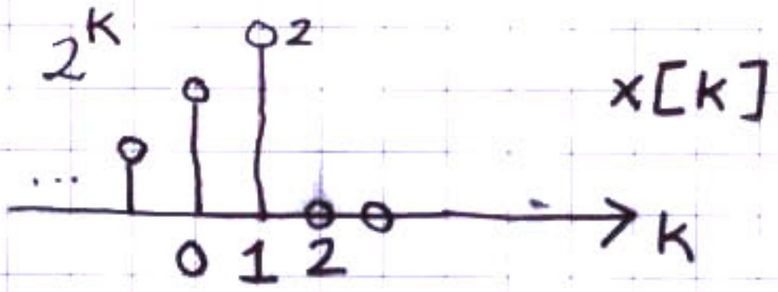
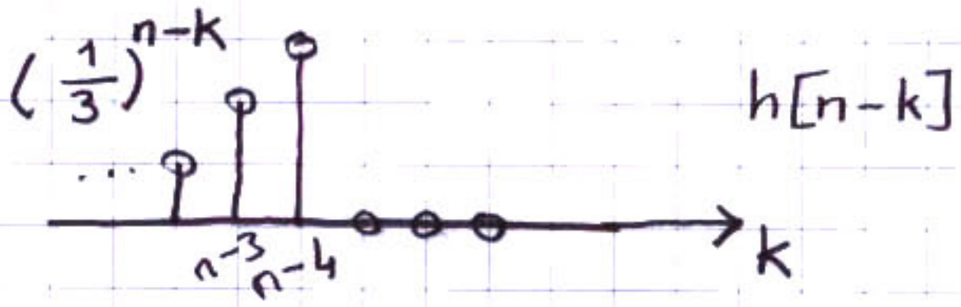
SIGNAL PROCESSING 2016 iÖ BÜTÜNLEME ÇÖZÜMLERI

1/25p





* For $n-4 < 1 \rightarrow \boxed{n < 5}$

$$y[n] = \sum_{k=-\infty}^{n-4} \left(\frac{1}{3}\right)^{n-k} 2^k = \left(\frac{1}{3}\right)^n \sum_{k=-\infty}^{n-4} 6^k$$

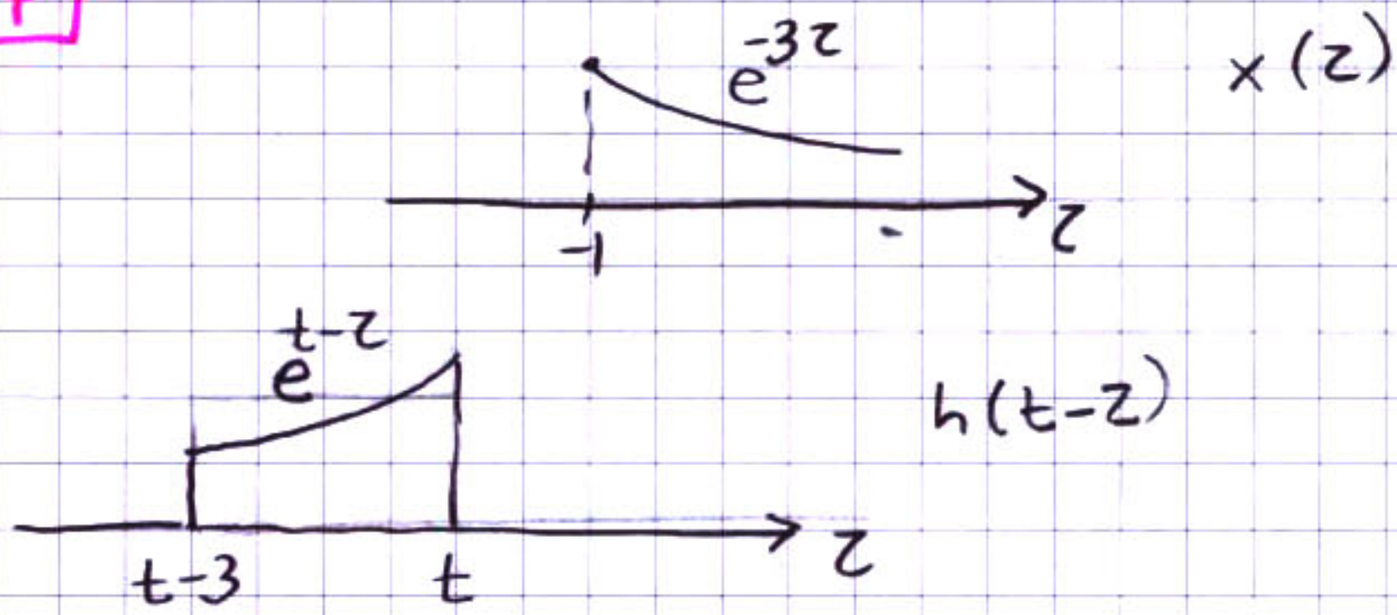
$$= 3^{-n} \times 6^{n-4} \times \frac{6}{5} =$$

