

Chapter 16: Exercises with Fractals and Dimension

Worksheet to accompany

David Feldman, *Chaos and Fractals: An Elementary Introduction*,
Oxford University Press, 2012

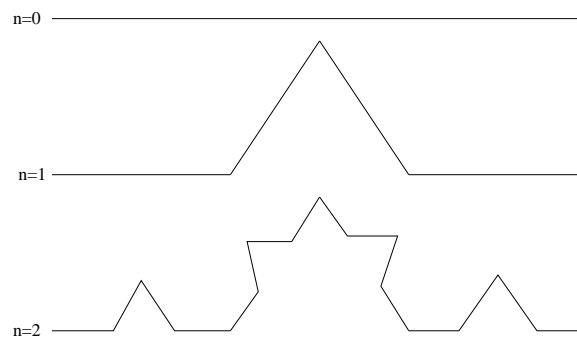


Figure 1: Steps in the construction of the Koch Curve.

1. The Koch Curve

- (a) Complete the following table using the successive steps in the construction of the Koch Curve, as illustrated in Fig. 1:

Step	Number of Segments	Length of Each Segment	Total Length
0			
1			
2			
3			
n			

- (b) As n goes to infinity, what happens to the total length of the Koch Set?
(c) What is the dimension of the Koch Set?

2. The Sierpiński Triangle

- (a) Draw a large Sierpiński triangle. Do so by starting with a large triangle and then removing triangles.
- (b) Complete the following table using the successive steps for your Sierpiński construction:

Step	Number of Triangles	Area of Each Triangle	Total Area
0			
1			
2			
3			
n			

- (c) As n goes to infinity, what happens to the total area of the Sierpiński triangle?

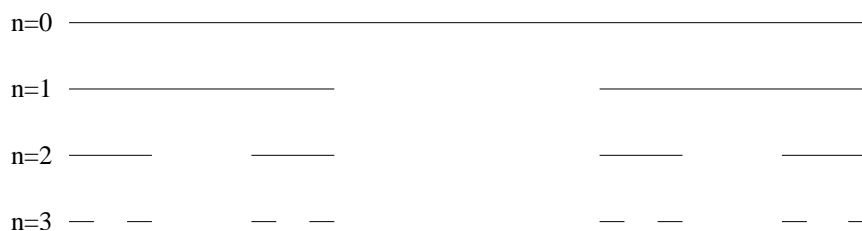


Figure 2: Steps in the construction of the Cantor Set.

3. The Cantor Set

- (a) Complete the following table using the successive steps in the construction of the Middle-Thirds Cantor Set, as illustrated in Fig. 2:

Step	Number of Segments	Length of Each Segment	Total Length
0			
1			
2			
3			
n			

- (b) As n goes to infinity, what happens to the total length of the Cantor Set?
- (c) What is the dimension of the Cantor Set?