Consider the following cascade system:


It is known that

$$
H(z)=\left(1-z^{-2}\right)\left(1-0.8 e^{j \pi / 4} z^{-1}\right)\left(1-0.8 e^{-j \pi / 4} z^{-1}\right)\left(1+z^{-2}\right)
$$

(a) Determine the poles and zeros of $H(z)$ and plot them in the complex $z$-plane.
(b) It is possible to determine two possible system functions $H_{1}(z)$ and $H_{2}(z)$ so that: (1) the overall cascade system has the given system function $H(z)$ and (2) $w[n]=x[n]-x[n-4]$. Find $H_{1}(z)$ and $H_{2}(z)$.
(c) Determine the difference equation that relates $y[n]$ to $w[n]$ for your answer in part (b).

