Homework 11

Geometric Topology
Math 99r – Harvard University
Due Monday, 8 December 2003

1. Compute the bracket polynomial for the link 4_1^2 using state diagrams (equation (6.1) of Adams). (Hint: the symmetry of the diagram should simplify your calculation.)

2. Find a presentation for the knot 6_3 as a closed braid. (Express the braid in terms of the standard generators σ_i of B_n for some small n.)

3. Find a sequence of Markov moves relating the two braids shown in Adams Figure 5.51.

4. Find a surjective homomorphism $\phi : B_3 \to \mathrm{SL}_2(\mathbb{Z})$. (Here B_3 is the braid group on 3 strands, and $\mathrm{SL}_2(\mathbb{Z})$ is the group of integral matrices $\left(\begin{smallmatrix} a & b \\ c & d \end{smallmatrix}\right)$ such that $ad - bc = 1$.)