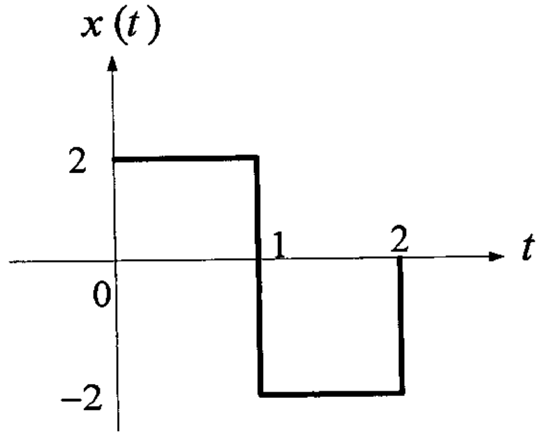
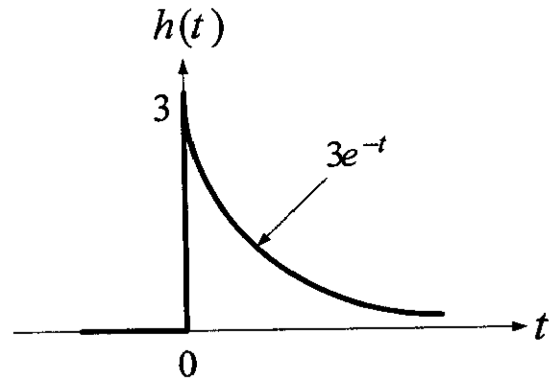
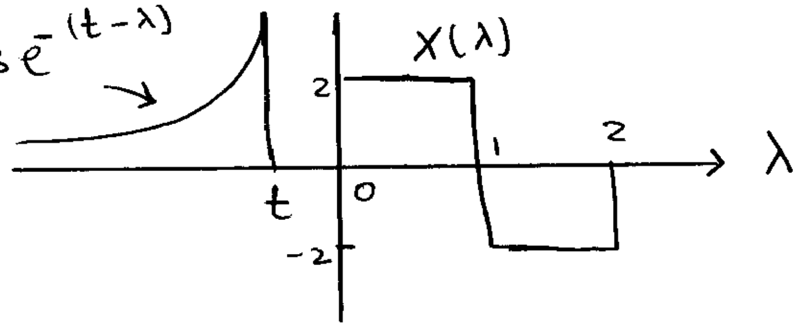
EE 207-03-06 – Winter 2012(112)
Quiz 2

SER	ID	NAME KEY

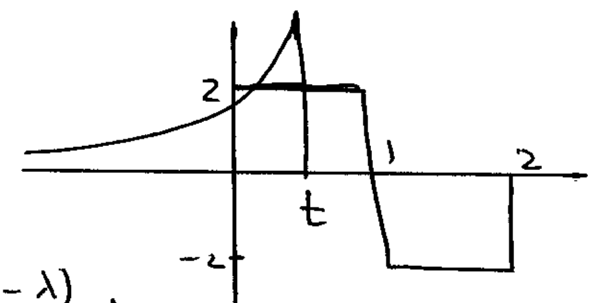




For the functions x(t) and h(t) shown above , evaluate the convolution x(t)*h(t)



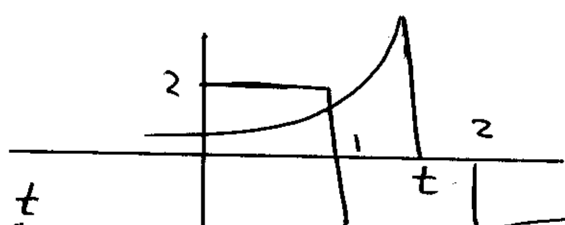
$t \leq 0 \Rightarrow x(t) * h(t) = 0$ (No overlapping)



