1. Assume that the Fourier Transforms of $f$ and $g$ exist, and denoted by $\hat{f}$ and $\hat{g}$, respectively. Show that $(f * g)^(\gamma) = \hat{f}(\gamma)\hat{g}(\gamma)$.

2. Let $f(t) = \chi_{[0,1]}$, the characteristic function over the interval $[0,1)$. Compute $f * f$;

3. Let $f$ be the function in problem number 2. Compute $f * f * f$. [Note, these two problems are the B-splines of orders 2 and 3]

4. Verify that $f * g = g * f$. 

Homework 4