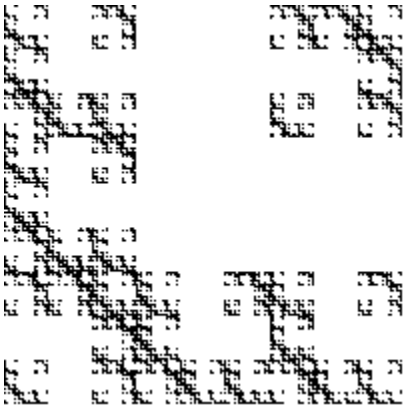
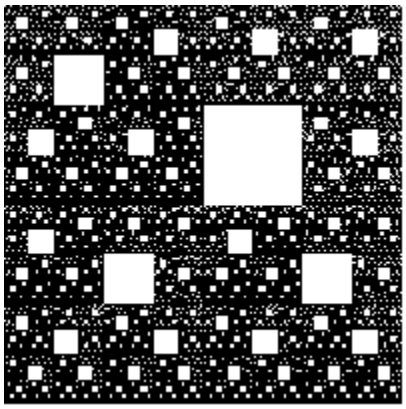
Practice Exam 3

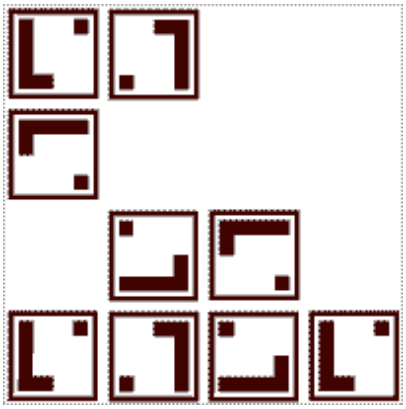
1. Find IFS rules to generate each of these fractals.





Find the similarity dimensions of the fractals (a) and (b) above. If the Moran equation is used, solve it exactly using the quadratic formula.

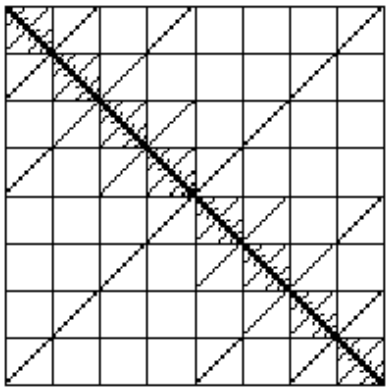
3. On the left is the starting picture for the deterministic IFS program, on the right, the second image produced by the program.

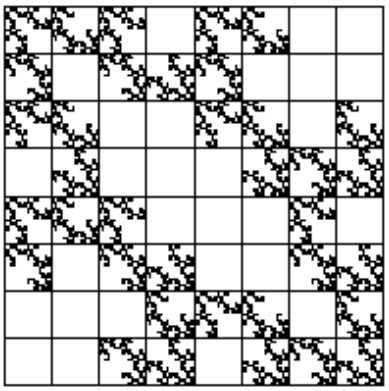


(a) Find the smallest number of transformations needed for this IFS. Explain how you arrived at your answer.

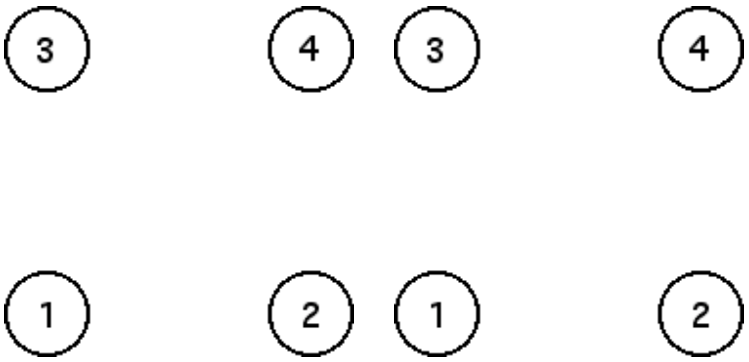
(b) Write the IFS rules.

4. (a) Pictured below are two IFS with memory images. Determine if either can be generated by forbidden pairs. Explain how you arrived at our answer. Give explicit details. For reference, the length three address squares are shown on both images.



