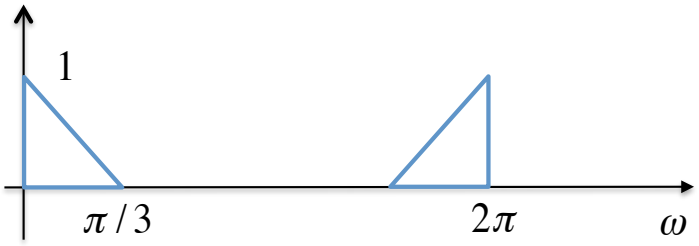
Hw2 Due Oct. 2, '14

Answers without justifications will not be given credits

1. Let $x(n) = 0.5(\delta(n-1) + \delta(n+1))$.
   (a) Determine $X(e^{j\omega})$. (Simplify the expression as much as possible)
   (b) Plot $X(e^{j\omega})$.
   (c) Plot $|X(e^{j\omega})|$.
   (d) Plot $\angle X(e^{j\omega})$.
2. Let $x(n)$ be real and $X(e^{j\omega})$ be as plotted in the following figure.



   (a) Plot $X(e^{j(\omega-\pi/4)})$.
   (b) Let $Y(e^{j\omega}) = 0.5(X(e^{j(\omega-\pi/4)}) + X(e^{j(\omega+\pi/4)}))$. Determine $y(n)$ in terms of $x(n)$.
3. Let $h(n)$ be the ideal lowpass filter with cut-off frequency $\pi/4$.
   (a) Let the input of $h(n)$ be $x(n) = (-1)^n$ for all n. Determine the output of $h(n)$.
   (b) * Consider the following system, where $x(n)$ is as in (a). Determine $y(n)$.