Statistics 330b/600b, spring 2009
Homework # 10
Due: Thursday 16 April

*Please attempt at least the starred problems.*

*[1] UGMTTP Problem 7.3.

[2] Suppose $H$ is a continuously differentiable function on $\mathbb{R}$ which is zero outside some bounded interval. For a given bounded measurable function $f$ on $\mathbb{R}$, define $g(x) := \int f(y)H(x - y)\,dy$.
   
   (i) Show (rigorously) that $g$ is differentiable with $g'(x) = \int f(y)H'(x - y)\,dy$.
   
   (ii) Explain why $g$ belongs to $C^\infty(\mathbb{R})$ if $H \in C^\infty(\mathbb{R})$.

*[3] UGMTTP Problem 7.8. Note that the $D$ in part (i) should be a $\Delta$. For part (ii), the $\ell_i$'s are defined for $i = 0, 1, \ldots, k$. It might help to show first that the function $F_k(x) = \sum_{0 \leq i \leq k} f_i(x)$ belongs to $BL(\mathcal{X})$ and $\epsilon \leq F_k(x) \leq k + 1$ for all $x$.