Real Analysis 1, MATH 5210, Fall 2016

Homework 3, Borel Sets, Solutions

Due Friday, September 9, at 1:30

Write in complete sentences!!! *Explain* what you are doing and convince me that you understand what you are doing and why. Justify all steps by quoting relevant results from the textbook, class notes, or hypotheses. Do not copy the work of others; **do your own work!!!**

1.36. The collection of Borel sets is the smallest σ-algebra that contains all intervals of the form $[a, b)$ where $a < b$.

1.37. Prove that each open set is an F_σ set.

1.56. Let f be a real-valued function defined on $\mathbb{R}$. Prove that the set of points at which f is continuous is a G_δ set. HINT: In the Riemann-Lebesgue Theorem supplement, modify the proof of Exercise 6.1.8 to show that when $\mathcal{D}(f) = \mathbb{R}$, $A_s = \{x \in \mathbb{R} \mid \text{osc}(f : x) \geq s\}$ is closed. Then use Theorem 6-10.