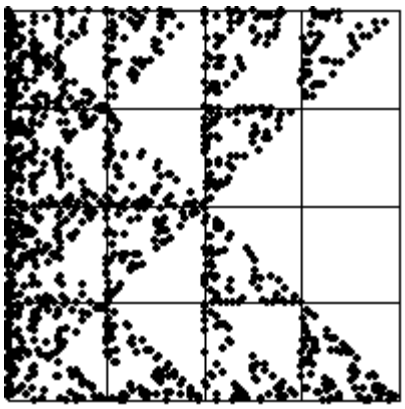


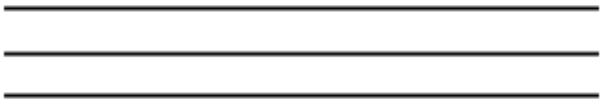
(b) For each image that is generated by forbidden pairs, fill in the appropriate arrows on the corresponding graph.

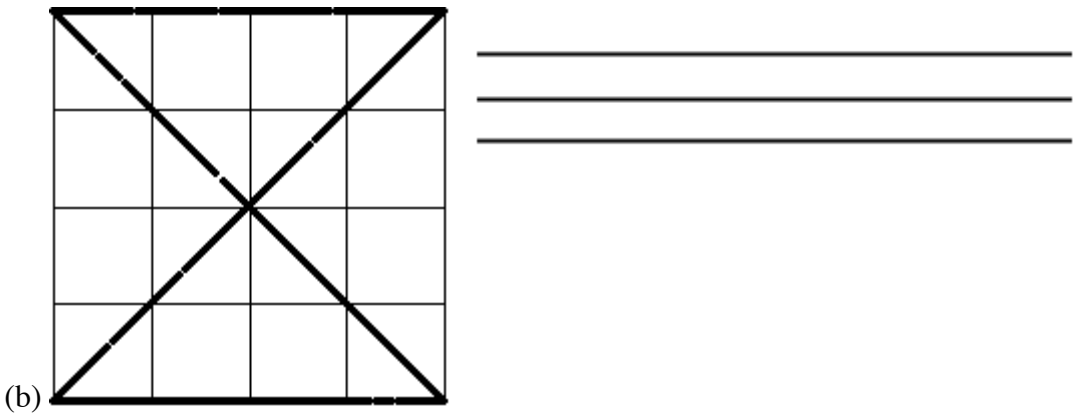


5. Pictured below are three driven IFS images. Using the bin boundaries beside each, sketch a time series that could generate the driven IFS. Explain what features of the driven IFS guided your construction of the time series. Provide enough detail in the time series to illustrate your explanation.

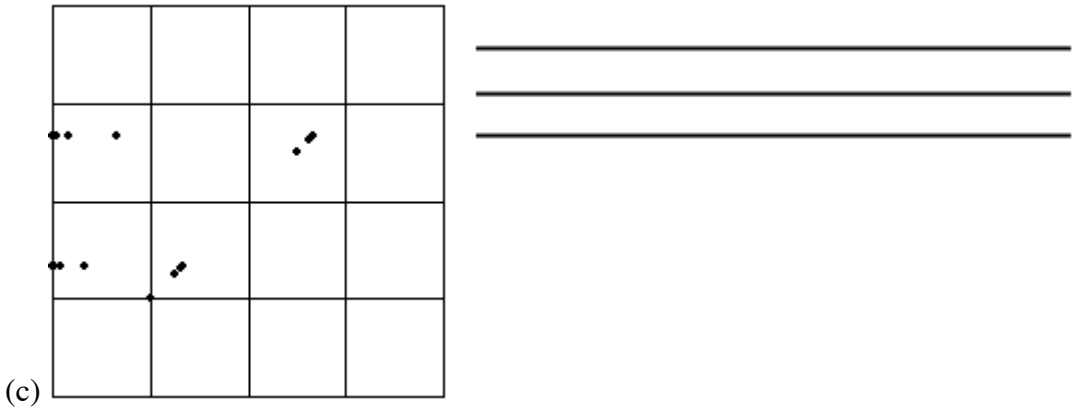
(a)







(b)



(c)

6. Pictured at the bottom of the page is the product of two Cantor middle halves sets. That is, Cantor sets constructed by removing the middle half of the intervals at each stage.

(a) What is the dimension of the Cantor middle halves set? Justify your answer.

(b) What is the dimension of the product of two Cantor middle halves sets? Justfy your answer.

(c) What is the dimension of a typical intersection of this product and a line segment? Assume both lie in the plane. Justify your answer.

(d) Draw two line segments. For one, the dimension of the intersection is 1/2; for the other, the dimension of the intersection is that given in (c). Label which is which.