Math 491, Problem Set #10
(first part due 10/16/03; second part due 10/21/03)

1. (a) Use transfer matrices to find the generating function for the number of domino-tilings of the 4-by-n grid-graph.
   (b) Use transfer matrices to find the generating function for the number of irreducible domino-tilings of the 4-by-n grid-graph. (Here an irreducible tiling is one that cannot be decomposed into tilings of two smaller rectangles of height 4.)
   (c) Check your work by deriving your answer to (a) from your answer to (b) and vice versa.

2. (a) Find a generating function for the number of spanning trees of a 2-by-n grid-graph.
   (b) These numbers turned up in a homework problem you did earlier in the course. Which one was it?
   (c) Is this a coincidence, or is there a connection between the two problems? That is, can you find a bijection between the two sorts of combinatorial objects?