e.g $x(t) = e^{-at} u(t)$; $a > 0$

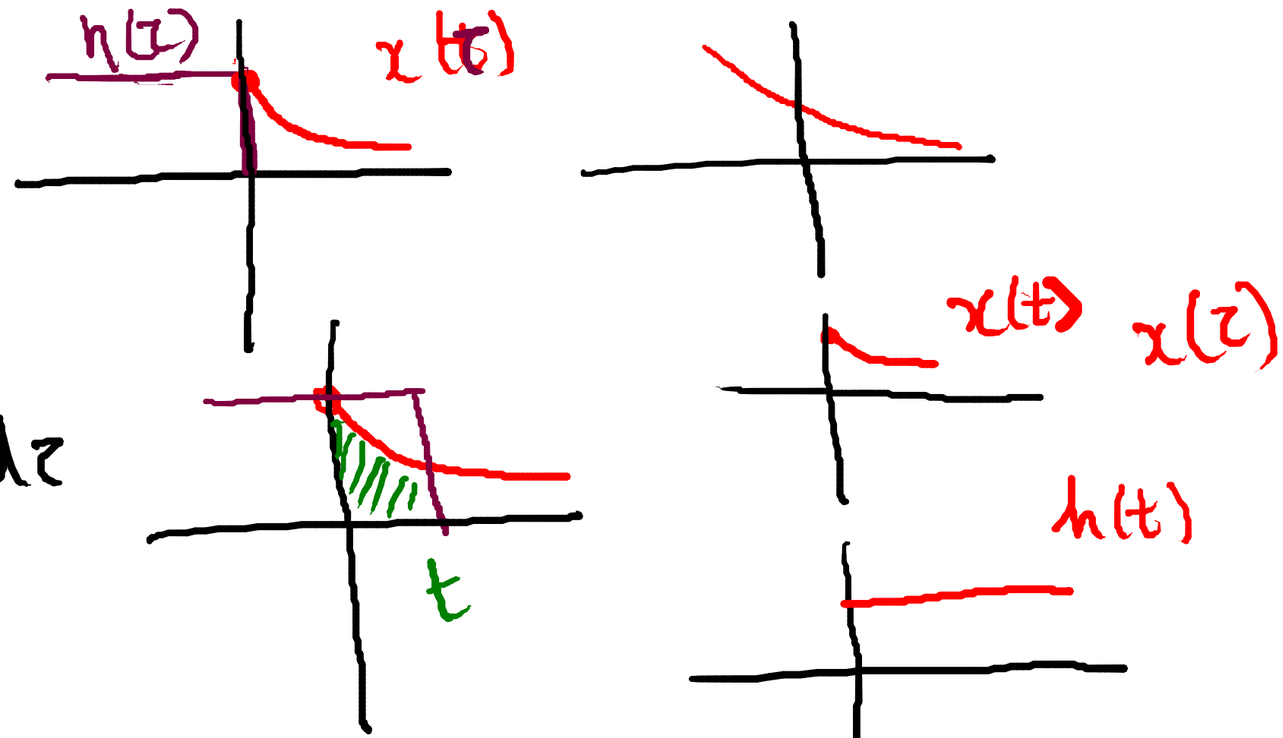
$h(t) = u(t)$

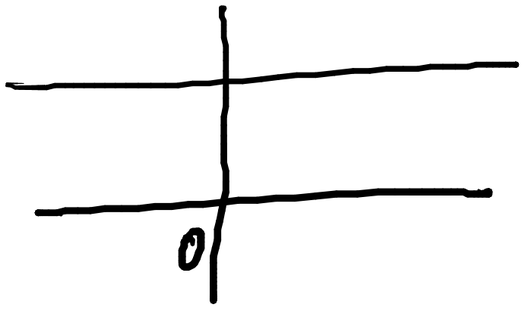
$$y(t) = \int_{-\infty}^{\infty} x(\tau)\, h(t-\tau)\, d\tau$$

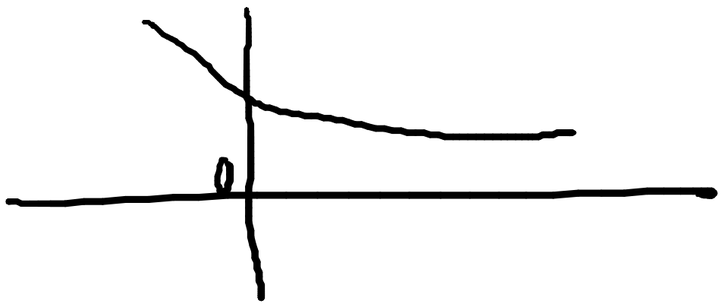
$$= \int_{0}^{t} e^{-a\tau}\, d\tau$$

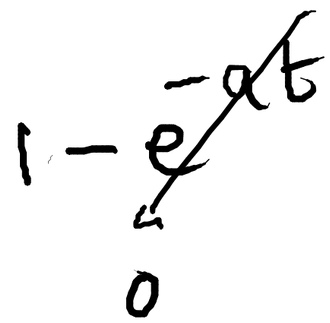
$$= \frac{e^{-a\tau}}{-a}\Bigg|_{0}^{t} = \frac{e^{-at} - 1}{-a}$$

