)

The summation is called the convolution sum of the sequance $x[n]$ and $h[n]$ and represented compactly.

As:

$$Y[x] = x[n] * h[n]$$

As we know

$$x[n] = 2x[n] + 2[x-1] + 3x[1-2]$$

and

$$Y[h] = 3x[n] + 2x[n-1] + x[n-2]$$

$$x[n] = x[0]\delta[n] + x[1]\delta[n-1] + x[2]$$

$$\uparrow f(n-2]$$

$$Y(n) = x[0]\,\delta[n] + x[1]\,f[n-1] + x[2]$$

$$f[n(-2]$$

$$x[n] = \sum_{k=0}^{2} x[m]\, f[n-k]$$

for $y[n]$

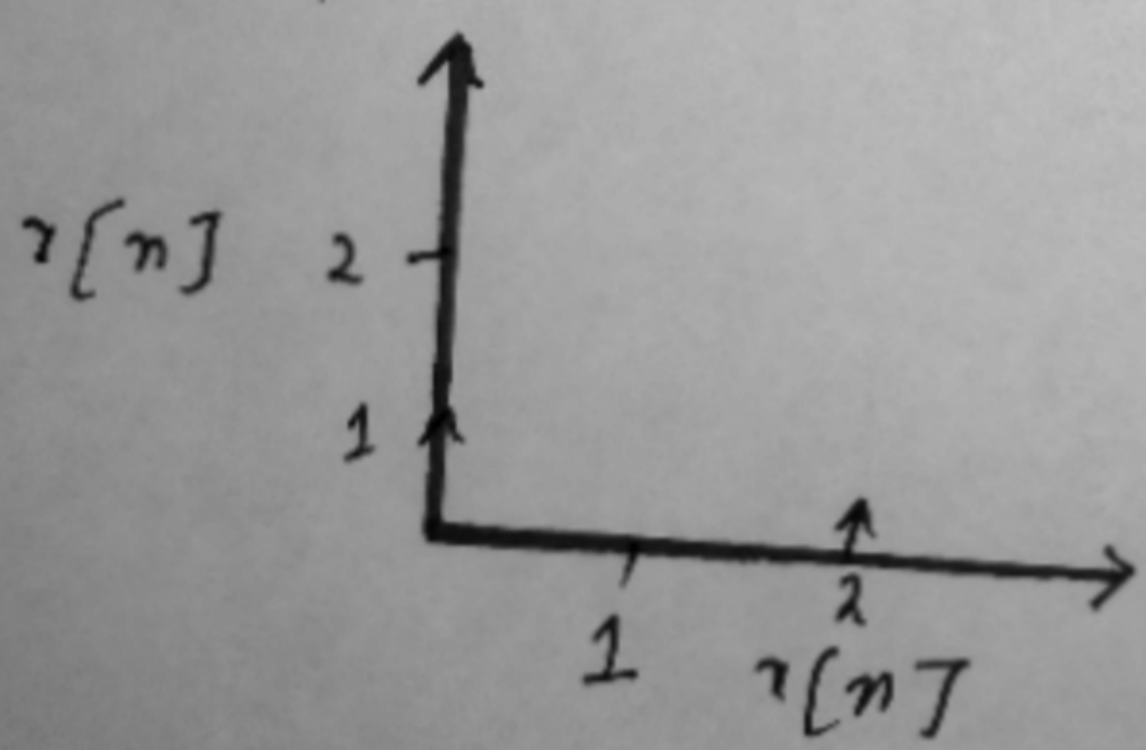
=

$$y[n] = \sum_{k=0}^{2} x[m]\, \delta[n-k]$$

Q1 part B:

