

**Example 8-5:** Consider the 10-point DFT of  $q[n] = \delta[n - 14]$  which should be  $Q[k] = e^{-j0.2\pi(14)k}$  by virtue of the DFT pair given in (??). If we take the 10-point IDFT of  $Q[k]$  we get a length-10 signal which is defined over the time index range  $n = 0, 1, 2, \dots, 9$ . Here is one way to determine the IDFT of  $Q[k]$ .

$$Q[k] = e^{-j0.2\pi(10+4)k} = e^{-j2\pi k} e^{-j0.2\pi(4)k} = e^{-j0.2\pi(4)k} \xleftrightarrow{\text{DFT}} \delta[n - 4]$$

Thus, the result of the IDFT has a nonzero value at  $n = 4$ , and seems to be different from  $q[n]$  which was nonzero at  $n = 14$ .

