$$n_0 \in [1 \ldots K-1] : \left(y[k] = \mathrm{e}^{\mathrm{j}\, n_0\, \frac{2\,\pi}{K}\, k}\, x[k] \right) \Leftrightarrow \left(\left\{ \begin{array}{ll} Y[n] = X[K + n - n_0], & n \in [0 \ldots n_0 - 1] \\ Y[n] = X[n - n_0], & n \in [n_0 \ldots K-1] \end{array} \right. \right)$$