Given :- $y = [n] = x[n] + x[n-2]$

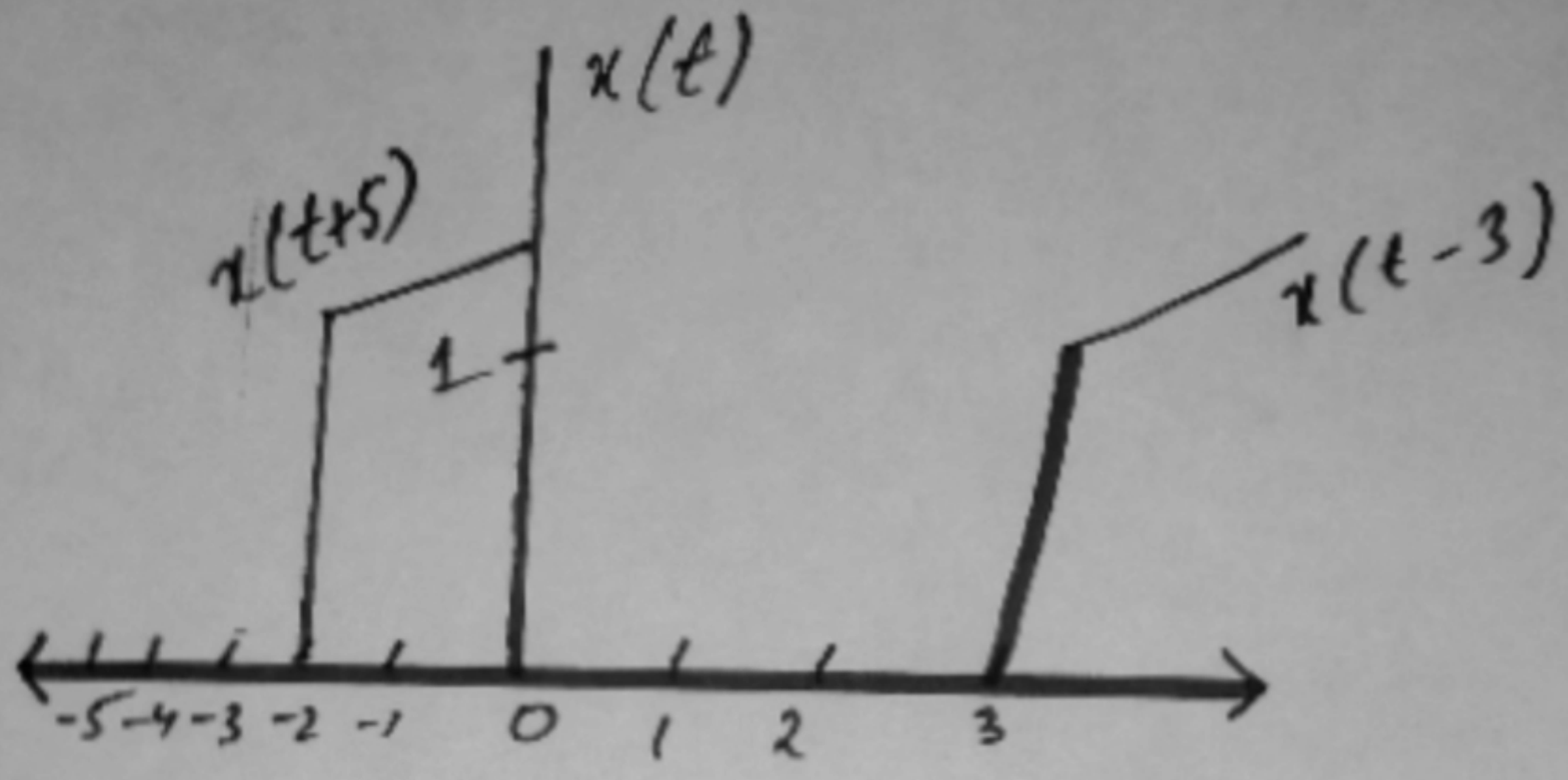
Graph.



Q2 part (a) (1) $x(t+5)$ and $x(3t)$

$y(t) = x(t-3)$,

$z(x) = x(t+5)$



Translation:

