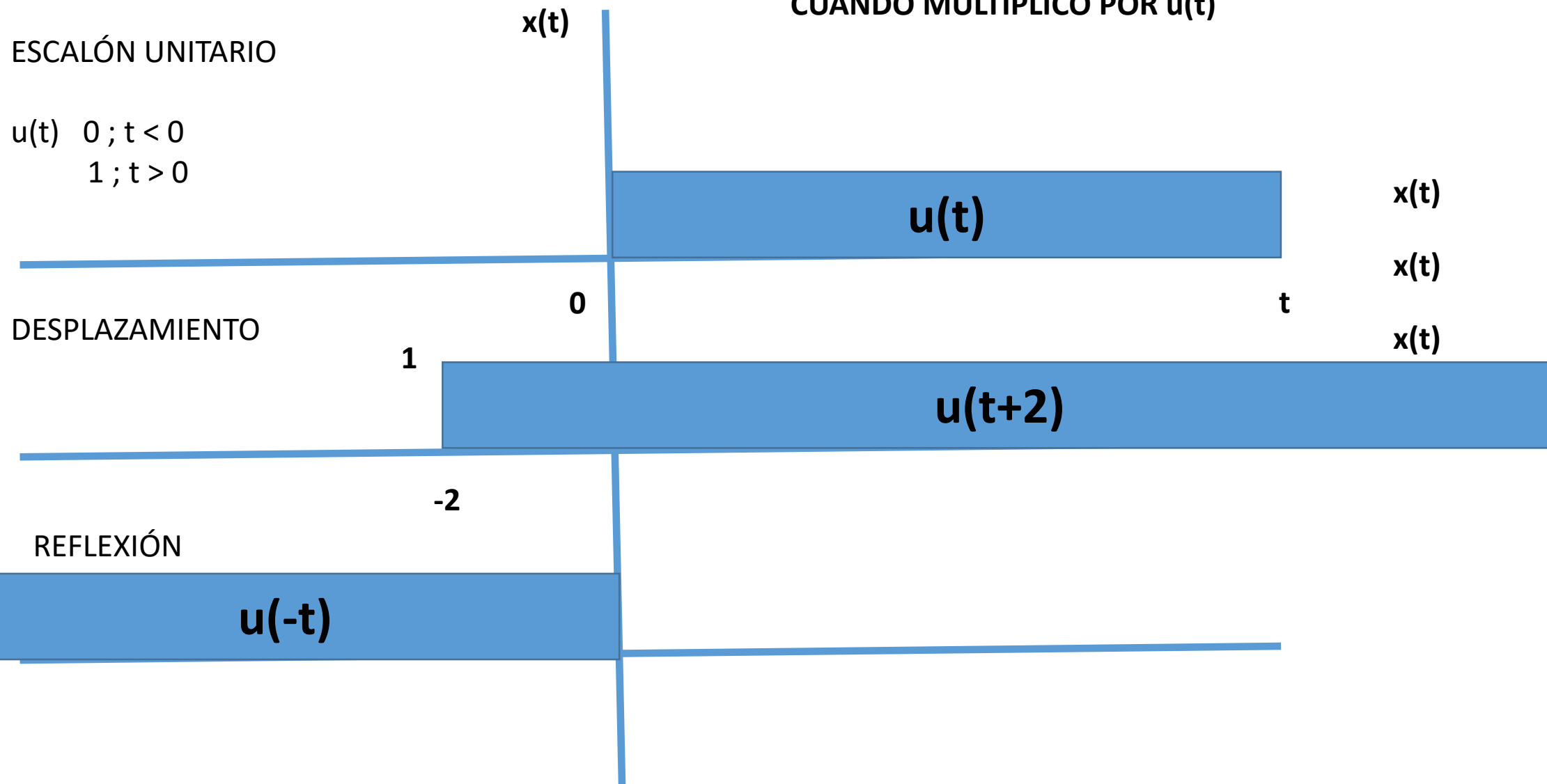


## SEÑALES PARTICULARES

### ESCALÓN UNITARIO

$$u(t) \begin{cases} 0 & ; t < 0 \\ 1 & ; t > 0 \end{cases}$$

### USO DEL ESCALÓN: ACOTAR SEÑALES CUANDO MULTIPLICADO POR $u(t)$

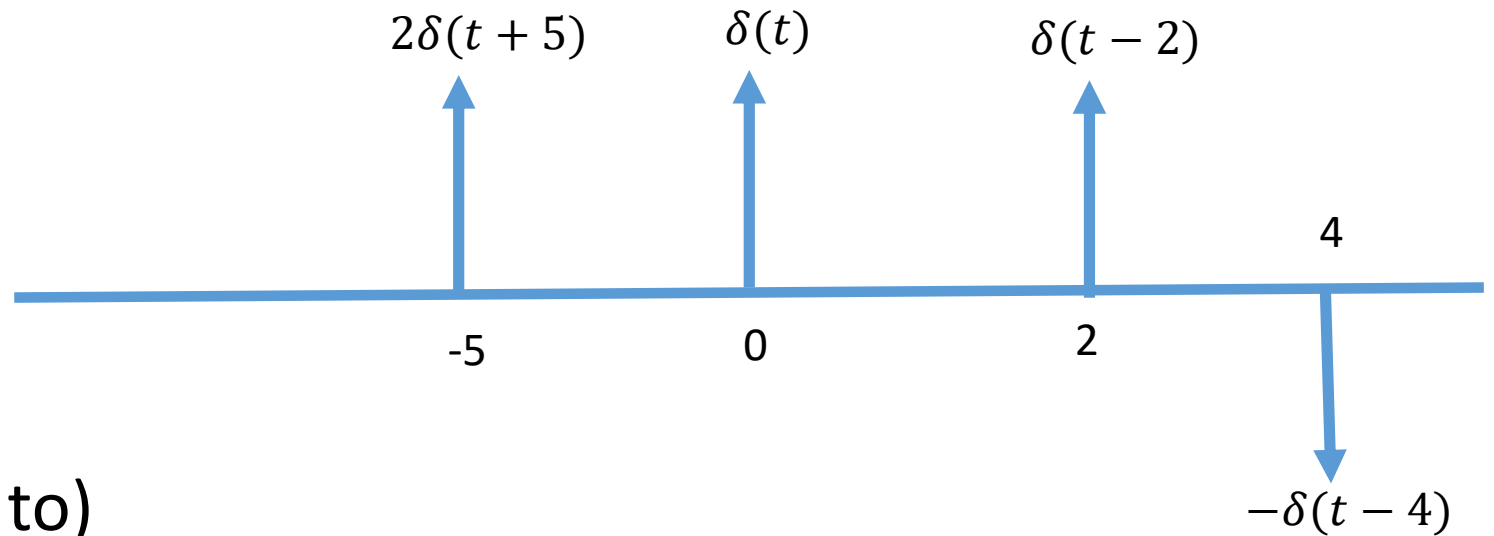


