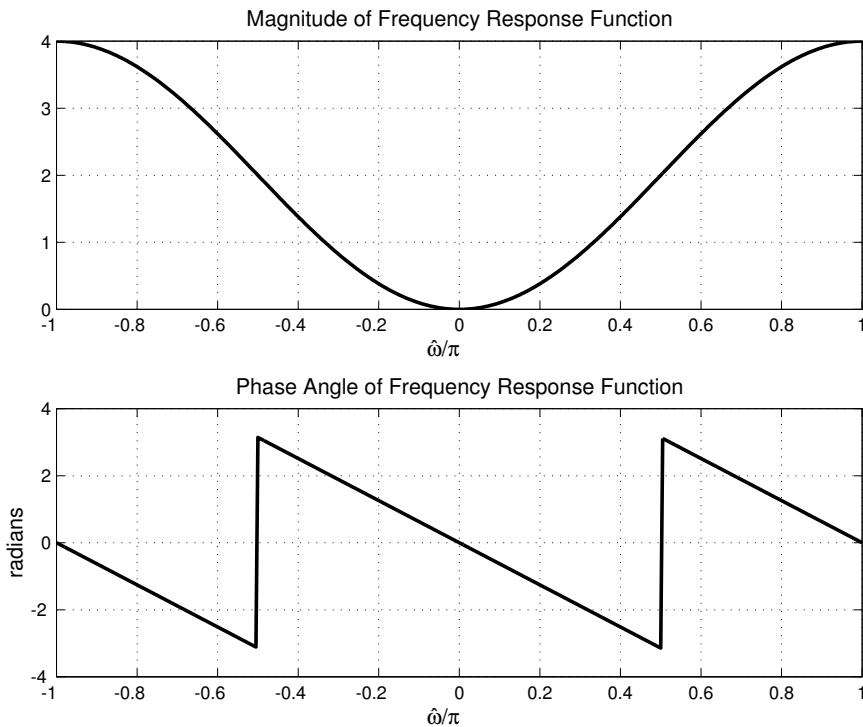## PROBLEM:

A linear time-invariant system is defined by the system function

$$H(z) = -z^{-1} + 2z^{-2} - z^{-3}.$$

The magnitude and phase of the frequency response of this system are plotted in the following figure. **Note that the frequency scale is $\hat{\omega}/\pi$.**

(a) This filter is a   *lowpass   bandpass   highpass*   filter. (Circle one.)

(b) Use the above graph to determine (as accurately as you can) the output $y[n]$ of this system when the input is

$$x[n] = 20 + 20\cos(0.6\pi n).$$

Mark the points on the graph that you used in your solution.

(c) Determine an expression for the frequency response, $H(e^{j\hat{\omega}})$. Write your answer in the form $H(e^{j\hat{\omega}}) = A(\hat{\omega})e^{-j\hat{\omega}n_0}$, where $A(\hat{\omega})$ is real and n_0 is an integer.