

$$\begin{aligned}
3.19 \text{ We have } X(k) &= \sum_{n=0}^{N-1} x(n) W^{nk} = \sum_{n=0}^{N-1} x^*(n) W^{nk} = \\
&= \left[\sum_{n=0}^{N-1} x(n) W^{-nk} \right]^* = \left[\sum_{n=0}^{N-1} x(n) W^{(N-k)n} \right]^* = X^*(N-k)
\end{aligned}$$

Thus, $X(k) = X^*(N-k)$