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(* Adam Beck *)

(* Calculate the fractional dimension of the Sierpinski carpet and "sponge" *)

(* Sierpinski carpet *)

In[51]:= (* consider a 2D square. As discussed in class, we need (1/epsilon)^2 objects
 to "fill" the square, where epsilon is the diameter. Let E refer to epsilon. *)
(* dimension = log[N{E,A}] / log[1/E] *)
(* log[N{E,A}] is calculated by taking the mass of the current iteration of the carpet,
and plugging E into that mass equation. *)

(* For the first iteration, the mass of the carpet is 8/9, the next is 8/9 squared,
then cubed, and so on. These are all multiplied by (1/E) squared. A
 For loop can be used to iterate through a few iterations of the carpet,
and converge on an answer. Let epsilon be raised to the 1,
2nd, 3rd, etc. power for every iteration *)

epsilon = 1 / 3;
mass = 8 / 9;

For[i = 1, i < 5, i++, (
   epsilonTemp = (epsilon ^i) ^2;
   massTemp = mass ^ i;
   massEquation = massTemp / epsilonTemp;
   Print[N[Log[massEquation] / Log[1 / (epsilon^i)]] ])
 ];

1.89279

1.89279

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