SEÑALES PARTICULARES  
IMPULSO UNITARIO

$\delta(t)$

$$\delta(t) \cdot x(t) = x(0) \cdot \delta(t)$$

$$\delta(t - t_0) \cdot x(t) = x(t_0) \cdot \delta(t - t_0)$$



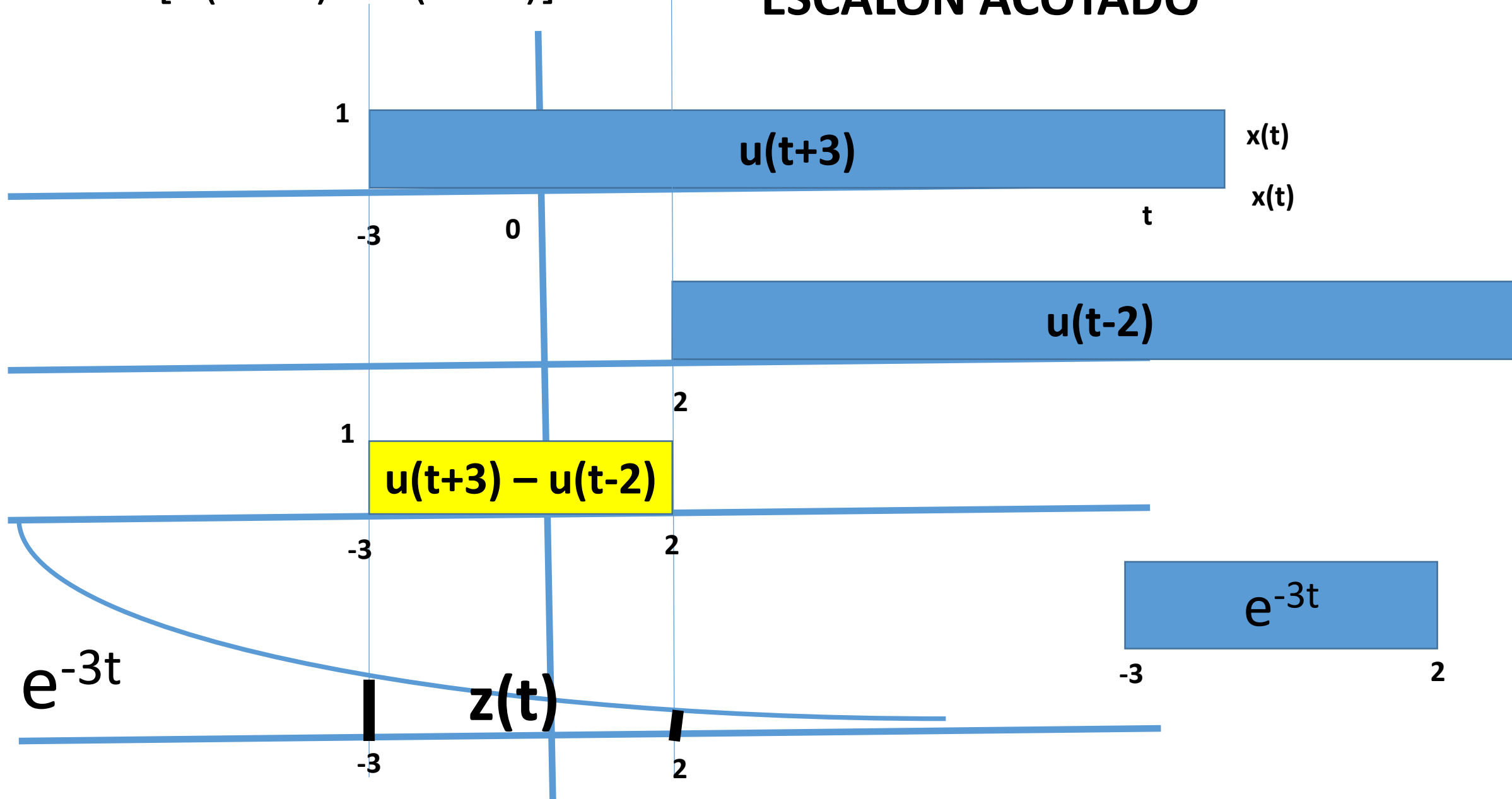
$$\int_{-\infty}^{+\infty} \delta(t) \cdot dt = 1$$

