MCS-115
Answers to Homework: 6.1, 6.2, 6.3

6.1.2 There are a variety of answers. The largest such sub-figure is half the size of the original picture. Note that the original picture can be sub-divided into three of these sub-figures. There are also sub-figures that are $1/4, 1/8, 1/16, \ldots$ as large. (Any power of $1/2$ will do.)

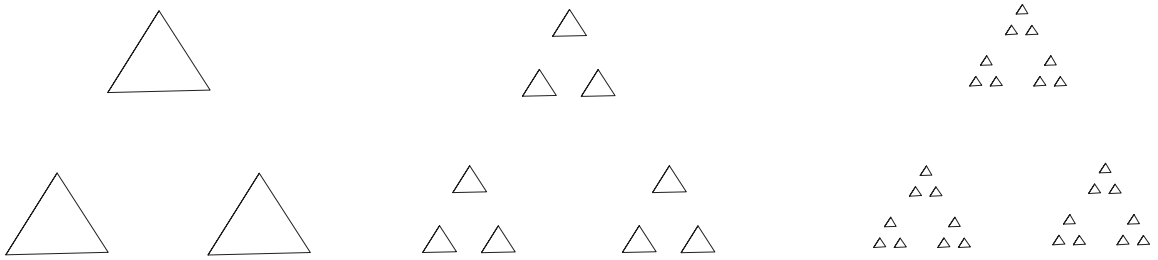
6.1.6 The question is referring to the Julia Set on the top of page 409. In this case, each half is the whole (except reduced).

6.2 13,14,15 Use CD or see solutions outside intructor's office. Both patterns in 13 are periodic of period two. The first pattern in 14 is migratory. The first pattern in 15 is stable while the second pattern in 10 is migratory.

6.2.23 For example,

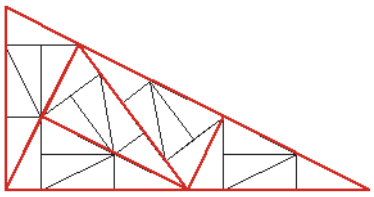
6.2.29 After 4 generations, you have $2^4 = 16$ end points. After n generations you have 2^n end points. If you reduce the V by a factor of $1/2$ each time, what remains is something like the Sierpinski triangle with all the horizontal segments taken out.

6.3.13 The edge of every triangle at each state is eventually replaced with a scaled version of the standard Cantor Set. In other words, for each edge of the triangle, think of removing the middle third and then repeating. The endpoints of the remaining outside thirds will always be in the Sierpinski Dust.

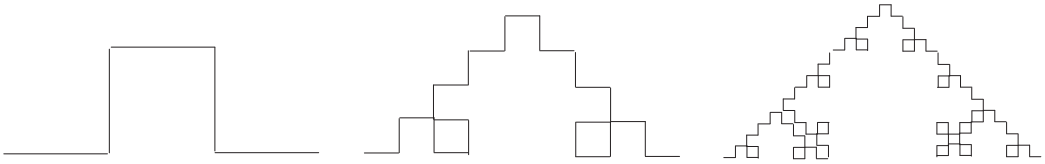


6.3.14 At the third stage there are 15 bends. At the fourth stage there are 63 bends. At the nth stage there are 4^{n-1} sides with a bend between each one, for a total of $4^{n-1} - 1$ bends.

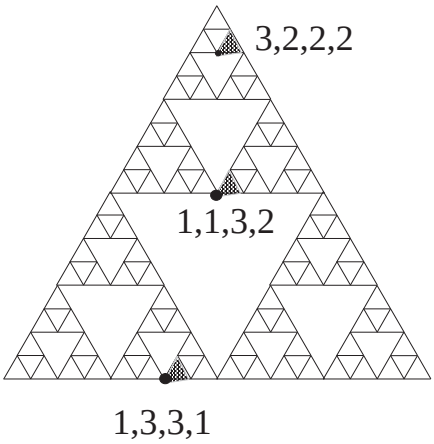
6.3.20



6.3.21



6.3.23



6.3.27 Like the Sierpinski Dust story above, the edges at each stage will be replaced with Cantor sets in the limit.