

Math 524

Homework due 10/13/2010

Reading from Stein & Shakarchi: Introduction, Chapter 1, §1, 2, 3.

Problem 1. Let F be a subset of $[0, 1]$ constructed in the same manner as the Cantor ternary set except that each of the intervals removed at the n th step has length $\alpha 3^{-n}$ with $0 < \alpha < 1$. Then F is closed, F^c is dense in $[0, 1]$ and $m_* F = 1 - \alpha$. Such set F is called a *generalized Cantor set*.

Exercise from Stein & Shakarchi: 1, 2, 3, Chapter 1 (pages 37 and 38).

Note the differences between Problem 2 and Exercise 3 in the textbook.

(*) **Problem from Stein & Shakarchi:** 2, Chapter 1 (page 46). This type of decomposition of an open set is called a Whitney decomposition. It is an important tool in Harmonic Analysis.