**COMP3121 Assignment 2 – Question 4**

**4A)** In this question we have to convolute the following sequence with itself i.e. . Note that the 0’s in between are of length *k*. To compute this convolution, we can do the following:

The associated polynomial is and thus to get the convolution of s with itself, it is of the sequence of the coefficients of the polynomial .

This is of the form of and hence we would get:



Hence, this is of the sequence with *k* number of zeros between 1 and 2 exclusive on either side.



**4B)** Since , in order to get the DFT of *s*, we need to evaluate it at all roots of unity of order *k + 2*. This can be done as shown below:

As shown in (a), the corresponding polynomial is and hence,

**End of Solution**