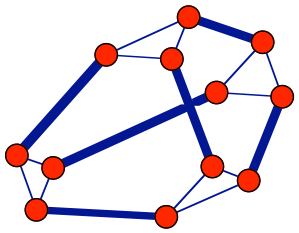
Homework for 651

Due Thursday, March 1, 2007 (Note the later date)

1. Problem 13 on page 80 in Hatcher.
2. Problem 21 on page 81 in Hatcher.
3. The following is a picture of the the truncated tetrahedron TT in $\mathbb{R}^3$.



(a) Show that the group of rotations of TT is isomorphic to A_4, the alternating group on four letters, which is the subgroup of even permutations of the symmetric group on four letters.

(b) Show that TT is a covering space of the figure 8, where the solid lines in the Figure are considered as double lines.

(c) Show that TT (with due regard to the double edges) is the Cayley graph of A_4 with respect to a generator x of order 3 and y of order 2.

(d) Use TT to show that $< x, y \mid x^3 = y^2 = (xy)^3 = 1 >$ is a presentation of A_4.