# Signals and Systems HW2

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**1.14**

a) $x_1(t) = 3t^2 + 4t^4$

- if $x_1(-t) = x_1(t)$ then the graph of $f(x)$ is symetical wl respect to the y-axis
- if $x_1(-t) = -x_1(t)$ then the graph is symmetical wl respect to the origin

- $x_1(t) = 3t^2 + 4t^4$
  - $x_1(-t)$
  - $x_1(-t) = 3(-t)^2 + 4(-t)^4 \Rightarrow \underline{x_1(-t) = x_1(t)}$

Symetrical wl respect to the y-axis

b) $x_2(t) = 3t^3$
  - $x_2(-t)$

- $x_2(-t) = 3(-t)^3 \Rightarrow \underline{x_2(-t) = -x_2(t)}$

Symetric wl respect to the origin

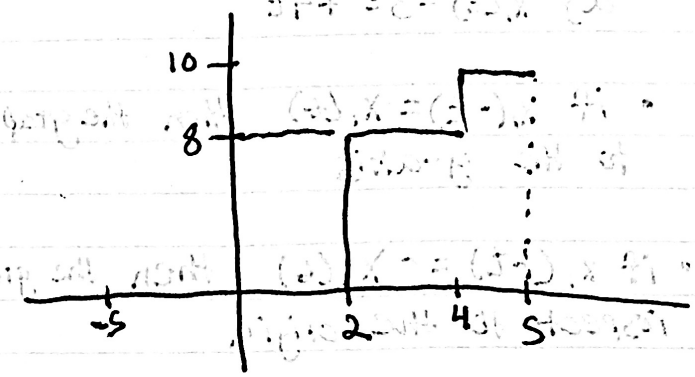
1.20

a) $x_1(t) = 8u(t-2) + 2u(t-4)$

$u(t) = \begin{cases} 1, & t \geq 0 \\ 0, & \text{elsewhere} \end{cases}$

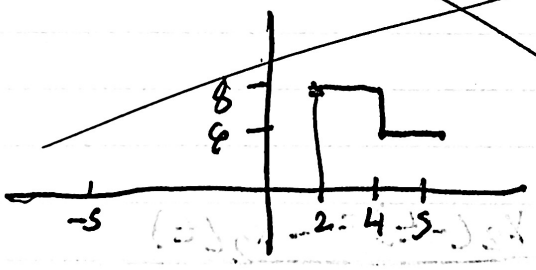
$u(t-2) = \begin{cases} 1, & t \geq 2 \\ 0, & \text{elsewhere} \end{cases}$

$u(t-4) \begin{cases} 1, & t \geq 4 \\ 0, & \text{elsewhere} \end{cases}$



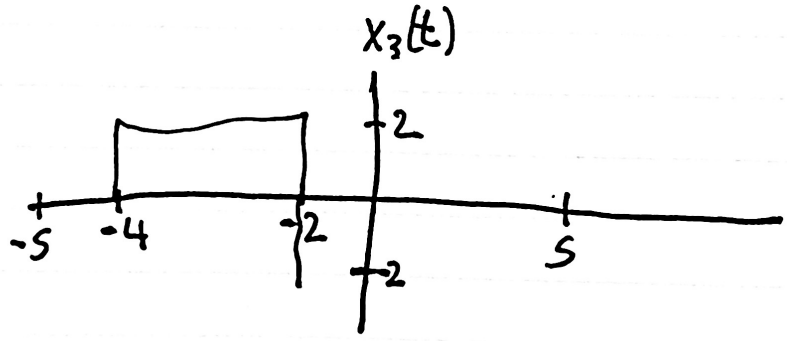

Did not mean to cross out

b) $u(t-2) = \begin{cases} 1, & t \geq 2 \\ 0, & \text{elsewhere} \end{cases}$ $u(t+4) = \begin{cases} 1, & t \geq 4 \\ 0, & \text{elsewhere} \end{cases}$




c) $u(t+2) = \begin{cases} 1, & t \geq -2 \\ 0, & \text{elsewhere} \end{cases}$

$u(t+4) = \begin{cases} 1, & t \geq -4 \\ 0, & \text{elsewhere} \end{cases}$



1.21

- a) $x_1(t) = 4u(t+1)$

~~b) $x_2(t) = -2u(t+2) + 2u(t-2)$~~

- c) $x_3(t) = 2u(t) + 2u(t-2) + 2u(t-3)$

~~d) $x_4(t) = 6u(t) - 2u(t-1) - 2u(t-3) - 2u(t-4)$~~

- e) $x_5(t) = 2u(t) + 4u(t-1) - 4u(t-3) - 2u(t-4)$

~~f) $x_6(t) = 4u(t) - 6u(t-1) + 6u(t-2) - 4u(t-3)$~~

1.28

a) $y_1(t) = \int_{-\infty}^{\infty} t^3 \delta(t-2)\,dt$

Sampling property of Impuls

- $\int_{-\infty}^{\infty} f(t)\,\delta(t-a)\,dt = f(a)$

$\Rightarrow$ $(2)^3 = 8$

b) $y_2(t) = \int_{-\infty}^{\infty} \cos(t)\,\delta(t-\pi/3)\,dt$

$\Rightarrow$ $\cos \pi/3 = 1/2$