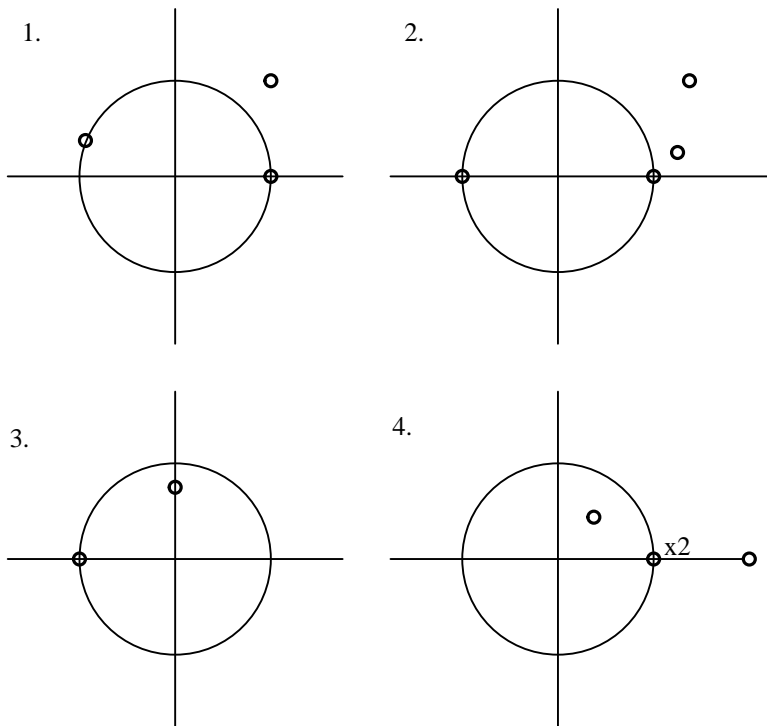For each pole/zero plot of the FIR filters
a. Fill in the missing zero locations to make the filter's impulse response real and linear phase
b. Name the type (I, II, III, or IV) of filter it is
c. Describe the filter's purpose (LP, HP, BP, BS)
d. Identify if the filter is stable

1.

2.

3.

4.

5. Is the following FIR filter linear phase? Explain/prove.
    $H(z) = 1 + 4z^{-1} - 6z^{-2} + 7z^{-3} - 6z^{-4} + 4z^{-5} + z^{-6}$

6. Find $H_{HP}(z)$ for a first-order IIR filter with a $\omega_c = \pi/4$.