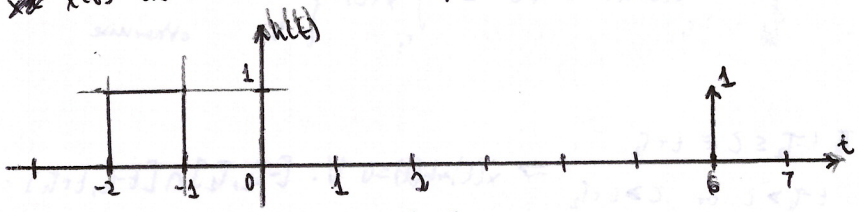
...2,44. (2)

d) Consider an LTI system with this impulse response. Over what interval must we know $x(t)$ in order to determine $y(0)$?




$$h(t) = \delta(t-6) + \begin{cases} 1 & \text{if } -2 \le t \le -1 \\ 0 & \text{otherwise} \end{cases}$$

$$y(0) = \int_{-\infty}^{\infty} x(\tau)\, h(0-\tau)\, d\tau = \int_{1}^{2} x(\tau)\, d\tau + x(t) * \delta(t-6)\Big|_{t=0} = \int_{1}^{2} x(\tau)\, d\tau + x(0-6) = \int_{1}^{2} x(\tau)\, d\tau + x(-6)$$

This means we need to know the values of $x(t)$ at $1 \le t \le 2$ and at $t = -6$.