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Selected Problems

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1. Prove that the Fourier Transform of $\delta(x)$ is equal to $1$.
2. Prove that the Fourier Transform of $\delta(x-x_0)$ is equal to $e^{-ikx_0}$.
3. Find two alternative definitions for Dirac's $\delta$ function.
4. Prove that the Fourier Transform of a Gaussian is also a Gaussian.
5. Devise an equation to determine a plausible size for a convolution kernel containing a Gabor filter tuned to spatio-temporal frequency $(k_x, k_y, \omega)$. 