(Math 170) Homework 4:

Due January 31, 2007

Exercise 1: Find

(a) $Log_3(81)$

(b) x if $2^{x^2+1} = 32$

(c) x to 4 decimal places if $4^2 = x^3$

Approximations to the "Cantor Set" are defined as follows:
1st Approximation
A line segment

n+1 st Approximation
Take every line segment in the nth Approximation and remove the middle third (considered as an open interval).

For a slightly different description go to
http://en.wikipedia.org/wiki/Cantor_set

Exercise 2: Draw the first 5 approximations to the cantor set.

Exercise 3: Let A be a Cantor set whose initial approximation has length 1. How many copies of A do I need to construct a Cantor set whose initial approximation has length 3?

Exercise 4: What is the dimension of the Cantor line (in terms of natural logarithms)?

Exercise 5: What is the dimension of the Cantor line to 4 decimal places?

Exercise 6: What is the length of the Cantor line?

Exercise 7: (2 Bonus Points) Prove your answer to Exercise 6.