How to find the Fourier Transform H(Ω) for h[n] = (n + 4)u[−n − 1] + (−n + 4)u[−n + 4]u[n].

Answer
- You may use the DTFT transform and properties tables to solve this problem. In this case, you need to find the DTFT of u[n] and use reflection and time shift properties to get the DTFT of u[-n+N] and then find the actual values for each n.
- Another way would be to plot h[n] (I would plot each term separately and then add them up); you will end up with a summations of delta functions with different amplitude and at different values of n. Then you can use the DTFT of the delta function with reflection and time shift property.

I'm wondering how to deal with negative DT signal.
First question: what is $x[n] = (n - 4)u[n]$? Answer: Please see the plot below:
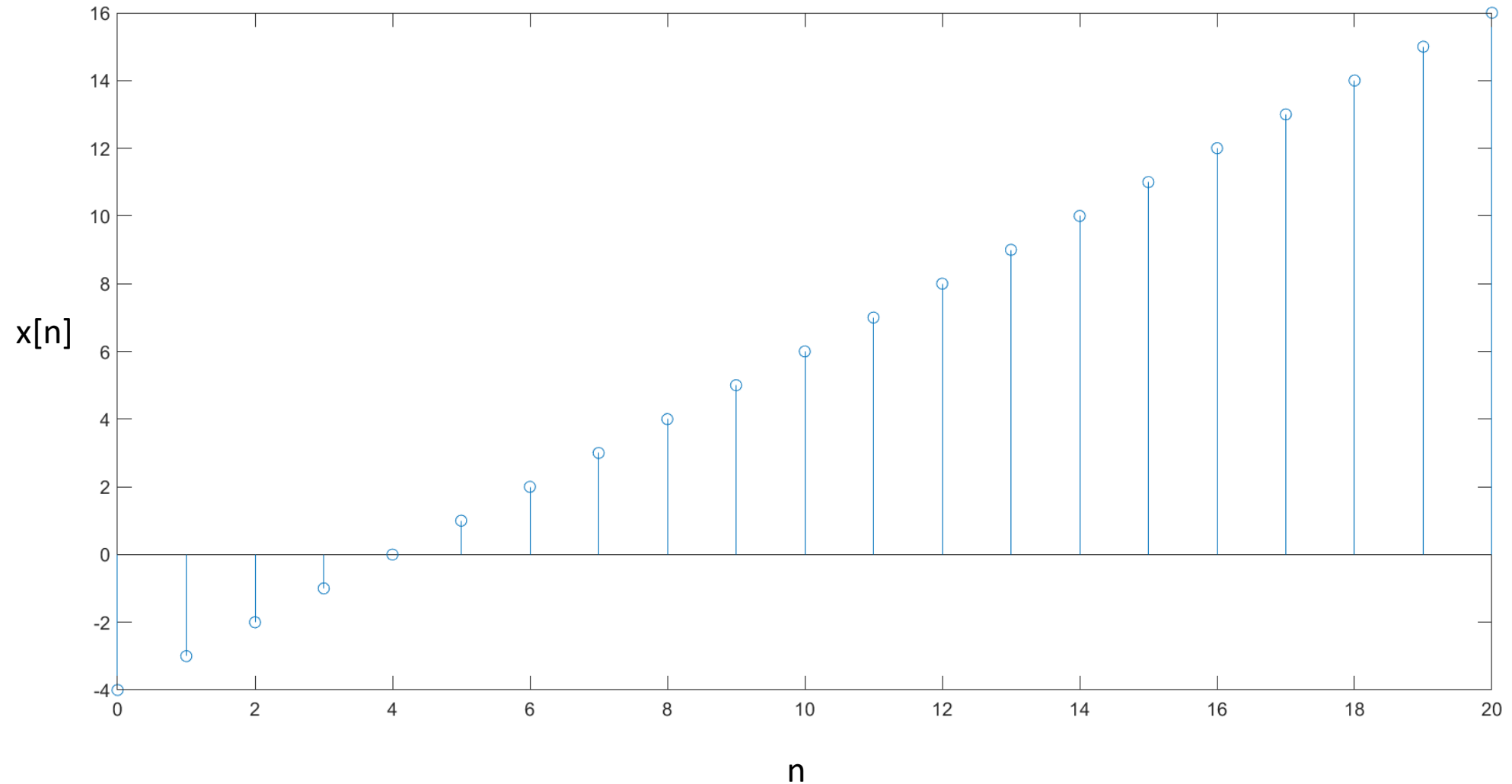
Second question: If x[n]=δ[n] and h[n]=-δ[n], what is y[n]=x[n]*h[n] (convolution)

Answer:
- You may use Table method to compute the convolution and you will find that $y[n] = h[n] = -\delta[n]$.
- You may use multiplication in the frequency domain ($Y(\Omega) = X(\Omega) \times H(\Omega)) = 1 \times (-1) = -1$, then we do the inverse Fourier transform to find $y[n] = h[n] = -\delta[n]$.