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

1. Find and graph their impulse responses.

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

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

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).