

Math 388 Exercises

Instructions: not to be turned in, but do them anyway.

1. Find the fractal dimension of the Sierpinski carpet defined on page 160.
2. Find the fractal dimension of the Kock snowflake. Does it matter whether you start with one side or a full triangle?
3. Construct a fractal that has dimension (a) $d = \frac{\ln 3}{\ln 4}$ (b) $d = \frac{\ln 4}{\ln 3}$ (c) $d = \frac{\ln 5}{\ln 3}$. Use your answers to parts b and c to describe the geometric property that the dimension is measuring. (That is, how can you look at the figures in b and c and say that "obviously" one has a higher dimension than the other.)
4. Analogous to your work in #3, construct a fractal that has dimension $d = \frac{\ln 9}{\ln 3}$. Is it fair to say that this really has dimension 2? Analogous to your work in #3, construct a fractal that has dimension $d = \frac{\ln 10}{\ln 3}$. Why is the fractal dimension formula in this example wrong?