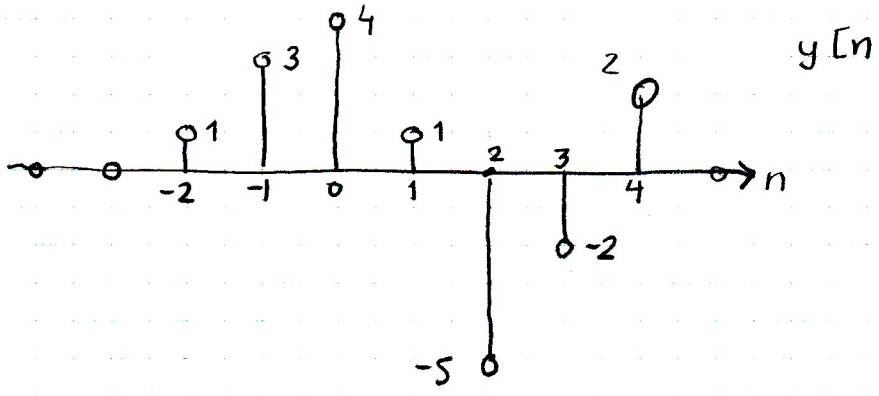
1-25p

$$h[n] = \delta[n+1] + 2\delta[n] - \delta[n-2]$$

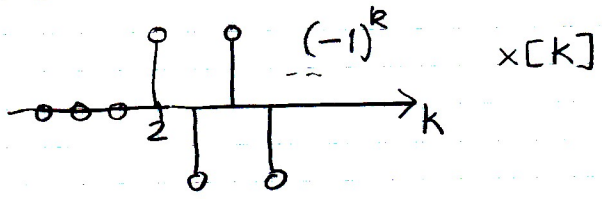
We know that $x[n] * \delta[n-k] = x[n-k]$

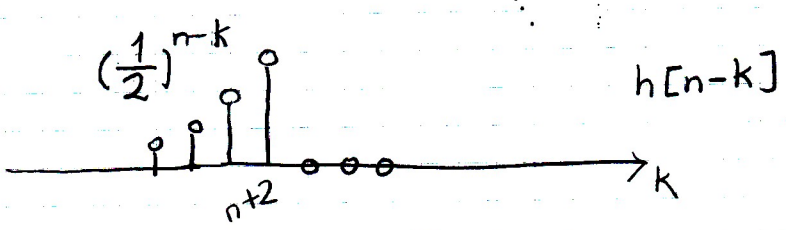
So: $x[n] * h[n] = x[n+1] + 2x[n] - x[n-2]$

	-3	-2	-1	0	1	2	3	4	5
$x[n+1]$	0	1	1	2	-2				
$2x[n]$			2	2	4	-4			
$-x[n-2]$					-1	-1	-2	2	
$y[n]$		1	3	4	1	-5	-2	2	



2-25p





① $n+2 < 2 \rightarrow n < 0$ $\quad y[n] = 0$

② $n \geq 0$

$$y[n] = \sum_{k=2}^{n+2} (-1)^k \cdot 2^{k-n}$$

$$= 2^{-n} \sum_{k=2}^{n+2} (-2)^k = 2^{-n} \left(\frac{(-2)^2 - (-2)^{n+3}}{-1-(-2)} \right)$$

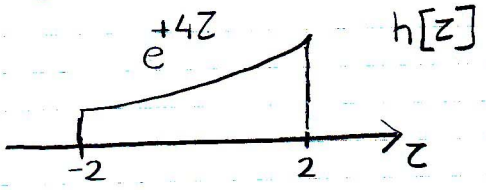
$$= 2^{-n} \cdot \frac{1}{3} \left[+4 - (-2)^{n+3} \right]$$

$$= \frac{4}{3} 2^{-n} - \frac{1}{3} 2^{-n} \cdot (+2)^{n+3} \times (-1)^{n+3}$$

$$= \boxed{\frac{4}{3} 2^{-n} + \frac{8}{3} \cdot (-1)^n}$$

/* $(-1)^{n+3} = -(-1)^n$ */

3-25p



① $t-1 < -2 \rightarrow$ $t < -1$ $\quad y(t) = 0$

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

$$y(t) = \int_{-2}^{t-1} e^{4\tau} \cdot e^{-(t-\tau)}\, d\tau$$

$$= e^{-t} \int_{-2}^{t-1} e^{5\tau}\, d\tau = e^{-t} \cdot \frac{1}{5} \left[e^{5\tau} \right]_{-2}^{t-1}$$