$$= \frac{1 - e^{-at}}{a}$$

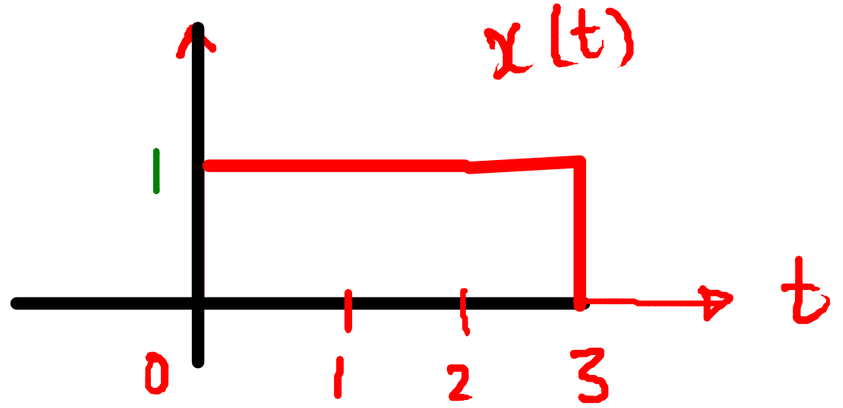


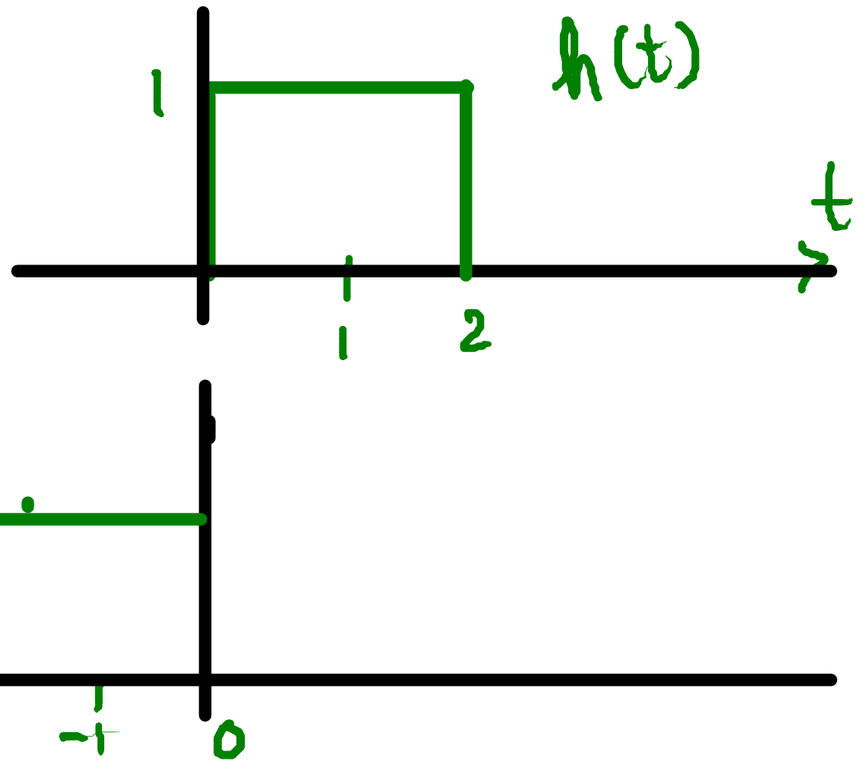


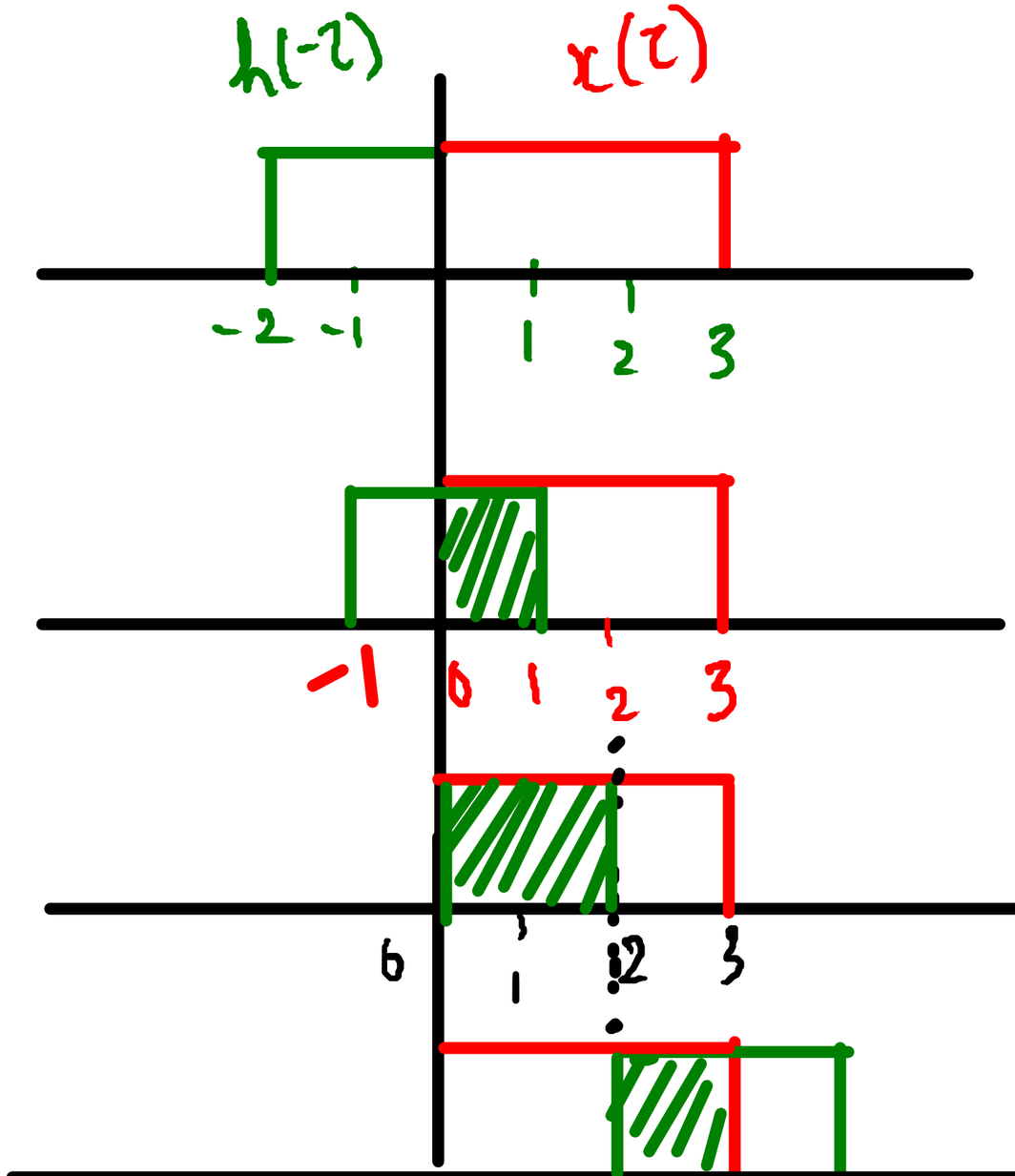




e.g.







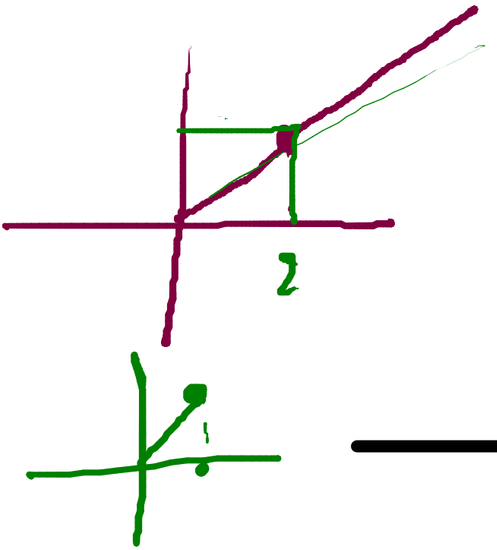
$$\int_{-\infty}^{\infty} x(\tau) \cdot h(t-\tau)\, d\tau$$

