EEE 203, TEST 2.   NAME:___SOLUTIONS____
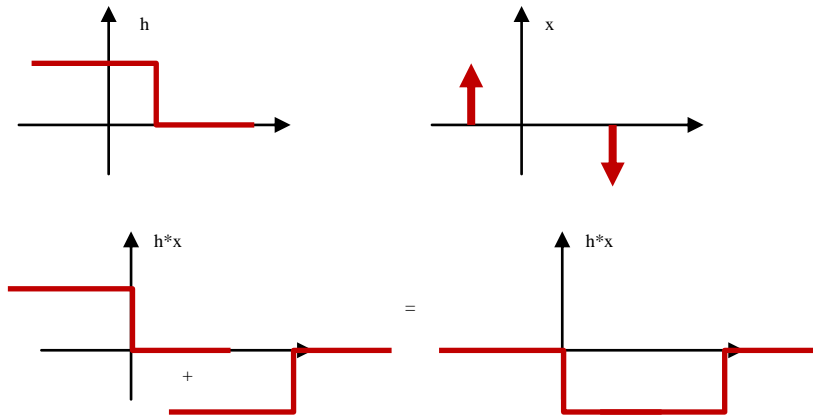
30min, 2 Problems, Equal Credit, Closed-book, Closed-notes, calculator and Transform tables allowed

Problem 1. Compute the convolution $h*x$ when $h(t) = u(-t+1), x(t) = \delta(t+1) - \delta(t-2)$

$$y(t) = u(-t+1) * [\delta(t+1) - \delta(t-2)]$$
$$= u(-(t+1)+1) - u(-(t-2)+1)$$
$$= u(-t) - u(-t+3)$$

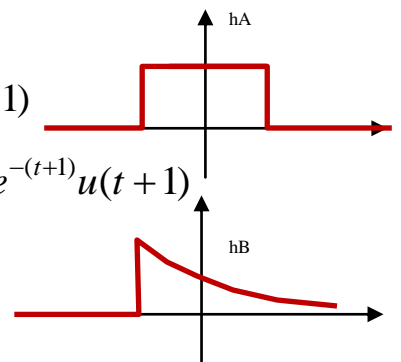Alternatively,

Problem 2.
Consider the filters:

A. $y(t) = \int_{t-1}^{t+1} x(\tau)d\tau$

B. $y(t) = \int_{-\infty}^{\infty} e^{-(t-\tau)} u(t-\tau) x(\tau+1) d\tau$

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1. Find and graph their impulse responses.

A. $h(t) = \int_{t-1}^{t+1} \delta(\tau)d\tau = \int_{-\infty}^{t+1}\delta(\tau)d\tau - \int_{-\infty}^{t-1}\delta(\tau)d\tau = u(t+1) - u(t-1)$

B. $h(t) = \int_{-\infty}^{\infty} e^{-(t-\tau)} u(t-\tau)\delta(\tau+1)d\tau = e^{-(t+1)}\int_{-\infty}^{t}\delta(\tau+1)d\tau = e^{-(t+1)}u(t+1)$

2. Which filters are causal? (Justify)
A. Is not causal, h(t) is not 0 for t < 0.
B. Is not causal, h(t) is not 0 for t < 0.

3. Which filters are stable? (Justify)
A. Is stable, |h| is integrable, (integral = 2).
B. Is stable, |h| is integrable (integral = 1).