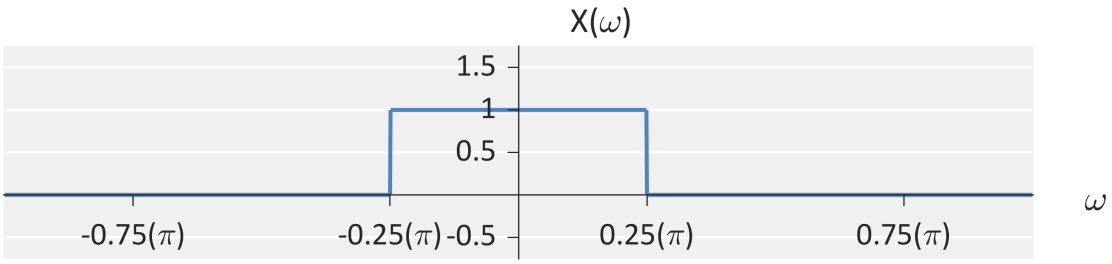
Full Name: _____

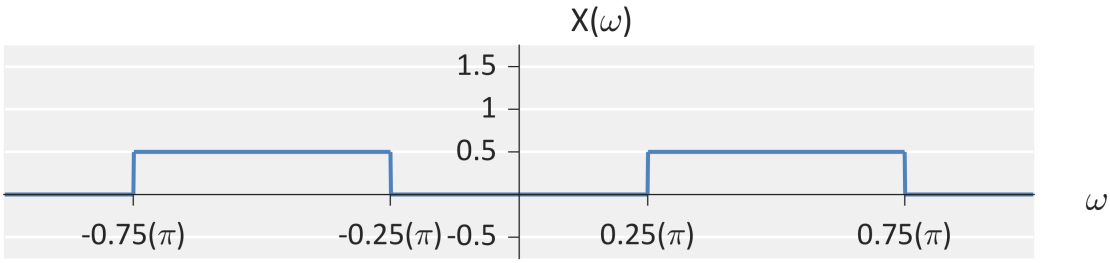
EEE 5502 (Fall 2022) – Practice **Filtering with DFT / FFT, 2022**

Question #1: Given the following DTFT of $x[n]$, answer the following questions.



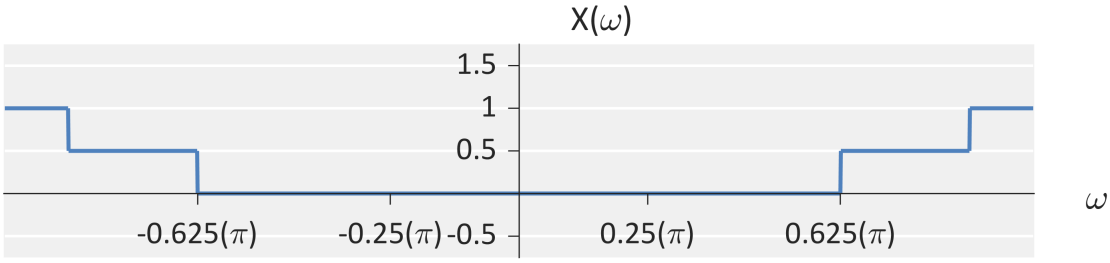
(a) Sketch the DTFT (in the range of $-\pi$ to π) of $x[n]\cos\left(\frac{\pi}{2}n\right)$

Solution:



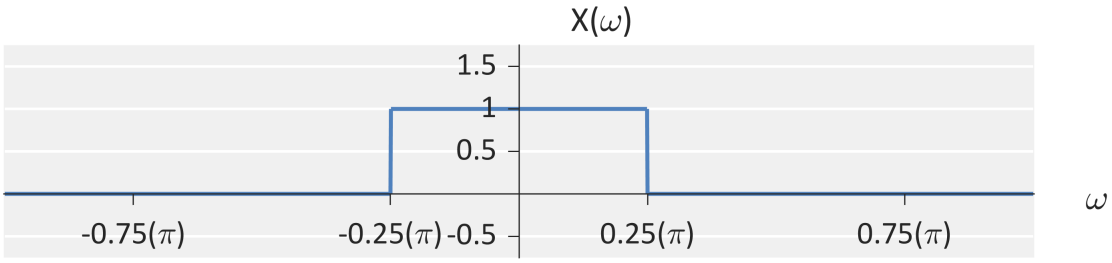
(b) Sketch the DTFT (in the range of $-\pi$ to π) of $x[n]\cos((7/8)\pi n)$

