1)

a) $x(k) = -2\,u(k) + 0{,}7^k \cdot u(k)$

$$X(k) = -2 \cdot \frac{1}{1-z^{-1}} + \frac{1}{1-0{,}7z^{-1}} = -\frac{2}{1-z^{-1}} + \frac{1}{1-0{,}7z^{-1}} \;//$$

b) $x(k) = u(k-2) + \delta(k-1)$

$$X(k) = z^{-2} = -\frac{1}{1-z^{-1}} + z^{-k}$$

$$X(k) = \frac{1}{z^2} \cdot \frac{1}{1-z^{-1}} + z$$

$$X(k) = z + \frac{1}{z(z-1)} \;//$$

c) $x(k) = (1-0{,}5^k) \cdot u(k) \rightarrow X(k) = u(k) - 0{,}5^k \cdot u(k)$

$$x(k) = \frac{1}{1-z^{-1}} - \frac{1}{1-0{,}5z^{-1}}$$

$$x(k) = \frac{1}{1-z^{-1}} - \frac{1}{1-0{,}5z^{-1}} \;//$$

d) $x(k) = 2\delta(k) - 3(0{,}5^k \cdot u(k)) \rightarrow X(k) = 2 - 3 \cdot \frac{1}{1-0{,}5z^{-1}} \;//$

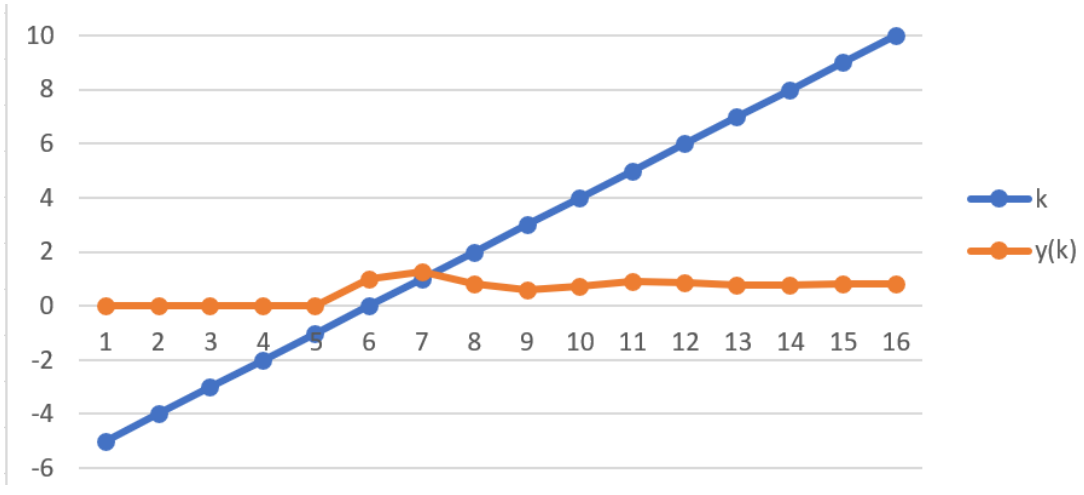
2)

Considere um sistema discreto descrito pela seguinte equação diferença: $y(k)-\frac{1}{4}y(k-1)+\frac{1}{2}y(k-2)=x(k)$. Calcule a saída $y(k)$ para uma entrada $x(k)=u(k)$ (degrau unitário), para $-2\le k\le 8$. Apresente os gráficos de $y(k)$ e $x(k)$ em função de k.

$$y(k)-\frac{1}{4}*y(k-1)+\frac{1}{2}*y(k-2)=x(k)$$

$$x(k)+\frac{1}{4}*y(k-1)-\frac{1}{2}*y(k-2)=y(k)$$

k	x(k)	y(k)	y(k-1)	y(k-2)
-5	0	0	0	0
-4	0	0	0	0
-3	0	0	0	0
-2	0	0	0	0
-1	0	0	0	0
0	1	1	0	0
1	1	1,250	1,000	0
2	1	0,813	1,250	1,000
3	1	0,578	0,813	1,250
4	1	0,738	0,578	0,813
5	1	0,896	0,738	0,578
6	1	0,855	0,896	0,738
7	1	0,766	0,855	0,896
8	1	0,764	0,766	0,855
9	1	0,808	0,764	0,766
10	1	0,820	0,808	0,764



