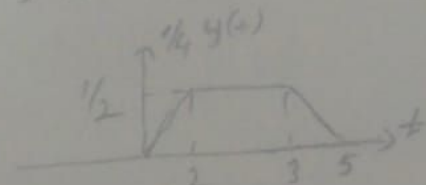
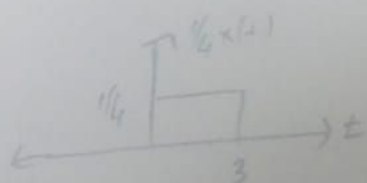
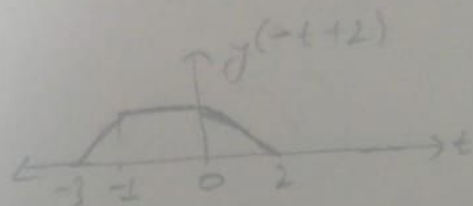
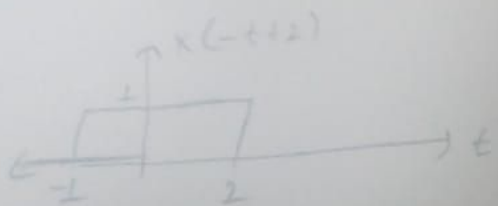
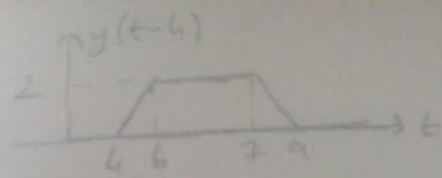
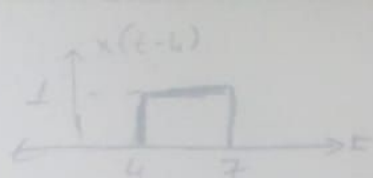
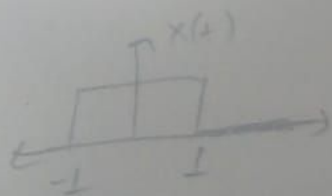


① a)



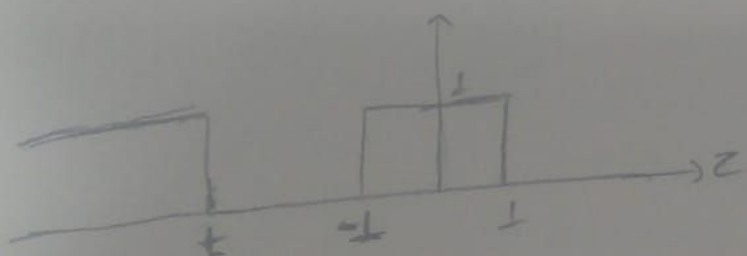
②



a) $y(t) = x(t) * \delta(t) = x(t)$

b) $y(t) = x(t) * \delta(t-2) = x(t-2)$

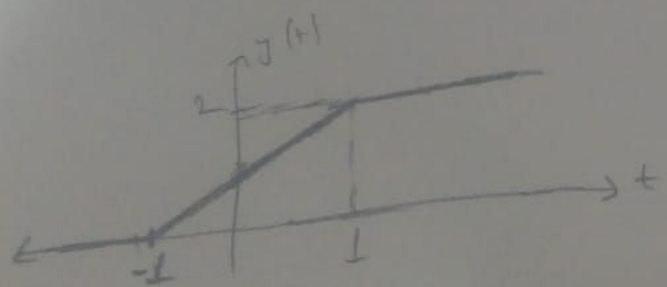
c) $y(t) = x(t) * u(t) = \int_{-\infty}^{\infty} x(z) u(t-z) dz$



$t < -1$ $y(t) = \int_{-\infty}^{\infty} x(z) u(t-z) dz = 0$

$-1 \leq t \leq 1$ $y(t) = \int_{-1}^t 1 \cdot 1 \cdot dz = t+1$

$t \geq 1$ $y(t) = \int_{-1}^1 1 \cdot 1 \cdot dz = 2$



③ a) $\int_{-2}^2 (3t^2 + 2t + 1) \delta(t) dt = 1$

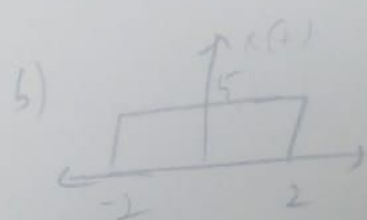
b) $(3t^2 + 2t + 1) \delta(t) = \delta(t)$

c) $\int_{-1}^1 (t^2 + 2t) \delta(t-2) dt = 0$

④ a) $x(t) = e^{-t} u(t)$

$$E = \int_{-\infty}^{\infty} x^2(t) dt = \int_0^{\infty} e^{-2t} dt = -\frac{1}{2} e^{-2t} \Big|_0^{\infty} = \frac{1}{2}$$

$E < \infty$ olduğundan enerji sınırlıdır $P=0$ 'dır



$$E = \int_{-\infty}^{\infty} x^2(t) dt = \int_{-2}^2 5^2 dt = 100$$

$E < \infty$ olduğundan enerji sınırlıdır $P=0$ 'dır

⑤ $x[n] = \delta[n+1] + \delta[n] + \delta[n-1]$

$$y[n] = \delta[n+1] + \delta[n] - \delta[n-1]$$

$$\begin{aligned} y[n] &= x[n] * h[n] = x[n] * (\delta[n+1] + \delta[n] - \delta[n-1]) \\ &= x[n] * \delta[n+1] + x[n] * \delta[n] - x[n] * \delta[n-1] \\ &= x[n+1] + x[n] - x[n-1] \\ &= \delta[n+2] + \delta[n+1] + \delta[n] + \delta[n+1] + \delta[n] + \delta[n-1] \\ &\quad - \delta[n] - \delta[n-1] - \delta[n-2] \\ &= \delta[n+2] + 2\delta[n+1] + \delta[n] - \delta[n-2] \end{aligned}$$