$$\int_{-\infty}^{+\infty} \delta(t) \cdot x(t) \cdot dt = x(0)$$

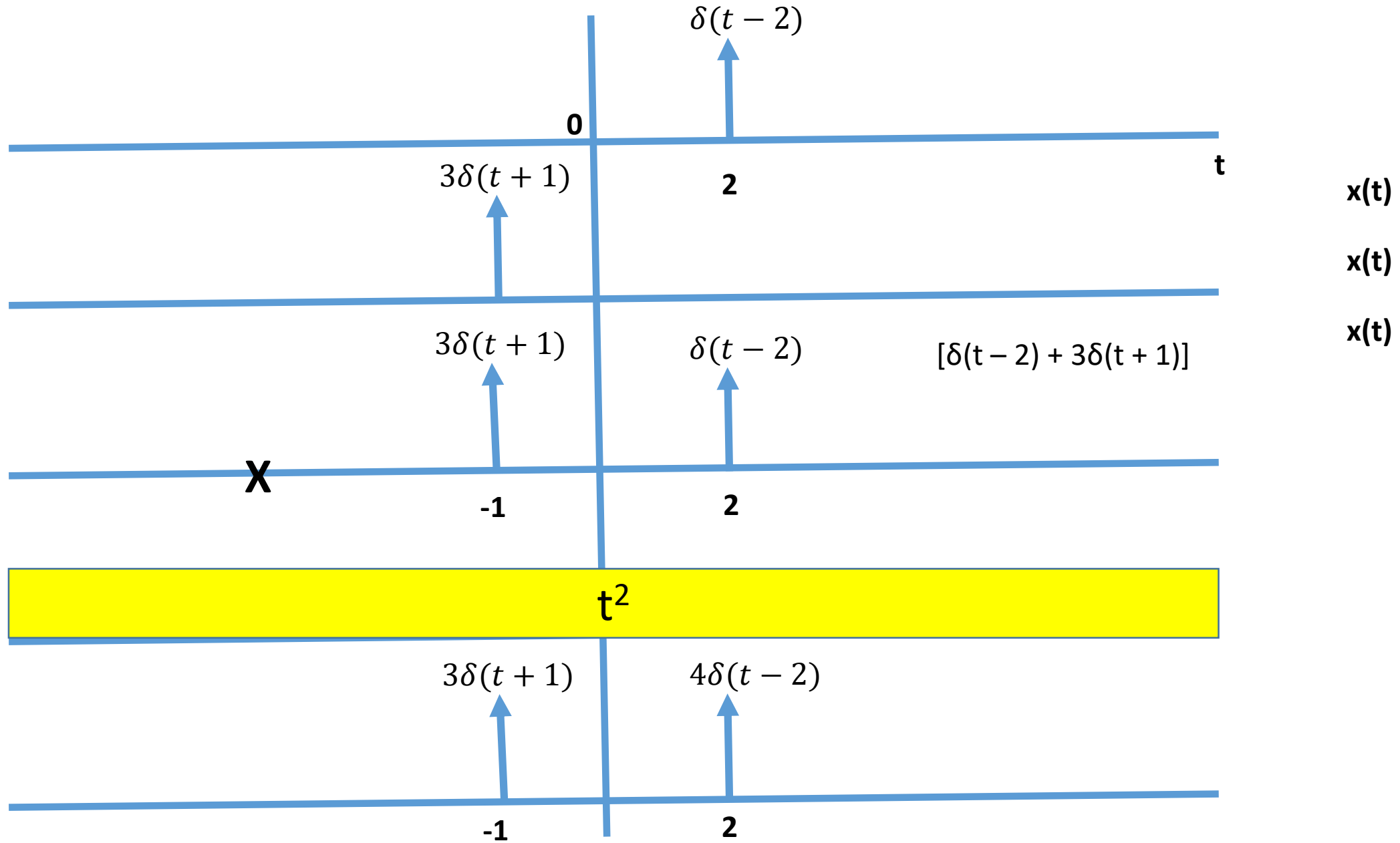
$$\int_{-\infty}^{+\infty} \delta(t - t_0) \cdot x(t) \cdot dt = x(t_0)$$

$$z(t) = e^{-3t} \cdot [u(t+3) - u(t-2)]$$

## ESCALÓN ACOTADO



$$y(t) = t^2 \cdot [\delta(t - 2) + 3\delta(t + 1)]$$



## Problema 2:

Dadas las siguientes señales:

