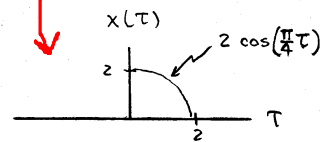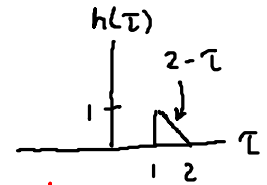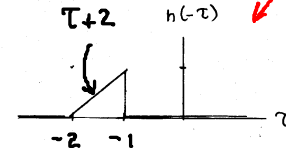## Exercise 4.101

[L] **Answer (f).**

We need to compute $x * h$, where

$$x(t) = \begin{cases} 2\cos\left(\frac{\pi}{4}t\right) & 0 \le t < 2 \\ 0 & \text{otherwise} \end{cases} \quad \text{and} \quad h(t) = \begin{cases} 2 - t & 1 \le t < 2 \\ 0 & \text{otherwise.} \end{cases}$$
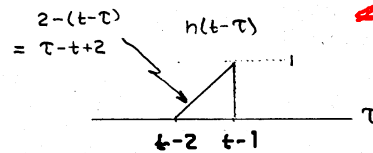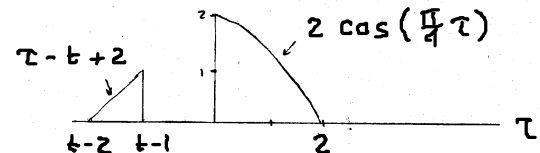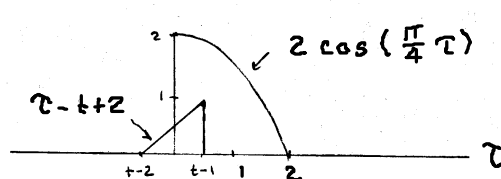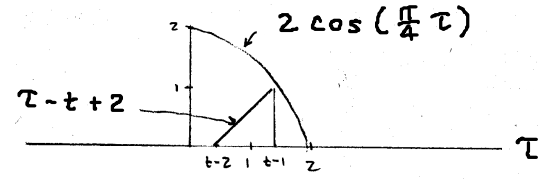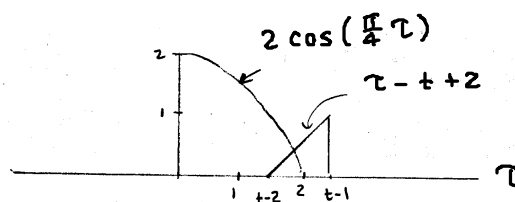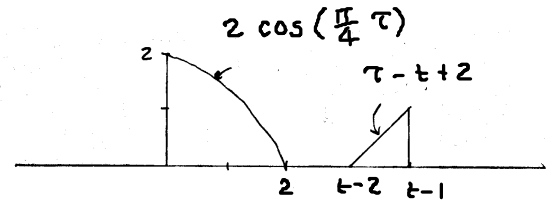

(a)

(b)

(c)

(d)

(e)

(f)

(g)

(h)

$$x * h(t) = \begin{cases} \int_0^{t-1} 2\cos\left(\frac{\pi}{4}\tau\right)(\tau - t + 2)\,d\tau & 1 \le t < 2 \\ \int_{t-2}^{t-1} 2\cos\left(\frac{\pi}{4}\tau\right)(\tau - t + 2)\,d\tau & 2 \le t < 3 \\ \int_{t-2}^{2} 2\cos\left(\frac{\pi}{4}\tau\right)(\tau - t + 2)\,d\tau & 3 \le t < 4 \\ 0 & \text{otherwise} \end{cases}$$