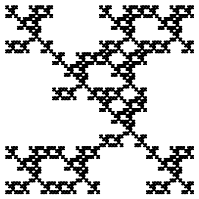
Fourth homework set

Due at the beginning of class on Thursday, Oct 8. No late homework will be accepted.
Fold your homework paper vertically and PRINT your name on the outside.

1. Compute the exact values of the similarity dimension of these fractals. If you use the basic similarity dimension formula, list the values of N and r. If you use the Moran equation, solve the Moran equation algebraically.

a  b 

2. Suppose a fractal consists of infinitely many copies, one scaled by 1/3, two scaled 1/9, two scaled by 1/27, and so on, with two copies scaled by $1/3^n$ for $n = 2, 3, 4, \ldots$.

(a) Assuming the Moran equation can be generalized to this case (it can), write the Moran equation for this fractal.

(b) Use the fact that for all x with $|x| < 1$,

$$1 + x + x^2 + x^3 + \cdots = \frac{1}{1-x}$$

to find the exact value of the dimension of this fractal.

3. Suppose a fractal consists of 2 pieces scaled by 1/2, 2 pieces scaled by 1/4, and 3 pieces scaled by 1/8.

(a) Write the Moran equation to find the dimension of this fractal.

(b) Find the exact value of the dimension. You can do this without solving the Moran equation. Look at problem 1(b) and think about the Sierpinski gasket.