PROBLEM:

A linear time-invariant filter is described by the difference equation

$$y[n] = x[n] + x[n-1] - x[n-3] - x[n-4]$$

(a) Derive a simple expression for $\mathcal{H}(\hat{\omega})$, the frequency response of this system.

(b) Sketch the frequency response (magnitude and phase) versus frequency for $-\pi \leq \hat{\omega} \leq \pi$.

(c) What is the output if the input is

$$x[n] = \cos[0.3\pi(n-2)] - 3\cos[0.2\pi n]$$