$$x(t) = \delta(t - 2) + \delta(t + 2) - 2\delta(t - 8)$$

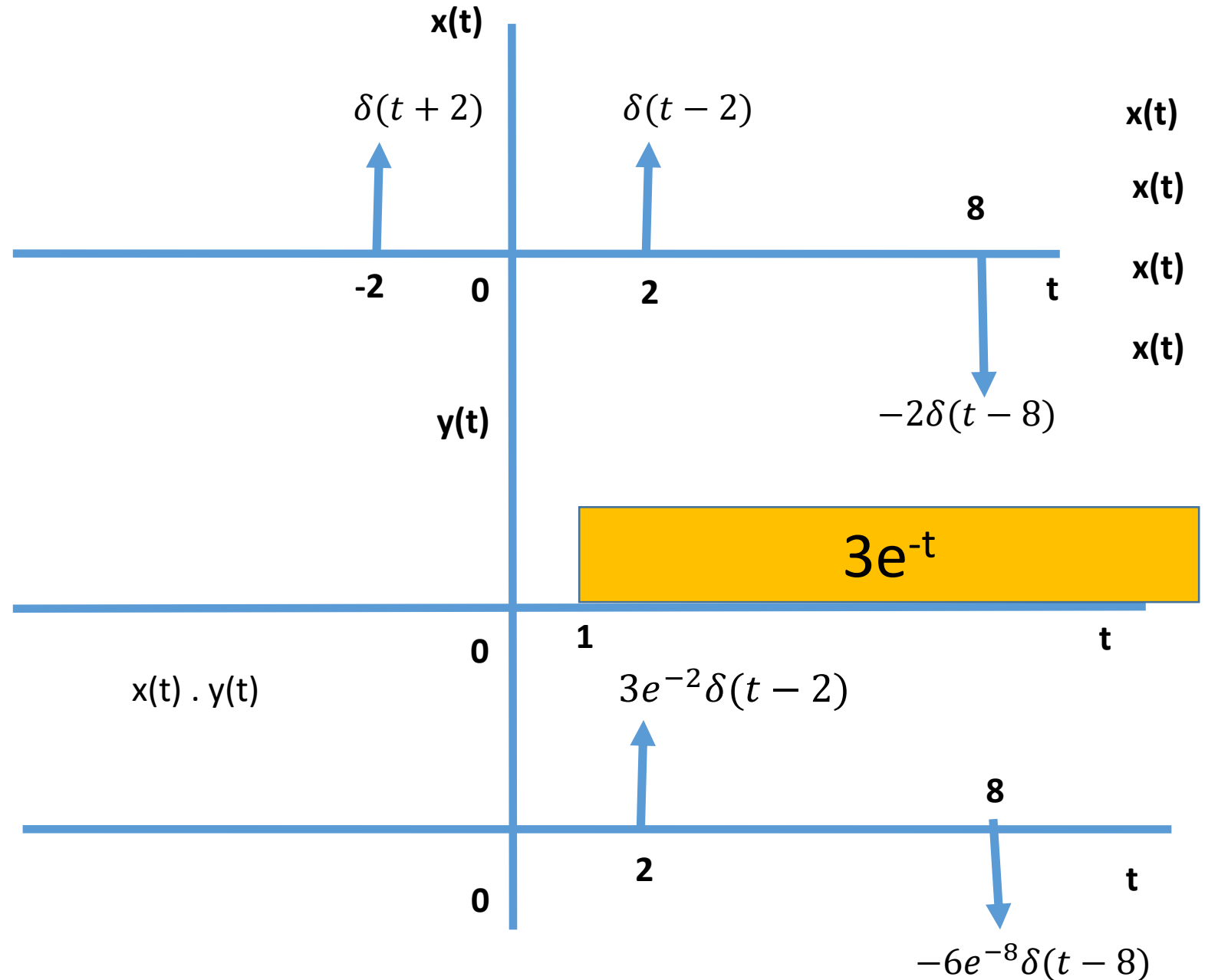
$$y(t) = 3e^{-t} u(t - 1)$$

$$z(t) = \begin{cases} -3t ; t < 1 \\ t^2 ; 1 \leq t < 3 \\ 5 ; t \geq 3 \end{cases}$$

Se pide:

a)  $x(t) \cdot y(t)$

b)  $x(t) \cdot z(t)$



## Problema 2:

Dadas las siguientes señales:

