ECE-205 Quiz 4

Fill in the following table with a Y (yes) or N (no) for each of the system models given. Assume $-\infty < t < \infty$ for all of the systems and all initial conditions are zero.

System	System Model	Linear?	Time-Invariant?	Causal?	Memoryless?
1	$y(t) = e^{t-1}x(t+1)$				
2	$y(t) = x\left(t - \dfrac{1}{2}\right)$				
3	$y(t) = x(1-t)$				
4	$\dot{y}(t) + y(t) = e^{-t}x(t)$				
5	$y(t) = \displaystyle\int_{-\infty}^{t} e^{-(t-\lambda)}x(\lambda+1)d\lambda$				
6	$y(t-1) = \cos(t)x(t)$				
7	$y(t) = x\left(\dfrac{t}{2}\right)$				
8	$y(t) = \dfrac{1}{2}\left[x(t-1) + x(t+1)\right]$				

9) If we have the integral $y(t) = \displaystyle\int_{1}^{t} e^{-\lambda}x(\lambda - T)d\lambda$ and we make the substitution $\sigma = \lambda - T$, the resulting integral is

a) $y(t) = \displaystyle\int_{1}^{t} e^{-\sigma-T}x(\sigma)d\sigma$ b) $y(t) = \displaystyle\int_{1}^{t-T} e^{-\sigma-T}x(\sigma)d\sigma$ c) $y(t) = \displaystyle\int_{1-T}^{t-T} e^{-\sigma-T}x(\sigma)d\sigma$ d) none of these

10) If we have the integral $y(t) = \int_1^t e^{-\lambda} x(-2\lambda)d\lambda$ and we make the substitution $\sigma = -2\lambda$, the resulting integral is

a) $y(t) = -2\int_1^t e^{-\sigma/2} x(\sigma)d\sigma$ b) $y(t) = -\frac{1}{2}\int_1^{-2t} e^{-\sigma/2} x(\sigma)d\sigma$ c) $y(t) = -\frac{1}{2}\int_{-2}^{-2t} e^{-\sigma/2} x(\sigma)d\sigma$ d) none of these

11) If we have the integral $y(t) = \int_{-\infty}^t e^{-(t-\lambda)} x(2-3\lambda)d\lambda$ and we make the substitution $\sigma = 2-3\lambda$, what do we get? (write out the answer, don't worry about simplifying it)