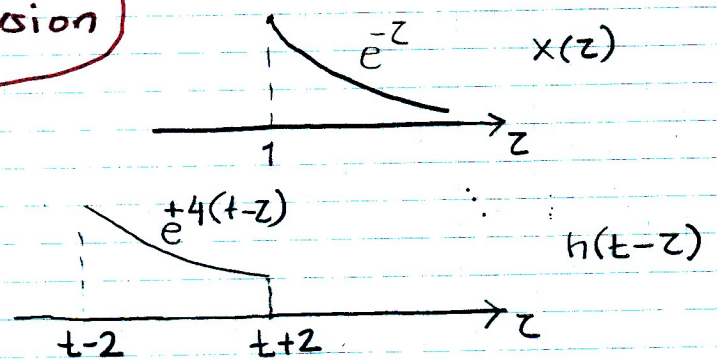
$$= \frac{e^{-t}}{5} \cdot (e^{5t-5} - e^{-10}) = \boxed{\frac{1}{5}\left[e^{4t-5} - e^{-(10+t)}\right]}$$

③ $t \geq 3$

$$y(t) = \int_{-2}^{2} e^{-t} \cdot e^{5\tau} \cdot d\tau = \frac{e^{-t}}{5} \left[e^{5\tau} \right]_{-2}^{2}$$

$$= \boxed{e^{-t}\left(\frac{e^{10} - e^{-10}}{5}\right)}$$

3-25p
2nd version



① $t+2<1 \rightarrow$ $t<-1$ $y(t)=0$

② $t+2 \geq 1$, $t-2<1$ $\}$ $-1 \leq t<3$

$$y(t)=\int_{1}^{t+2} e^{4(t-\tau)}\, e^{-\tau}\, d\tau$$

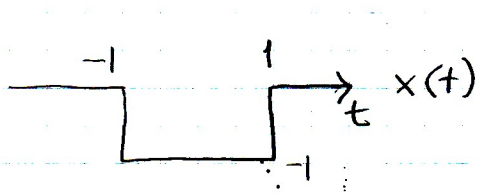
$$=\frac{1}{5}\left[e^{4t-5}-e^{-(10-t)}\right]$$

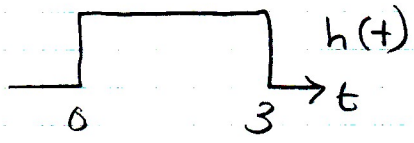
③ $t \geq 3$

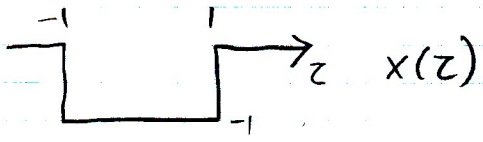
$$y(t)=\int_{t-2}^{t+2} e^{4(t-\tau)}\, e^{-\tau}\, d\tau$$

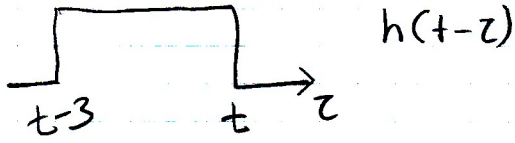
$$=e^{-t}\left(\frac{e^{10}-e^{-10}}{5}\right)$$

4-25p









① $t<-1$ → $y(t)=0$

② $-1<t<1$ → $y(t)=\int_{-1}^{t}(-1)\,dt = -(t-(-1)) = -t-1$

③ $t\geq 1$ & $t-3<-1$

→ $1\leq t<2$ → $y(t)=\int_{-1}^{1}(-1)\,d\tau = -(1-(-1)) = -2$

④ $t-3>1$ & $t-3<1$ → $2\leq t<4$

$$y(t)=\int_{t-3}^{1}(-1)\,d\tau = -[1-(t-3)]$$
$$= t-4$$

⑤ $t\geq 4$ → $y(t)=0$