Q2a: Letting $s(x) = \sum_{k=0}^{n} a_k x^k$, with $a_n = 1$, we see that

$$\begin{aligned} s(\alpha) &= [x^n]_{s(x)} + a_{n-1}[x^{n-1}]_{s(x)} + \cdots + a_0 \\ &= [x^n]_{s(x)} + [a_{n-1}x^{n-1}]_{s(x)} + \cdots + [a_0]_{s(x)} \\ &= [x^n + a_{n-1}x^{n-1} + \ldots a_0]_{s(x)} \\ &= [s(x)]_{s(x)} \\ &= [0]_{s(x)} \end{aligned}$$