PROBLEM 1. Recall that a forest is an acyclic graph, *i.e.*, a graph which contains no cycle as a subgraph. Suppose G is a forest with 50 vertices and 44 edges. How many connected components does the G have?

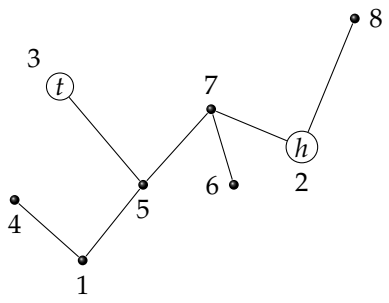
PROBLEM 2.

(a) Find the three unlabeled trees with five vertices.

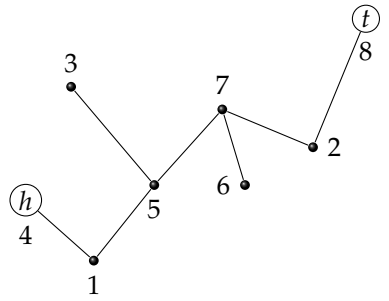
(b) Use these unlabeled trees to count the number of (labeled) trees with five vertices.

PROBLEM 3. Determine the functions $[8] \to [8]$ associated with the following vertebrates:

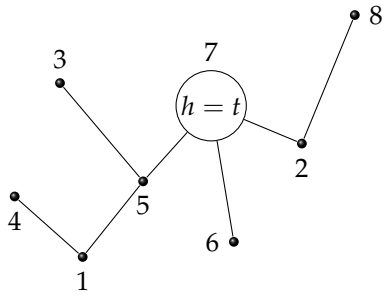
(a)



(b)



(c)



PROBLEM 4. Find the vertebrates associated with the following functions

(a)

i	1	2	3	4	5	6	7	8	9
$f(i)$	4	6	5	2	9	1	7	4	3

(b)

i	1	2	3	4	5	6	7	8	9
$f(i)$	2	3	1	5	6	1	8	8	8

PROBLEM 5. Characterize the vertebrates associated with functions $[n] \to [n]$ which are permutations (i.e., bijective).