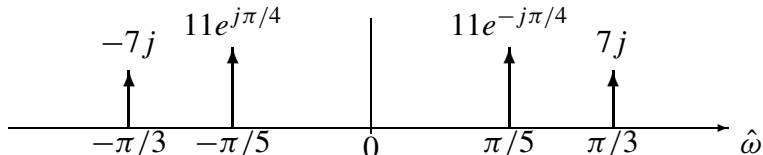
PROBLEM:

An FIR filter is characterized by the following frequency response:

$$H(e^{j\hat{\omega}}) = \frac{\sin(5\hat{\omega})}{\sin(\frac{1}{2}\hat{\omega})} e^{-j5\hat{\omega}}$$

(a) If the input to the filter is a signal with the following spectrum, determine a formula for the input signal, $x[n]$ for $-\infty < n < \infty$.



(b) Using the input signal from part (a), determine the output, $y[n]$ for $-\infty < n < \infty$.