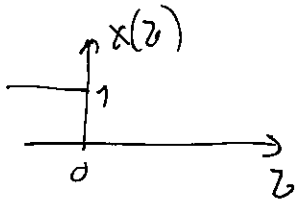
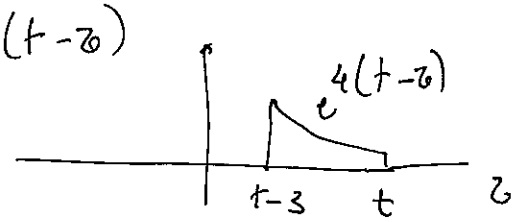
Problema 5

$$y(t) = x(t) * h(t)$$

$$= \int_{-\infty}^{+\infty} x(z)\, h(t-z)\, dz$$





Há a considerar 3 intervalos

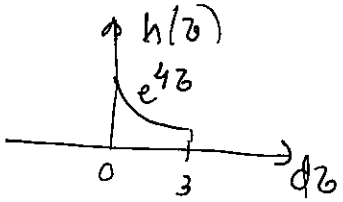
$t<0$ $\quad y(t) = \int_{t-3}^{t} e^{4(t-z)}\, dz = e^{4t}\, \frac{e^{-4z}}{-4}\Big|_{t-3}^{t} = \frac{e^{12}-1}{4}$

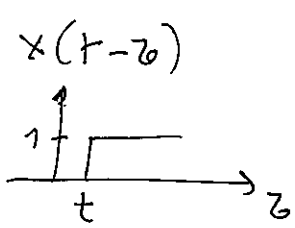
$0 \le t \le 3$ $\quad y(t) = \int_{t-3}^{0} e^{4(t-z)}\, dz = e^{4t}\, \frac{e^{-4z}}{-4}\Big|_{t-3}^{0} = \frac{e^{12}-e^{4t}}{4}$

$t > 3$ $\quad y(t) = 0$

Outra resolução possível:

$$y(t) = h(t) * x(t) = \int_{-\infty}^{+\infty} h(z)\, x(t-z)\, dz$$ (comutatividade da convolução)





Há a considerar 3 intervalos

$t<0$ $\quad y(t) = \int_{0}^{3} e^{4z}\, dz = \frac{e^{12}-1}{4}$

$0 \le t \le 3$ $\quad y(t) = \int_{t}^{3} e^{4z}\, dz = \frac{e^{12}-e^{4t}}{4}$

$t > 3$ $\quad y(t) = 0$