At $t = 3$, $x(t) = 1$

At $t+5 = 3$, $x(t) = 1$

$t = -5+3$

$\boxed{t = -2}$

Compression: $x(3t)$

At $t = 3$, $x(t) = 1$

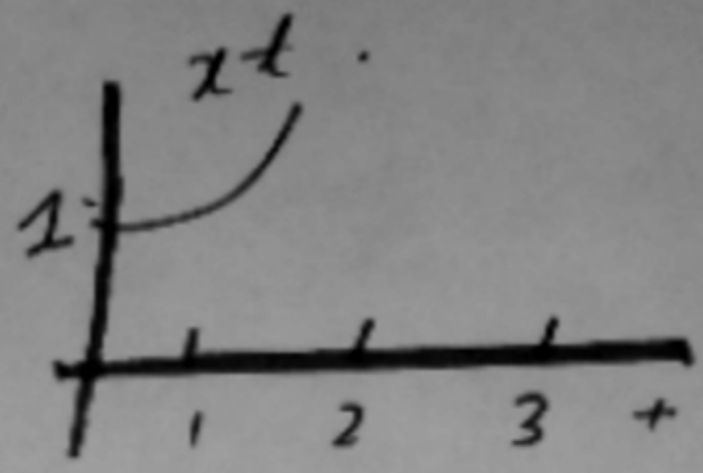
At $3t = 3$, $x(3t) = 1$

$3t = 3$

$t = 3/3$

$t = 1$

So $y(t) = x(t-3)$, $z(t) = x(3t)$



ii) $x(t/4)$ and $x(t-2)$

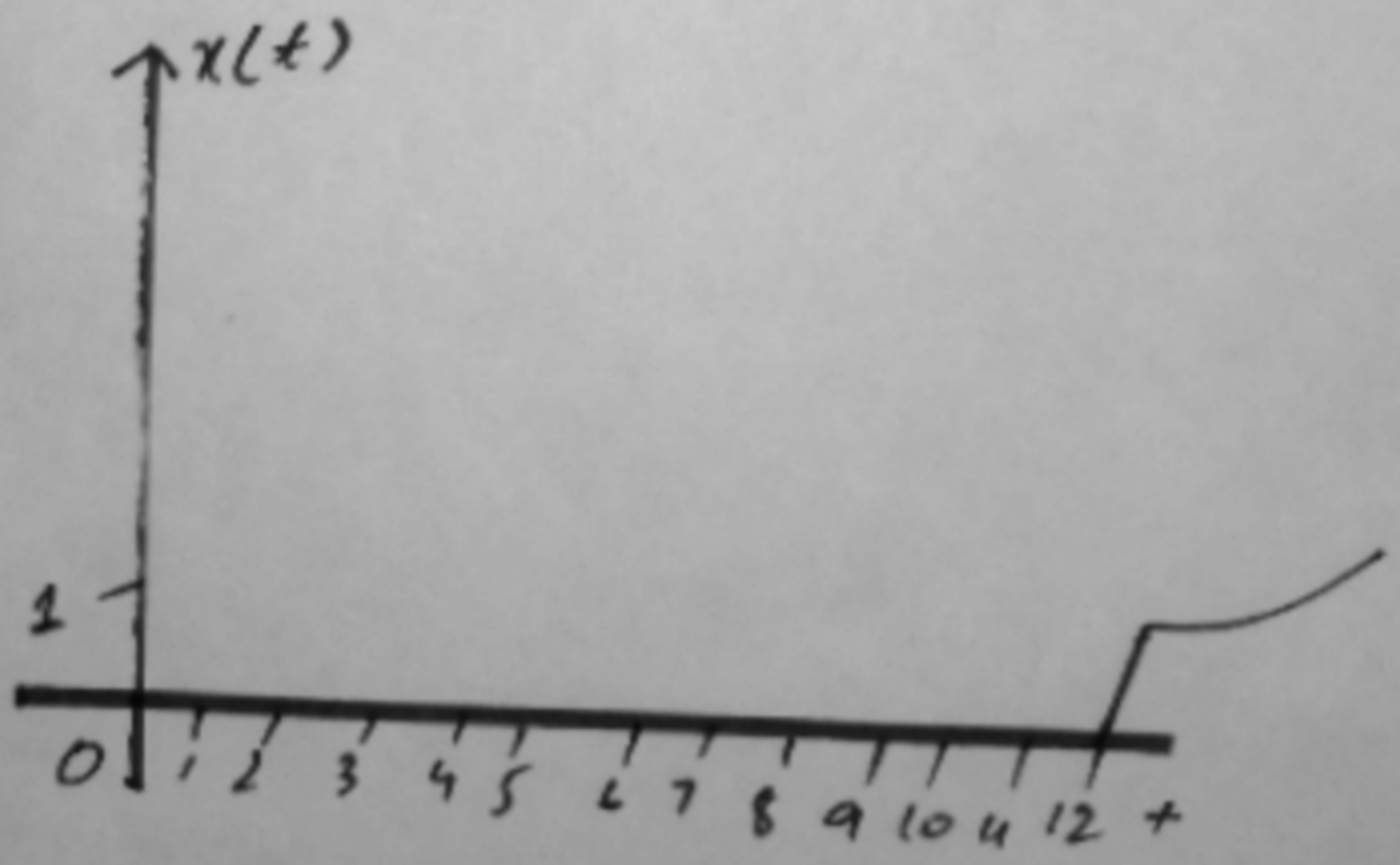
Expansion $x(t/4)$ - :-

$At = t = 3,\ x(t) = 1$

$At\ \ t/4 = 3,\ x(t/4) = 1$

$$\frac{t}{4} = 3$$

$$\boxed{t = 12}$$



