DYNAMICAL SYSTEMS, MATH 117, HW#9

Chapter 14, problems 11, 14, 15, 17, and the following problems:

Problem 1.

Let $C \subseteq [0,1]$ be the Cantor set generated by contractions $f_1(x) = \frac{x}{3}$ and $f_2(x) = \frac{x}{9} + \frac{8}{9}$. Find $\dim_B C$.

Hint: use Moran's formula.

Problem 2.

Calculate box counting dimension of the Menger sponge (the first three steps of the construction are shown on the picture below).
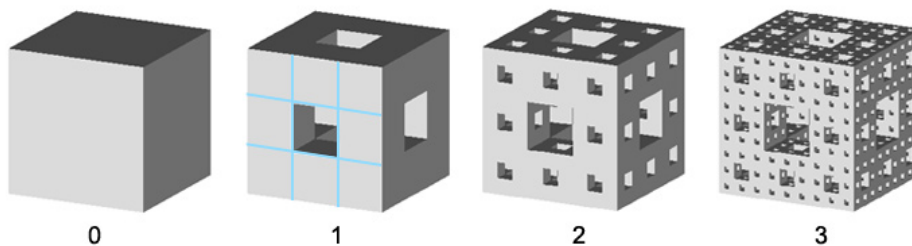

Figure 1: The first three steps of the construction of the Menger sponge.

Problem 3.

Give an example of a compact subset $S \subseteq \mathbb{R}^2$ of the plane such that it has zero topological dimension, and $\dim_B S = 1$.