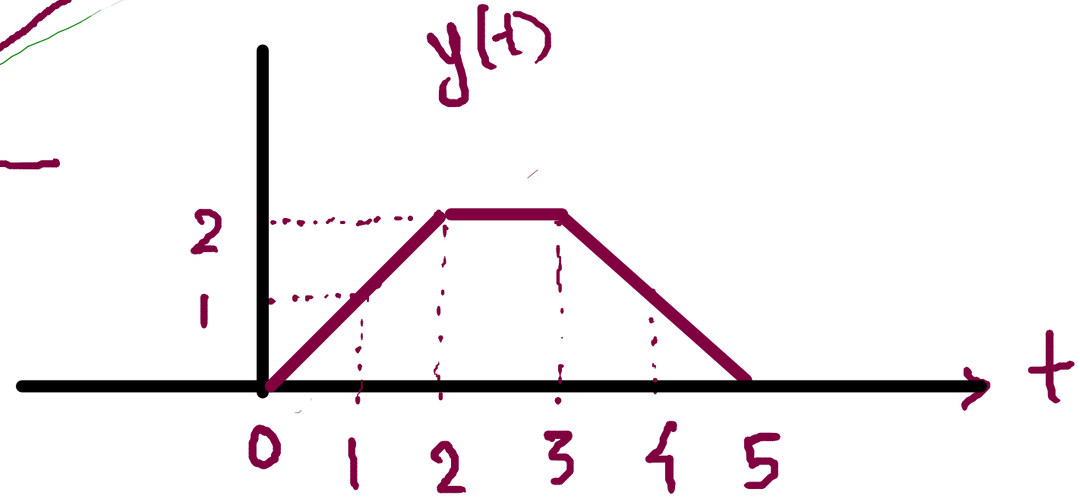
6 to

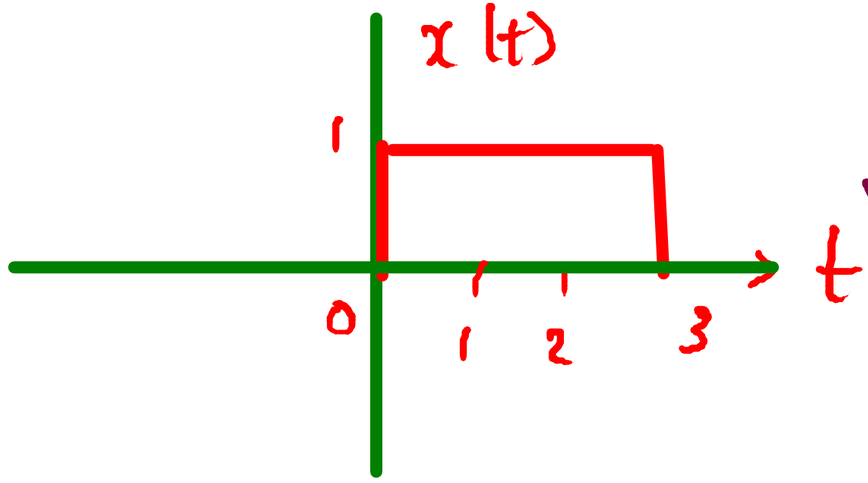
$$x : \{ x_{min}, x_{max} \}$$

$$h : \{ h_{min}, h_{max} \}$$

$$y : \{ x_{min} + h_{min}, \; x_{max} + h_{max} \}$$



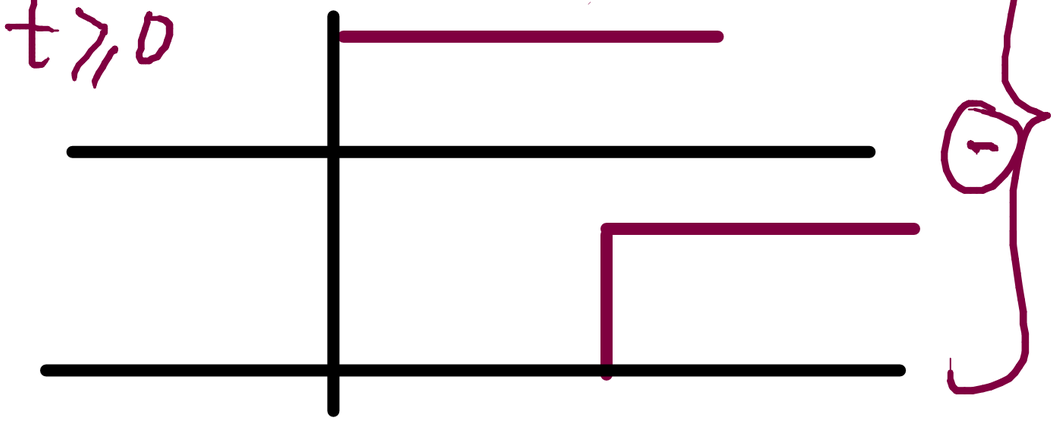




$u(t) - u(t-3)$

✓ $t\left(u(t)-u(t-2)\right)$

$r(t) = t \quad ; t \geq 0$



e.g. $x[n] = \{1, 2, 3\}$; 0 to 2

$h[n] = \{4, 5, 6\}$; 0 to 2

} 0 to 4