$$x(t) = \delta(t - 2) + \delta(t + 2) - 2\delta(t - 8)$$

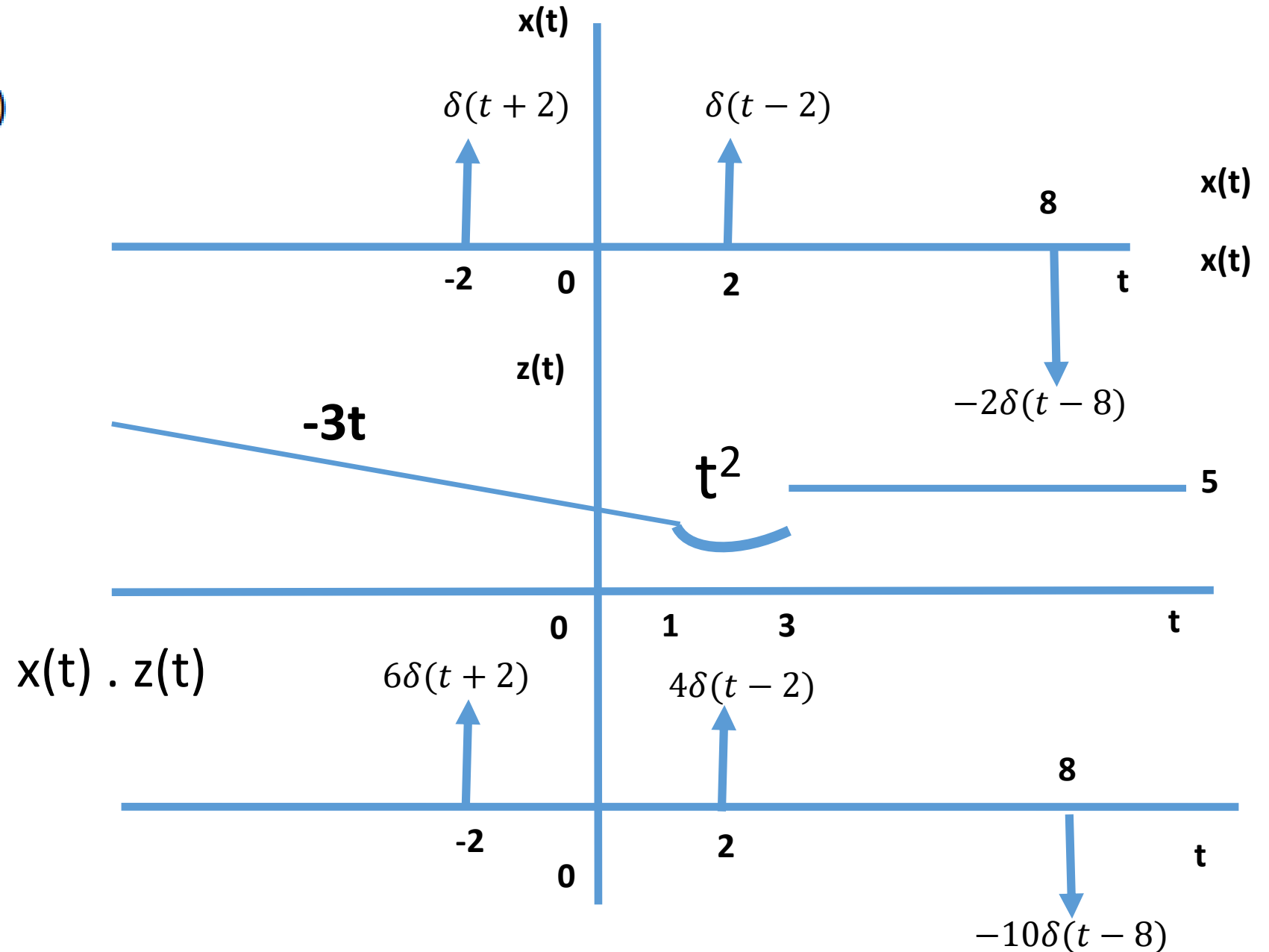
$$y(t) = 3e^{-t} u(t - 1)$$

$$z(t) = \begin{cases} -3t ; t < 1 \\ t^2 ; 1 \leq t < 3 \\ 5 ; t \geq 3 \end{cases}$$

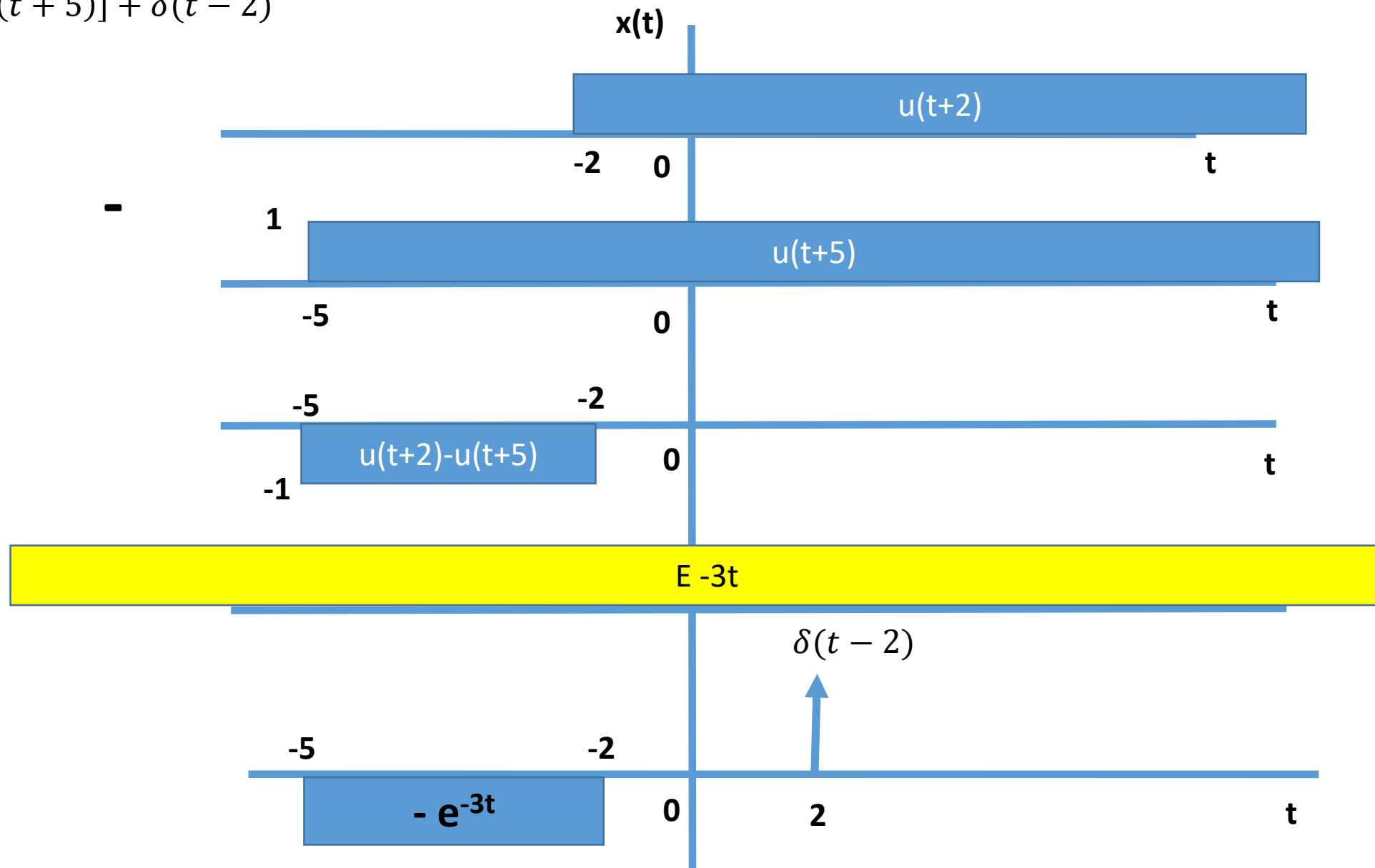
Se pide:

