605: Ασκήσεις Ia

Additional Exercises:

1. If $f : [-\pi, \pi] \to \mathbb{C}$ is integrable, $f_1 = \operatorname{Re} f$ and $f_2 = \operatorname{Im} f$, find $\hat{f}_1(k)$ and $\hat{f}_2(k)$ in terms of $\hat{f}(k)$.

2. Let $f : \mathbb{R} \to \mathbb{C}$ be 2π-periodic and integrable over compact intervals. If $x \in \mathbb{R}$ define $f_x : \mathbb{R} \to \mathbb{C}$ by $f_x(t) = f(t - x)$ $(t \in \mathbb{R})$. Show that $\widehat{f_x}(k) = e^{-ikx} \hat{f}(k)$ for all $k \in \mathbb{Z}$.