$0 < t \leq 1$

$$x(t) * h(t) = \int_0^2 (2)(3e^{-(t-\lambda)})\,d\lambda \Rightarrow 6$$

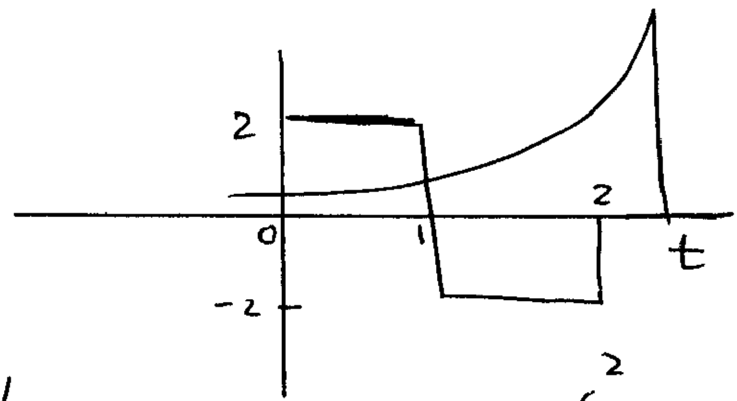
$$= 6e^{-t}\int_0^2 e^{\lambda}\,d\lambda = \boxed{6[1 - e^{-t}]}$$



$1 < t \leq 2$

$$\int_0^1 (2)(3e^{-(t-\lambda)})\,d\lambda + \int_1^t (-2)\,e^{-(t-\lambda)}\,d\lambda = \boxed{12e^{(1-t)} - 6e^{-t} - 6}$$

$2 \leq t \leq \infty$



$$x(t) * h(t) = \int_0^1 (2)(3e^{-(t-\lambda)})\,d\lambda + \int_1^2 (-2)(3e^{-(t-\lambda)})\,d\lambda$$

$$= 6e^{-t}\int_0^1 e^{\lambda}\,d\lambda - 6e^{-t}\int_1^2 e^{\lambda}\,d\lambda$$

$$\boxed{x(t) * h(t) = 12e^{(1-t)} - 6e^{(2-t)} - 6e^{-t}}$$

$$x(t) * h(t) = \begin{cases} 0 & t \leq 0 \\ 6[1-e^{-t}] & 0 \leq t \leq 1 \\ 12e^{(1-t)} - 6e^{-t} - 6 & 1 \leq t \leq 2 \\ 12e^{(1-t)} - 6e^{(2-t)} - 6e^{-t} & t \geq 2 \end{cases}$$

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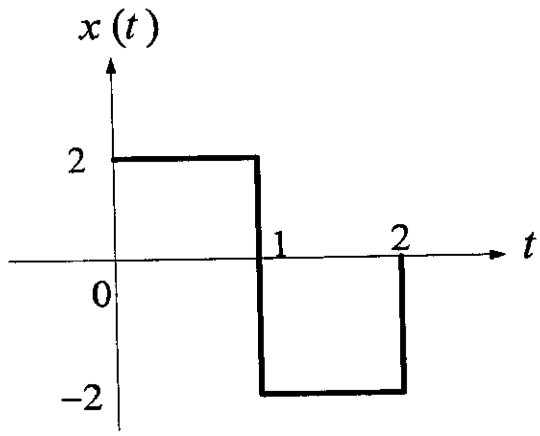
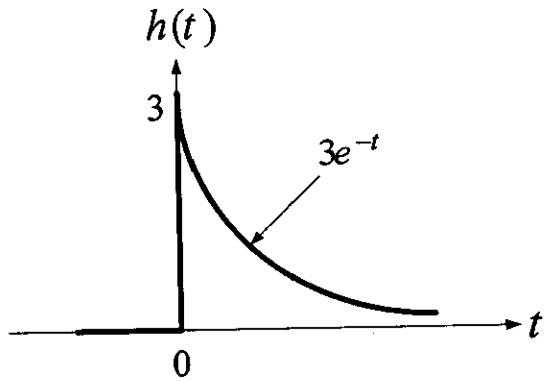
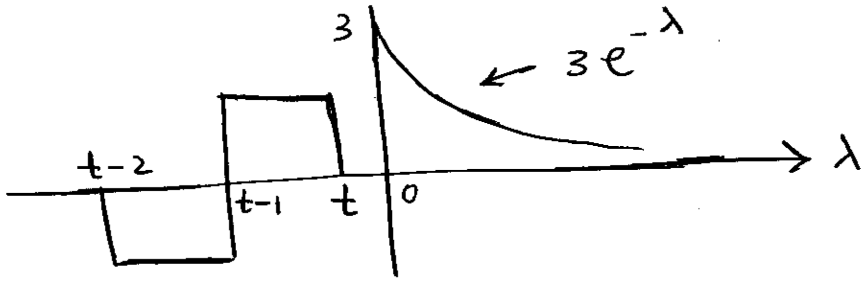
SER	ID	NAME [illegible]