a)  $x(t) \cdot y(t)$

b)  $x(t) \cdot z(t)$



$$x(t) = e^{-3t}[u(t+2) - u(t+5)] + \delta(t-2)$$



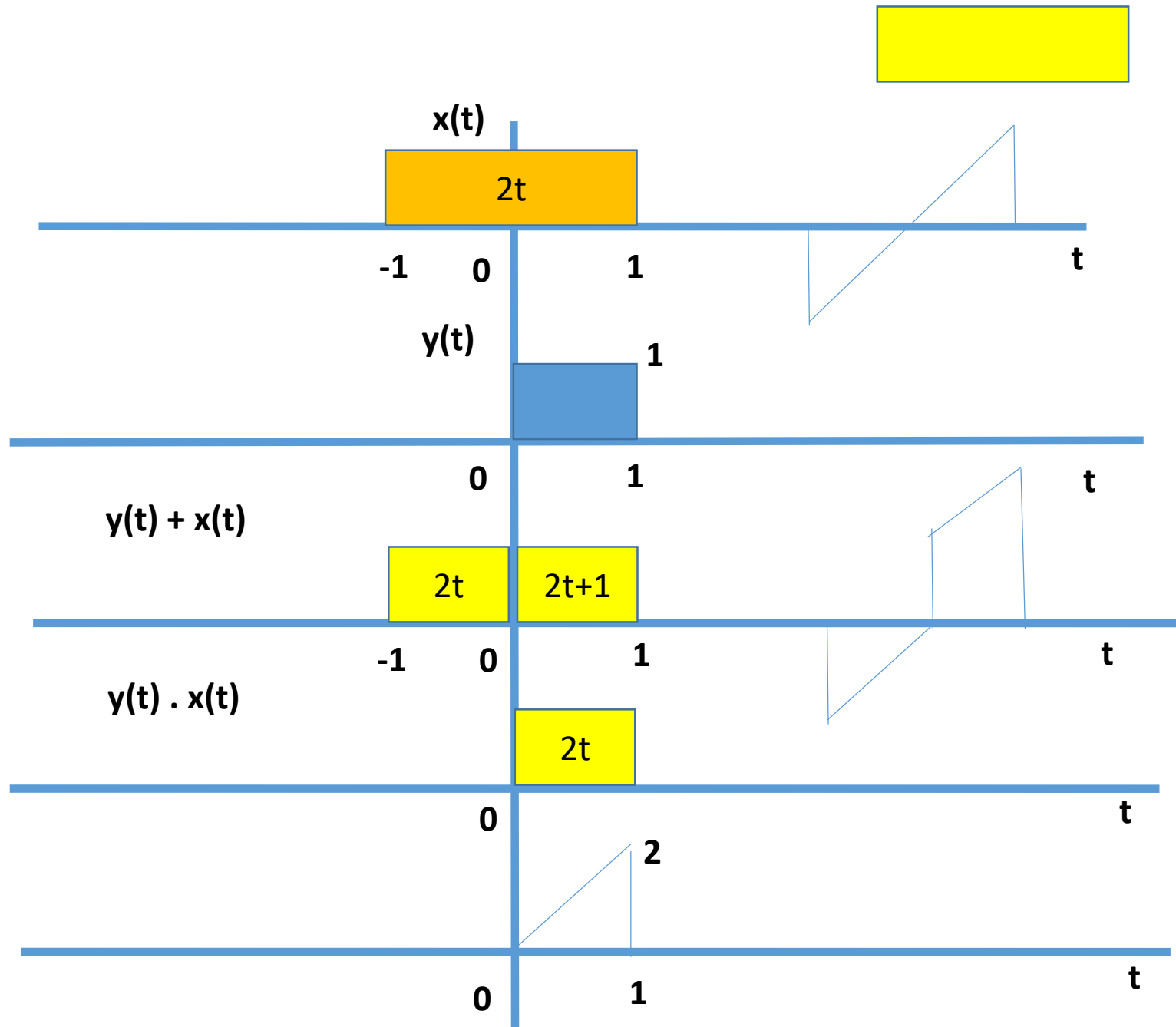
$$x(t) = 2t \cdot [u(t + 1) - u(t - 1)]$$

