

Badatad 14

$$[(1-\tau)\mu(\tau) - (1-\tau)\mu(\tau-1)] [\mu(t-\tau) - \mu(t-1-\tau)] \quad x(t) = (1-t)\mu(t) - (1-t)\mu(t-1) \\ y(t) = \mu(t) - \mu(t-1)$$

$$= \int (1-\tau)\mu(\tau)\mu(t-\tau) d\tau \Rightarrow \int \mu(\tau)\mu(t-\tau) d\tau - \int \tau\mu(\tau)\mu(t-\tau) d\tau = \mu(t) \int_0^t \mu(\tau) d\tau - \int_0^t \tau\mu(\tau) d\tau = \boxed{\mu(t)(t - \frac{t^2}{2})}$$

$$\Rightarrow \int (1-\tau)\mu(\tau)\mu(t-1-\tau) d\tau = - \int \mu(\tau)\mu(t-1-\tau) d\tau + \int \tau\mu(\tau)\mu(t-1-\tau) d\tau = -\mu(t-1) \int_0^{t-1} d\tau + \mu(t-1) \int_0^{t-1} \tau d\tau \\ = -\mu(t-1)(t-1-0) + \mu(t-1) \left[\frac{\tau^2}{2} \right]_0^{t-1} = \boxed{-\mu(t-1)(t-1) + \mu(t-1)(\frac{t^2-2t+1}{2})}$$

↳ $\frac{1}{2}(t^2-2t+1)-0 = \frac{t^2}{2}-t+\frac{1}{2}$

$$\int (1-\tau)\mu(\tau-1)\mu(t-\tau) d\tau = - \int \mu(\tau-1)\mu(t-\tau) d\tau + \int \tau\mu(\tau-1)\mu(t-\tau) d\tau = -\mu(t-1) \int_1^t d\tau + \mu(t-1) \int_1^t \tau d\tau \\ = \boxed{-\mu(t-1)(t-1) + \mu(t-1)(\frac{1}{2}t^2 - \frac{1}{2})}$$

$$+ (1-\tau)\mu(\tau-1)\mu(t-1-\tau) = \int \mu(\tau-1)\mu(t-1-\tau) d\tau - \int \tau\mu(\tau-1)\mu(t-1-\tau) d\tau \\ = \mu(t-2) \int_1^{t-1} d\tau - \mu(t-2) \int_1^{t-1} \tau d\tau = \mu(t-2)(t-2) - \mu(t-2) \left[\frac{1}{2}(t^2-2t+1) - \frac{1}{2} \right] \\ = \boxed{\mu(t-2)(t-2) - \mu(t-2) \left[\frac{t^2}{2} - t + \frac{1}{2} - \frac{1}{2} \right]}$$

$$\mu(t) \cdot (t - \frac{t^2}{2})$$

$$\mu(t-1) \left(\cancel{t-t} + \frac{t^2}{2} - \cancel{t} + \cancel{\frac{1}{2}} + \cancel{t-t} + \frac{1}{2}t^2 - \cancel{\frac{1}{2}} \right) \Rightarrow \mu(t-1)(2-3t+t^2)$$

$$\mu(t-2) \left[t-2 - \frac{t^2}{2} + t \right] = \mu(t-2) \left(2t-2 - \frac{t^2}{2} \right) \checkmark \checkmark$$

$$(t - \frac{t^2}{2})\mu(t) + \mu(t-1)(2-3t+t^2) + \mu(t-2)(2t-2 - \frac{t^2}{2})$$