Solution:

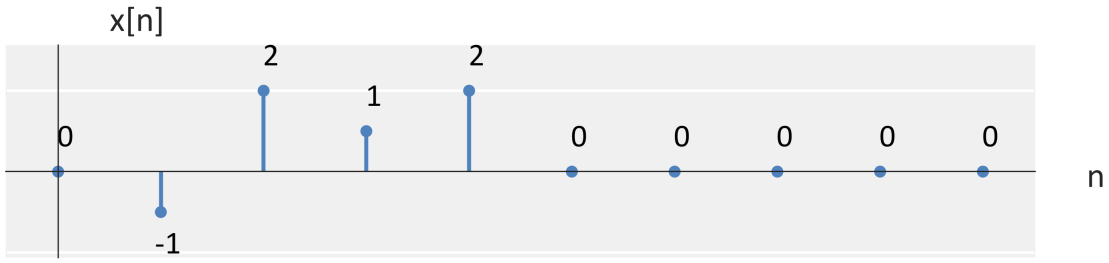


(c) Sketch the DTFT (in the range of $-\pi$ to π) of $x[n]\cos(2\pi n)$

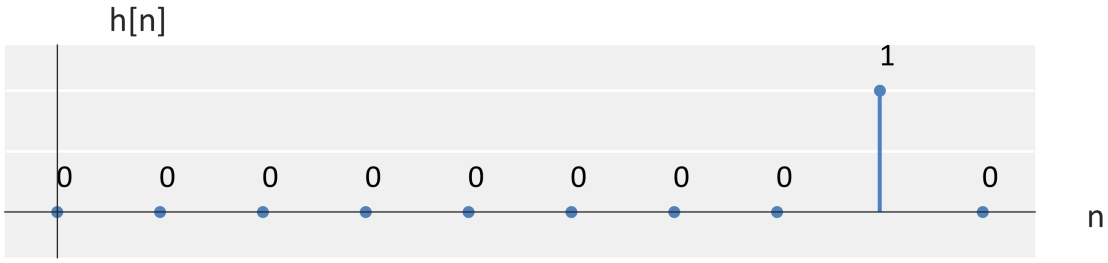
Solution:



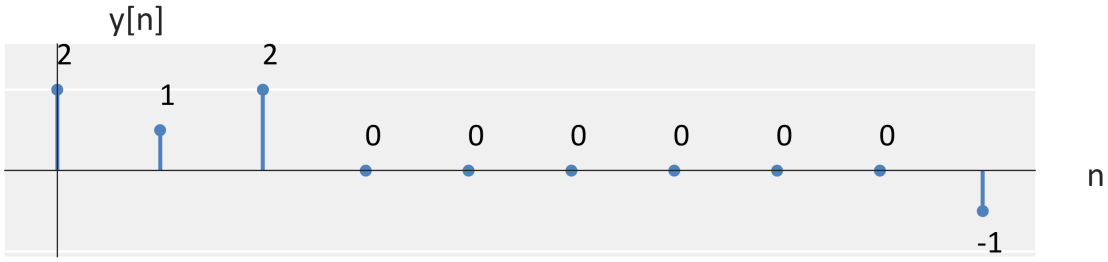
Question #2: For each part of this question, consider the following signal $x[n]$.



