• Assume $f$ is a tempered function and $\phi \in \mathcal{S}$ is a Schwartz function. Prove that $\phi \ast f$ is also a tempered function.

• Prove the extension of formula (5) in the book to distributional Fourier transforms. I.e. let $f$ be a tempered function such that $g = \hat{f}$ is its distributional Fourier transform. Then prove that the distributional Fourier transform of $f \circ T$ is $\frac{1}{|\text{det}(T)|} \hat{f} \circ T^{-1}$, whenever $T : \mathbb{R}^n \to \mathbb{R}^n$ is an invertible linear map.

• Let $f \in L^1_{\text{loc}}(\mathbb{R}^n)$. Assume that $\int f \phi = 0$, for all $\phi$ continuous and compactly supported in $\mathbb{R}^n$. Prove that $f(x) = 0$ a.e. $x \in \mathbb{R}^n$. 