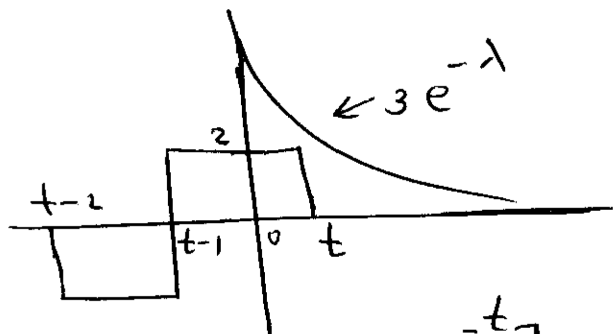


For the functions x(t) and h(t) shown above , evaluate the convolution x(t)*h(t)

$h(t) * x(t)$

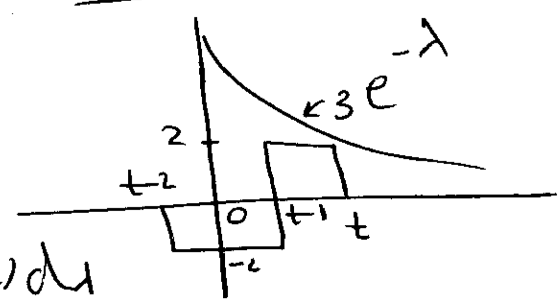


$t \leq 0 \qquad h(t) * x(t) = 0$ (no overlapping)



$\underline{0 \leq t \leq 1}$

$$\int_0^t (3e^{-\lambda})(2)\,d\lambda = 6\int_0^t e^{-\lambda}\,d\lambda = \underline{6[1-e^{-t}]}$$

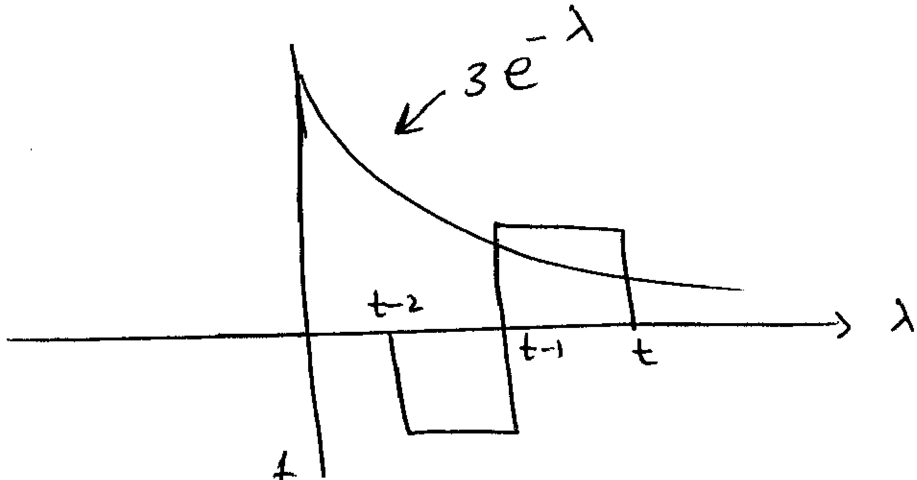


$\underline{1 \leq t \leq 2}$

$$\int_0^{t-1} (3e^{-\lambda})(-2)\,d\lambda + \int_{t-1}^{t} (3e^{-\lambda})(2)\,d\lambda$$

$$= \underline{12e^{(1-t)} - 6e^{-t} - 6}$$

$\underline{\underline{2 \leq t \leq \infty}}$



$$\int_{t-2}^{t-1} (3e^{-\lambda})(-2)\, d\lambda + \int_{t-1}^{t} (3e^{-\lambda})(2)\, d\lambda$$

$$= \underline{\underline{12 e^{(1-t)} - 6e^{(2-t)} - 6e^{-t}}}$$

$$h(t) * x(t) = \begin{cases} 0 & t \leq 0 \\ 6[1 - e^{-t}] & 0 \leq t \leq 1 \\ 12 e^{(1-t)} - 6e^{-t} - 6 & 1 \leq t \leq 2 \\ 12 e^{(1-t)} - 6e^{(2-t)} - 6e^{-t} & t \geq 2 \end{cases}$$