Faculty of Information Engineering & Technology
COMM 401: Signals & Systems Theory
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GUC
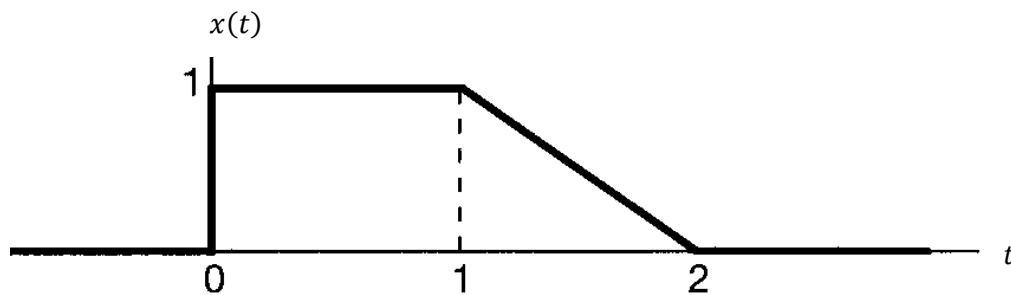German University in Cairo

Sheet 1

➢ **Transformation of Independent Variables:**

Given the continuous-time signals shown in the following figures, sketch and label carefully each of the given requirements:
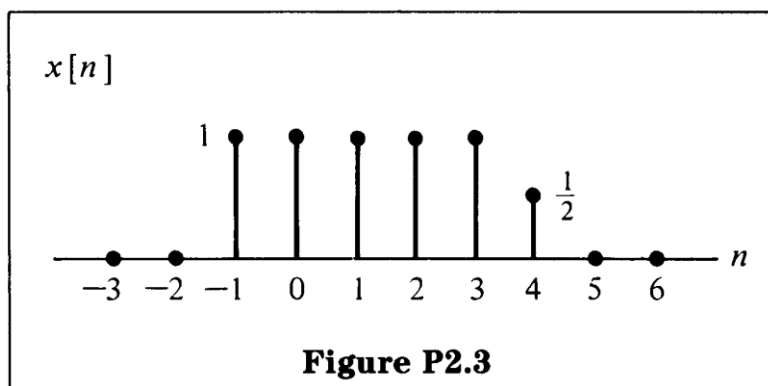
1.

a. $x(1-t)$

b. $x\left(\frac{3}{2}t+1\right)$

c. $[x(t)+x(-t)]$

d. $x(t)\left[\delta\left(t-\frac{1}{2}\right)-\delta\left(t-\frac{3}{2}\right)\right]$

2.

Figure P2.3
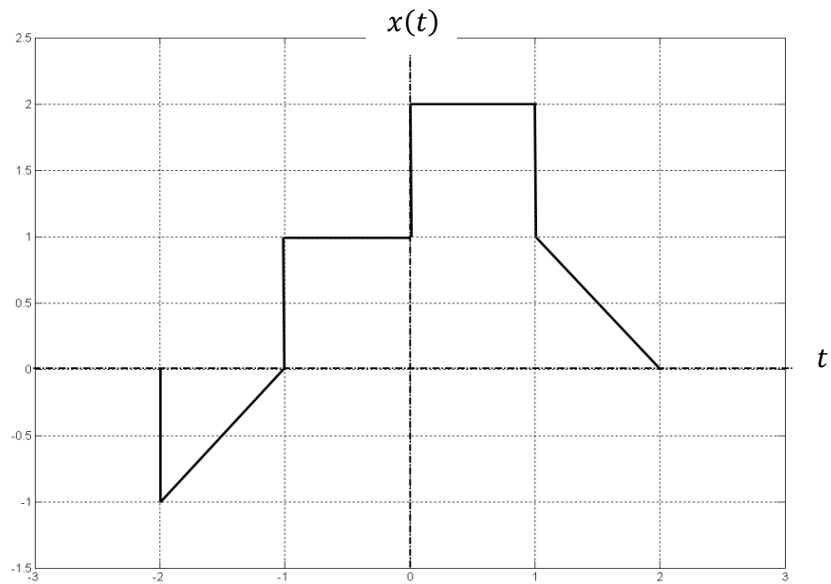
a. $x[n-2]$

b. $x[4-n]$

c. $x[2n]$

3.

$x(t)$

a. $x(t-1)$
b. $x(2-t)$
c. $x(2t+1)$
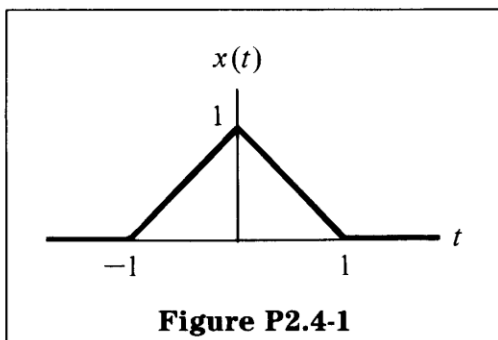
d. $x\left(4-\frac{t}{2}\right)$
e. $[x(t)+x(-t)]\,u(t)$
f. $x(t)\left[\delta\left(t+\frac{3}{2}\right)-\delta\left(t-\frac{3}{2}\right)\right]$
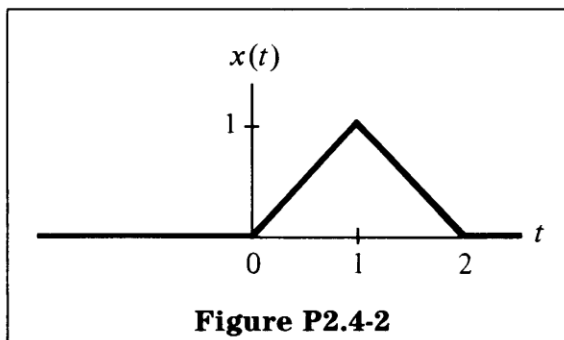
➤ **Even & Odd Signals:**

4. For each signal given below, determine all the values of the independent variable at which the even part of the signal is guaranteed to be zero.

a. $x_1[n]=u[n]-u[n-4]$
b. $x_2(t)=sin\left(\frac{1}{2}t\right)$
c. $x_3[n]=\left(\frac{1}{2}\right)^n u[n-3]$
d. $x_4(t)=e^{-5t}u(t+2)$

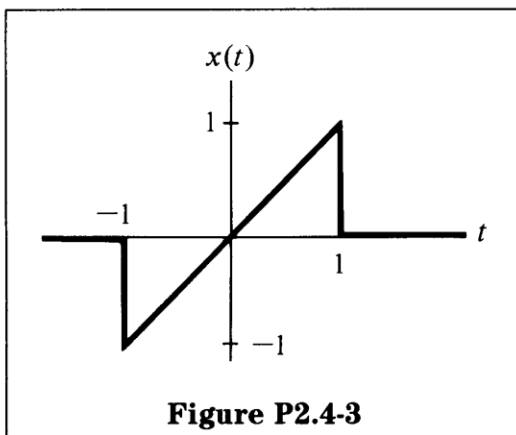5. For each of the following signals, determine whether it is even, odd, or neither and mention the reason.

(a)

Figure P2.4-1

(b)

Figure P2.4-2

(c)

Figure P2.4-3

(d)

Figure P2.4-4