ECE113, Winter 2023 **Quiz #4**
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Monday, 23 Jan 2023
10 points total.

Name: _____
UID: _____

1. (10 points) Consider the following sequences:

$$x[n] = \{2, \quad 0, \quad 2, \quad 3, \quad 0, \quad 1, \quad 2 \quad 5\}, -10 \leq n \leq -3,$$

$$h[n] = \{2, \quad 0, \quad 2, \quad 3, \quad 1, \quad 3, \quad 1\}, 2 \leq n \leq 8,$$

$$y[n] = x[n] * h[n],$$

(a) What is the range of non-zero index n of the output $y[n]$?

(b) What is the length of y[n]?

Solution:

(a)

We can first write out the convolution: $y[n] = \sum_{k=-\infty}^{+\infty} x[k]h[n-k]$.

Firstly, according to $x[k]$, we have $-10 \leq k \leq -3$.

Similarly, according to $h[n-k]$, we have $n-8 \leq k \leq n-2$

To guarantee the intersection of these two interval, we can get $-8 \leq n \leq 5$, which is the non-zero index n of $y[n]$.

(b)

L = 5 - (-8) + 1 = 14