Time Delay:

$x(t-2)$

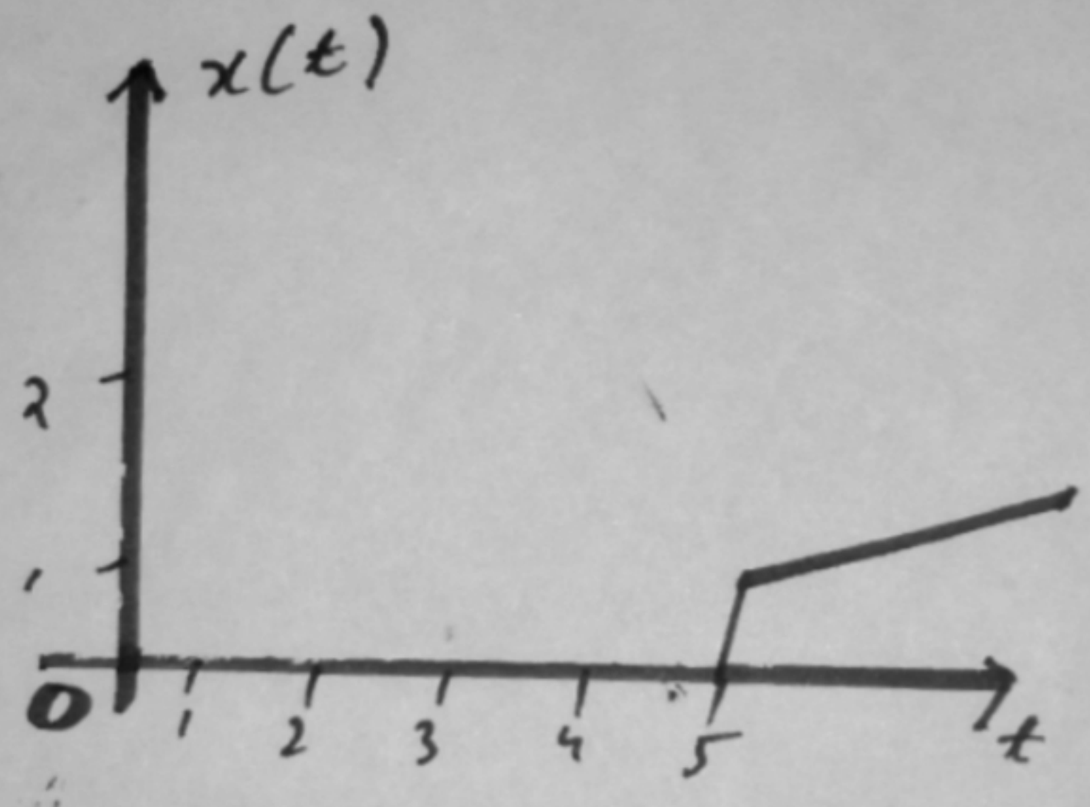
At $t = 3$, $x(t) = 1$

At $t-2 = 3$, $x(t) = 1$

$t = 2+3$

$\boxed{t = 5}$

So



Q2 part B:

(i) $Y[n] = x^2[n]$ - This is non-invertible Because we cannot determine the sign of the input from knowledge of out put.

(ii) $Y[n] = [n+2]$

This is non-caused Because its output involves future value of the input so it's non-caused.

Q3:-

Fill in the blank.

Ans:

Even

Smell