$$y(t) = u(t) - u(t - 1)$$

Calcular

a)  $y(t) + x(t)$

b)  $x(t) \cdot y(t)$

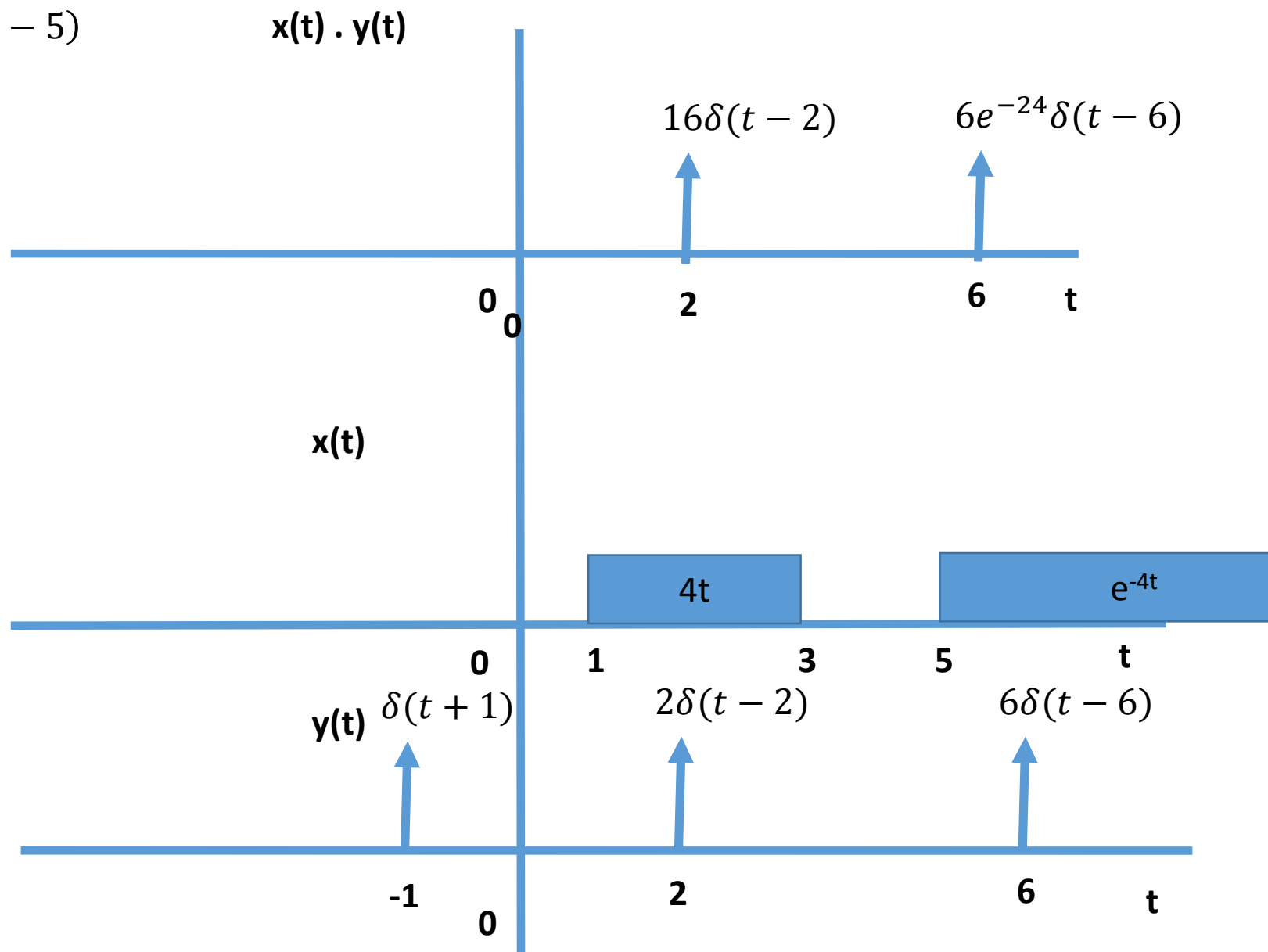


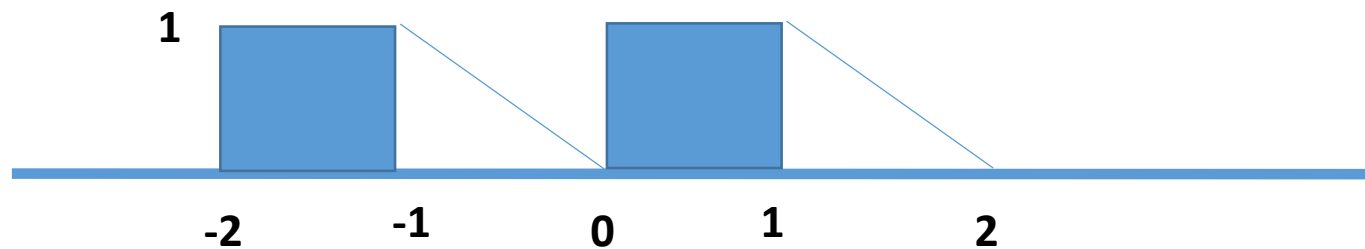


$$x(t) = 4t[u(t-1) - u(t-3)] + e^{-4t}u(t-5)$$

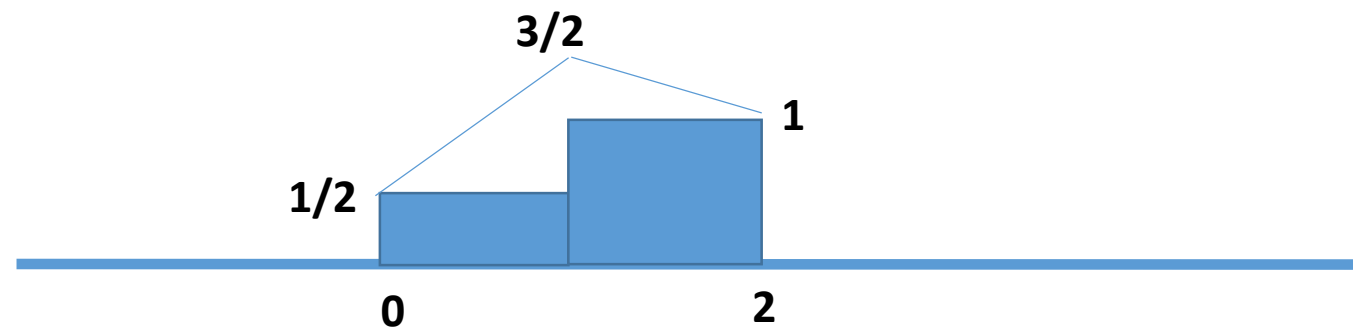
$$y(t) = \delta(t+1) + 2\delta(t-2) + 6\delta(t-6)$$