$$= \frac{1}{5} 3^{-n} 6^{n-3} = \boxed{\frac{1}{1080} \times 2^n}$$

* For $n \geq 5$

$$y[n] = \sum_{k=-\infty}^{1} 3^{-n} 6^k = \boxed{\frac{36}{5} \times 3^{-n}}$$

2/25 p



① $t < -1 \rightarrow y(t) = 0$

② $t \geq -1$ & $t-3 < -1 \rightarrow -1 \leq t < 2$

$$y(t) = \int_{-1}^{t} (e^{-3\tau} \cdot e^{t-\tau})\, d\tau$$

$$= e^{t} \int_{-1}^{t} e^{-4\tau}\, d\tau$$

$$= e^{t} \cdot \frac{-1}{4} \cdot \left[e^{-4\tau} \right]_{-1}^{t}$$

$$= e^{t} \cdot \frac{1}{4} \cdot \left[e^{+4} - e^{-4t} \right]$$

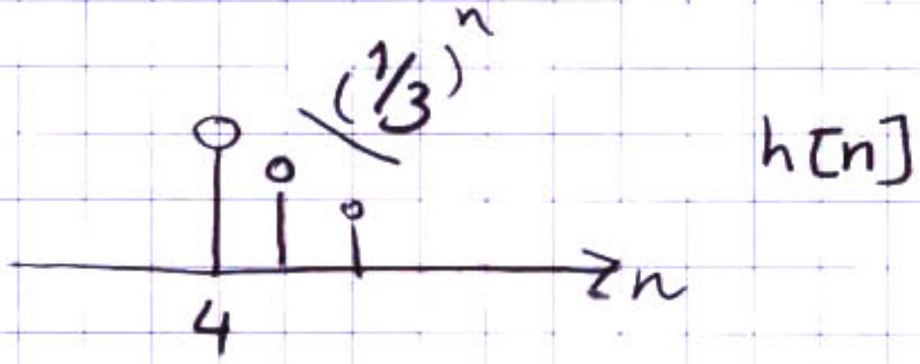
$$= \frac{1}{4} \left(e^{4+t} - e^{-3t} \right)$$

③ $t \geq 2 \rightarrow$

$$y(t) = \int_{t-3}^{+} (e^{-3\tau} \cdot e^{t-\tau})\, d\tau$$

$$= \cdots = \frac{1}{4} \left(e^{12-3t} - e^{-3t} \right)$$

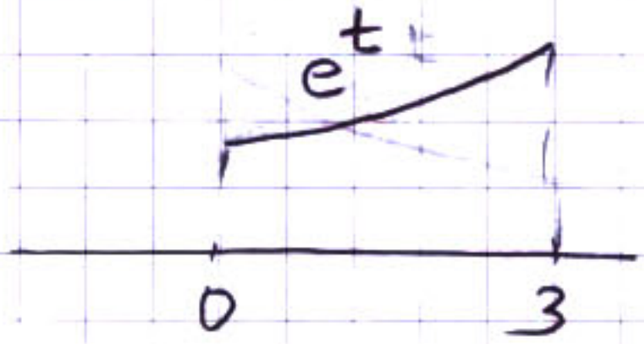
③ 15p



① $n<4 \rightarrow s[n]=0$

② $n \geq 4 \rightarrow s[n]=\sum_{k=4}^{n}\left(\frac{1}{3}\right)^k = \frac{1}{54}-\frac{1}{2}3^{-n}$

4-15p



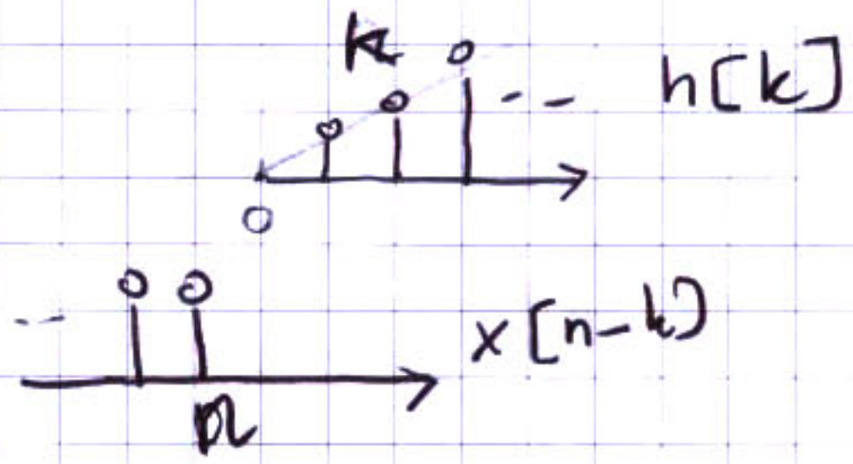
① $t<0 \rightarrow s(t)=0$

② $0 \leq t<3 \qquad s(t)=\int_0^t e^{+\tau}\,d\tau = e^t-1$

③ $t \geqslant 3 \qquad s(t)=\int_0^3 e^{\tau}\,d\tau = e^3-1$

5-10p $\quad y(t)=u(t)-u(t-2) \quad (\text{Hint } x(t)*\delta(t-k)=x(t-k))$

6-10p



$n<0 \rightarrow y[n]=0$

$n \geqslant 0 \quad y[n]=\sum_{k=0}^{n} k = \frac{n(n+1)}{2}$