CENG 384 - Signals and Systems for Computer Engineers
Spring 2024
Homework 2

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Answer 1

$$x(t) = \begin{cases} 1 & -3 \leq t \leq 7 \\ 0 & otherwise \end{cases}$$

$$h(t) = \begin{cases} 1 & 1 \leq t \leq 15 \\ 0 & otherwise \end{cases}$$

Three ranges of t values, integrated seperately:

$$-3 \leq \tau \leq 7$$

$$t - 15 \leq \tau \leq t - 1$$

(I) partially overlap: $-2 \leq t \leq 8$

$$-3 \leq \tau \leq t - 1$$

$$\int_{-3}^{t-1} d\tau = t + 2$$

(II) fully overlap: $8 \leq t \leq 12$

$$-3 \leq \tau \leq 7$$

$$\int_{-3}^{7} d\tau = 10$$

(III) partially overlap: $12 \leq t \leq 22$

$$t - 15 \leq \tau \leq 7$$

$$\int_{t-15}^{7} d\tau = 22 - t$$

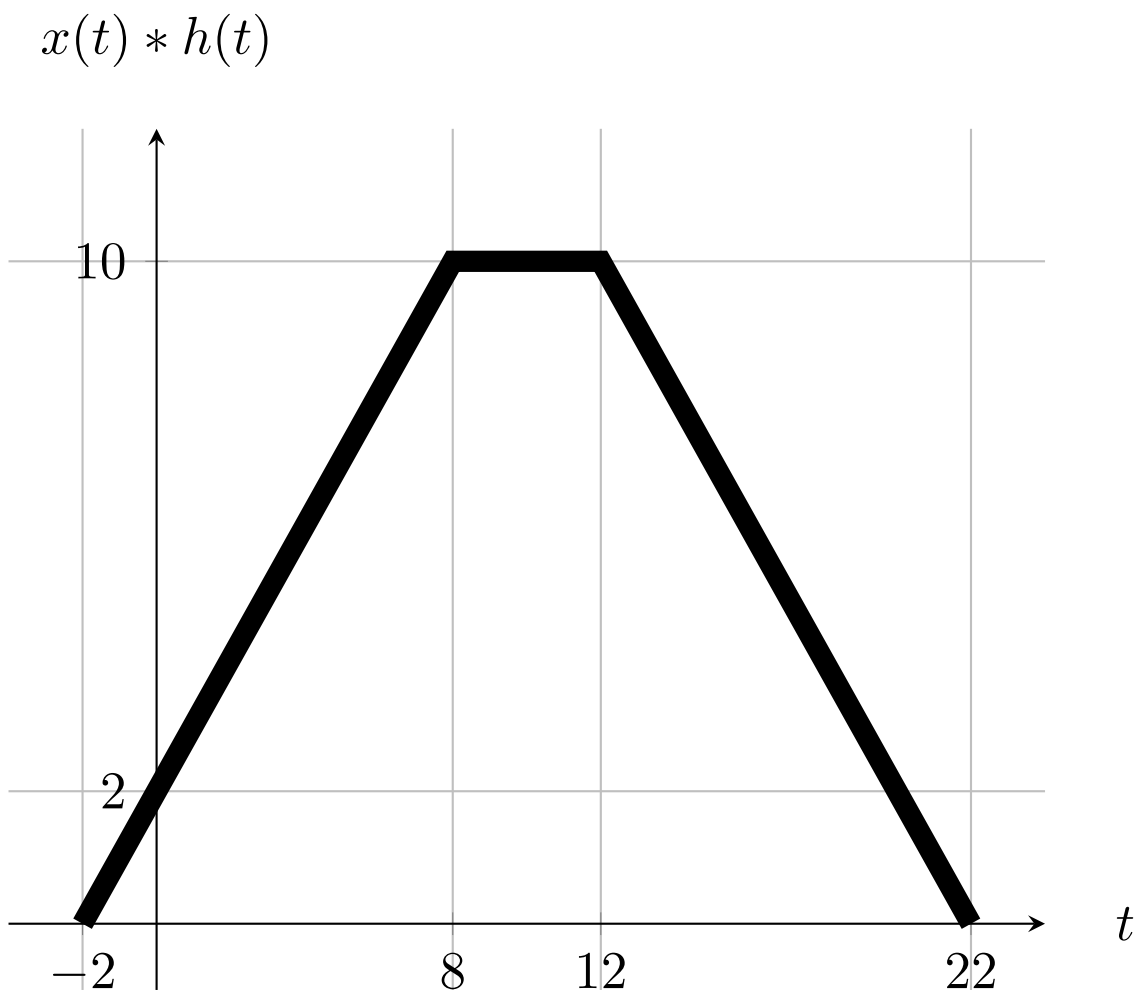

Figure 1: t vs. $x(\frac{1}{2}t - 2)$.