$$x(t) \cdot y(t)$$

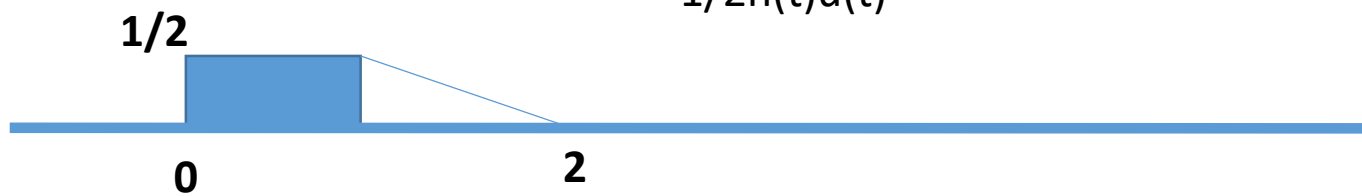




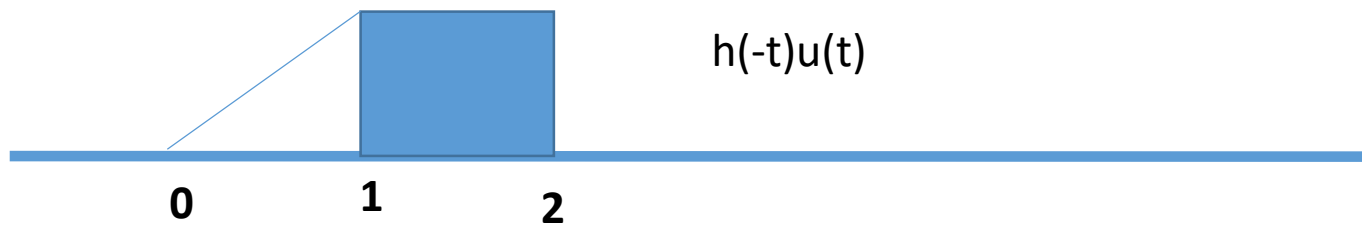
$$\frac{1}{2}h(t)u(t) + h(-t)u(t)$$



$$\frac{1}{2}h(t)u(t)$$



$$h(-t)u(t)$$

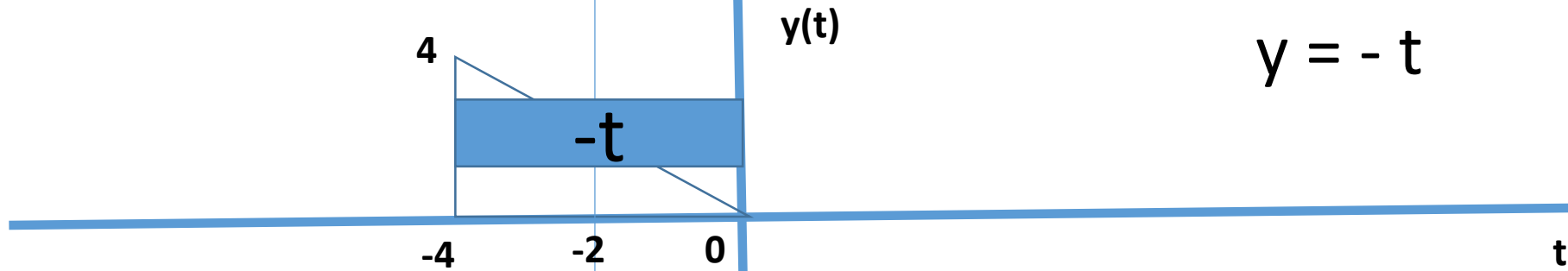
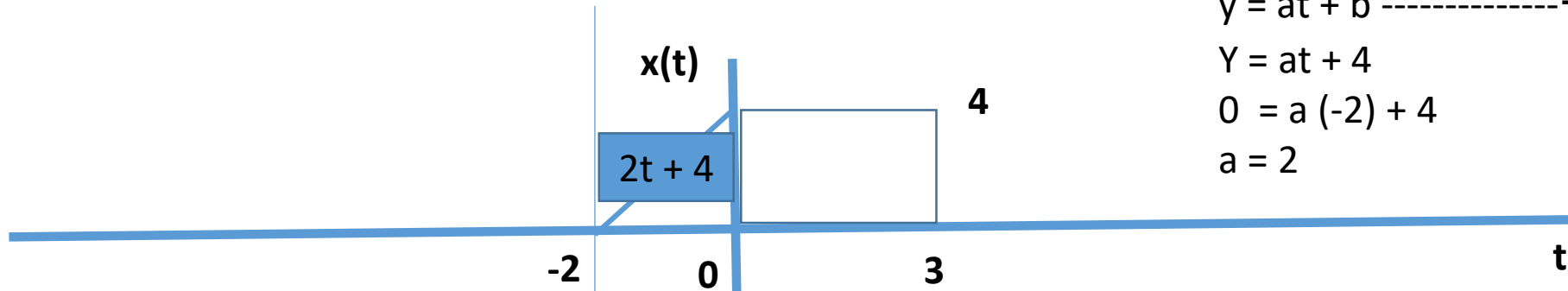


$$y = at + b \longrightarrow x = 2t + 4$$

$$Y = at + 4$$

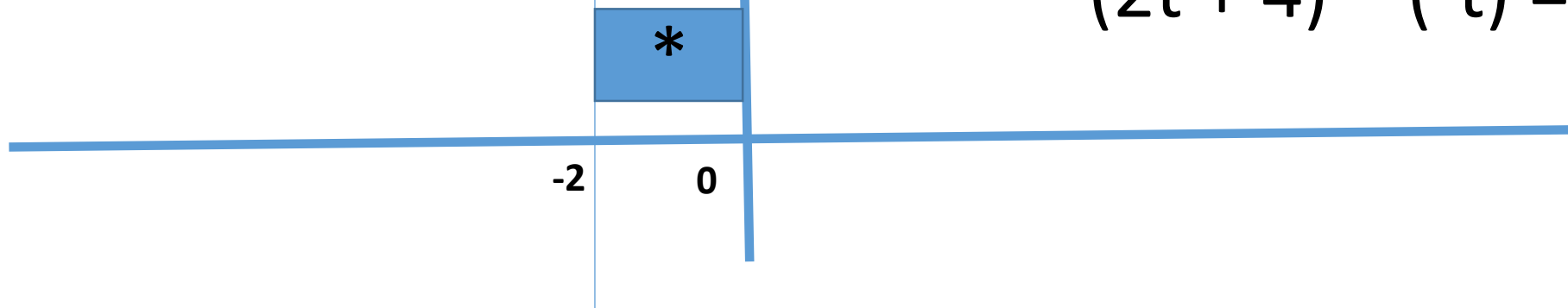
$$0 = a(-2) + 4$$

$$a = 2$$



$$y = -t$$

$$(2t + 4) * (-t) = -2t^2 - 4t (*)$$



$$x(t) \cdot y(t) = -2t^2 - 4t ; \quad 2 < t < 0$$