

BIOLOGY 309A: PROBLEM ASSIGNMENT #2
Due Thursday Oct. 27

Problem A

Book Problem 2.3

Problem B

Book Problem 2.6

Problem C

Book Problem 2.7

Problem D

Book Problem 2.9

Problem E

Describe in detail the self-similarity of some familiar object (e.g., the tree outside your window, the crack in the plaster above your bed, ...) Give measurements, angles, etc and tell in what way the self-similarity is an approximation to the actual shape.

Problem F

Consider the following “fractal game”: Four points mark the corners of a square. From an initial condition somewhere inside the square, pick one of the four points at random and move $2/3$ of the way towards that point. Iterate. What is the dimension of the resulting attractor? Explain how you got this result.

Problem G

Design a “fractal game” to draw a cantor set. Give the rules for the game, and show the first several iterations.

Bonus: Design a “fractal game” to draw a snowflake-like object. Calculate the dimension of the object that results from the game.