3)

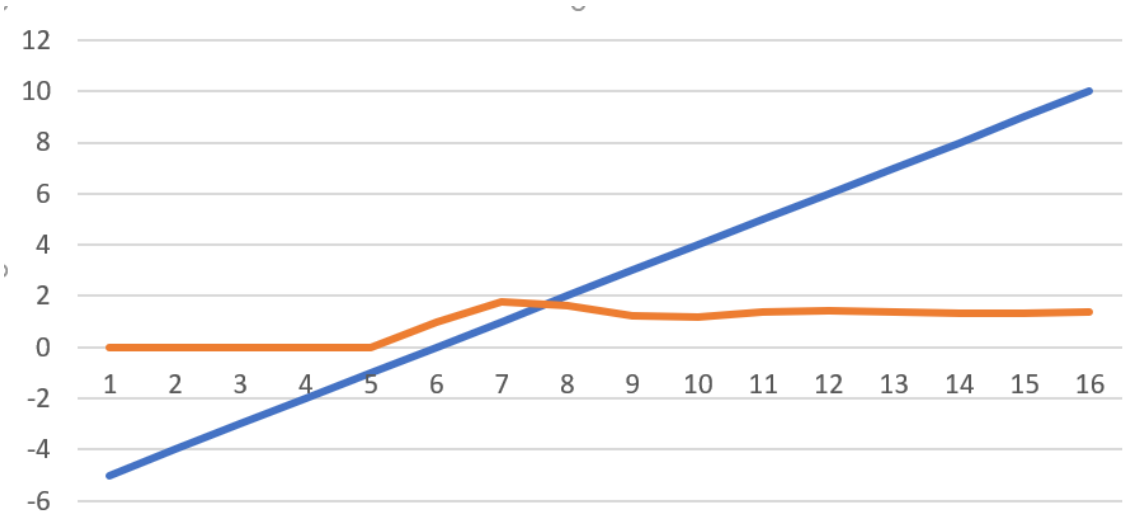
Repita o exercício 2 para as seguintes equações diferença:

a) $y(k)-\frac{1}{4}y(k-1)+\frac{1}{2}y(k-2)=x(k)+\frac{1}{2}x(k-1)+\frac{1}{5}x(k-2)$.

b) $y(k)=0,2.x(k)+0,3.x(k-1)+0,3.x(k-2)+0,2.x(k-3)$

A) $y(k)=x(k)+\frac{1}{2}x(k-1)+\frac{1}{5}x(k-2)+\frac{1}{4}y(k-1)-\frac{1}{2}y(k-2)$

k	x(k)	x(k-1)	x(k-2)	y(k)	y(k-1)	y(k-2)
-5	0	0	0	0	0	0
-4	0	0	0	0	0	0
-3	0	0	0	0	0	0
-2	0	0	0	0	0	0
-1	0	0	0	0	0	0
0	1	0	0	1,000	0,000	0,000
1	1	1	0	1,750	1,000	0,000
2	1	1	1	1,638	1,750	1,000
3	1	1	1	1,234	1,638	1,750
4	1	1	1	1,190	1,234	1,638
5	1	1	1	1,380	1,190	1,234
6	1	1	1	1,450	1,380	1,190
7	1	1	1	1,372	1,450	1,380
8	1	1	1	1,318	1,372	1,450
9	1	1	1	1,343	1,318	1,372
10	1	1	1	1,377	1,343	1,318



b) $y(k) = 0{,}2x(k) + 0{,}3x(k-1) + 0{,}3x(k-2) + 0{,}2x(k-3)$

k	x(k)	x(k-1)	x(k-2)	x(k-3)	y(k)
-5	0	0	0	0	0
-4	0	0	0	0	0
-3	0	0	0	0	0
-2	0	0	0	0	0
-1	0	0	0	0	0
0	1	0	0	0	0,2
1	1	1	0	0	0,5
2	1	1	1	0	0,8
3	1	1	1	1	1
4	1	1	1	1	1
5	1	1	1	1	1
6	1	1	1	1	1
7	1	1	1	1	1
8	1	1	1	1	1
9	1	1	1	1	1
10	1	1	1	1	1