

# Introduction to Complexity (Spring 2013)

## 3.7 Submit Unit 3 Homework » Unit 3 Homework

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### Instructions 1

Download Homework3.pdf from the Course Materials website. Submit your answers below

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### Question 2

Suppose the initial (level 0) line segment in the Koch curve is 3 centimeters. What is the length in centimeters of the Koch curve at level

- $16/3$
  - $16/27$
  - $64/27$
  - $64/9$
  - $27/3$
- 

### Question 3

Consider a variation on the Koch curve. Start with a line segment of length  $L$ . The iteration rule is illustrated in Homework 3.pdf (please download from Course Materials page), where each segment is replaced by five segments, each of length  $1/3$  the original segment. What is the length of this curve at level 2?

- $(25/9) L$
  - $(10/6) L$
  - $(9/5) L$
  - $(16/9) L$
  - $(10/9) L$
- 

### Question 4

What is the length of the fractal in question 2 at level  $N$  ?

- $(4/3)^N L$
  - $(5/3)^N L$
  - $(6/3)^N L$
  - $(5N/3) L$
  - $(3/5)^N L$
- 

### Question 5

What is the fractal (Hausdorff) dimension of the fractal in question 2?

- $\log 4 / \log 3$
- $\log 3 / \log 4$
- $\log 5 / \log 3$
- $\log 5 / \log 4$
- $\log (4/3)$

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**Question 6**

Consider the Cantor Set, a fractal that is formed by starting with a line segment of length  $L$ , and at each level, the middle third of the segment is erased (and not replaced by anything!). A picture of this process is in Homework3.pdf. What is the length of the Cantor set (sum of the length of the segments) at level  $N$ ?

- $(1/3)^N L$
  - $(3/2)^N L$
  - $(4/3)^N L$
  - $(2/5)^N L$
  - $(2/3)^N L$
- 

**Question 7**

What is the fractal (Hausdorff) dimension of the Cantor set?

- $\log 3 / \log 2$
- $\log 2 / \log 3$
- $\log 2 / \log 4$
- $\log [2/3]$
- $\log [3/2]$