18.100B
Fall 2012

Problem Set 10

Due December 6th at 4 pm in room 2-285.

Hand in parts 1 and 2 separately. Put your name on each part.

Part 1

1. Let $K\colon [0,1]\times[0,1]\to\mathbb{R}$ be continuous, and let $\mathcal{F}$ be the family of functions f from $[0,1]$ to $\mathbb{R}$ satisfying

$$f(x)=\int_0^1 K(x,y)g(y)dy$$

for some continuous function $g\colon [0,1]\to[-1,1]$. Prove that the family $\mathcal{F}$ is equicontinuous.

2. Problem 15 from page 168.
3. Problem 18 from page 168.

Part 2

4. Problem 1 from page 196.
5. Prove that if $\alpha\in\mathbb{R}$ and $f\colon (0,\infty)\to\mathbb{R}$ is given by $f(x)=x^\alpha$, then $f'(x)=\alpha x^{\alpha-1}$
6. Problem 10 from page 139, parts (a) through (c). Hint: Use the results of the previous Problem and of Problem 7 from Problem Set 8.