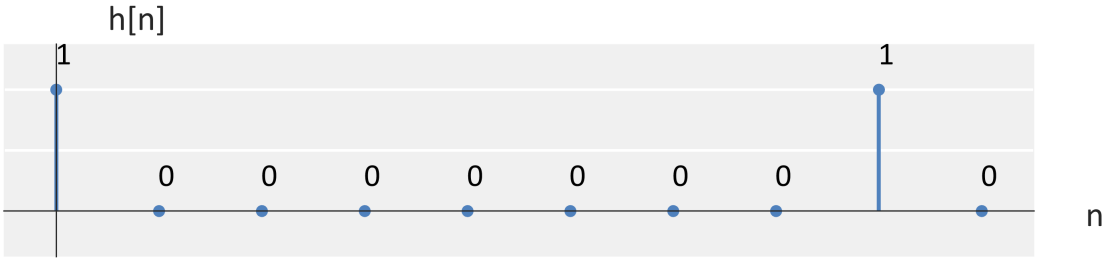
(a) Compute $x[n] \circledast h[n]$ for $h[n]$ below (defined for one period from $0 \leq n \leq 9$).



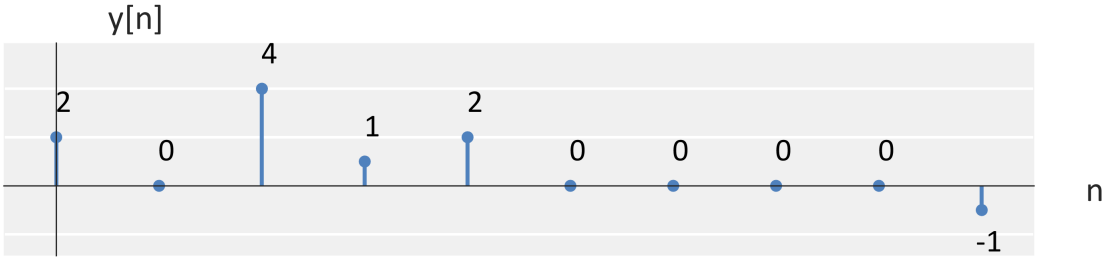
Solution:



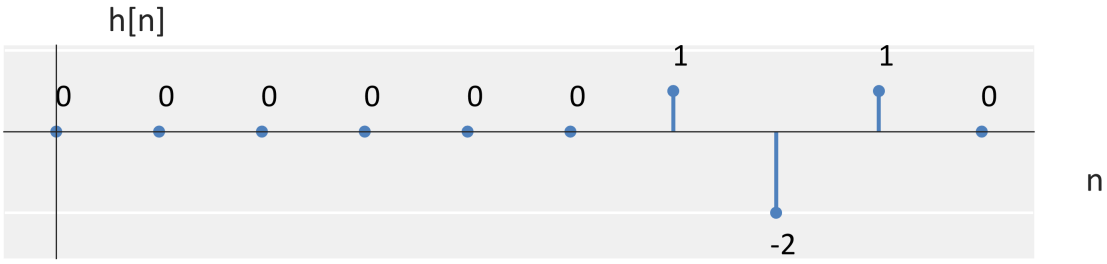
(b) Compute $x[n] \circledast h[n]$ for $h[n]$ below (defined for one period from $0 \leq n \leq 9$).



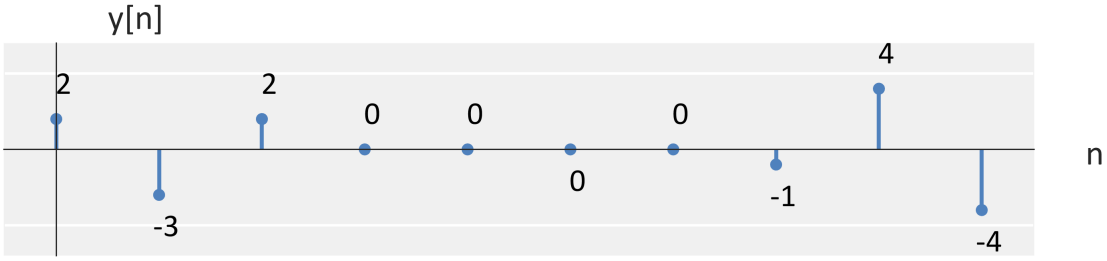
Solution:



(c) Compute $x[n] \circledast h[n]$ for $h[n]$ below (defined for one period from $0 \leq n \leq 9$).



Solution:


y[n]
2
-3
2
0
0
0
0
0
-1
4
-4
n