

## HOMEWORK 5

**Exercise 1.** Prove that the space which arises by glueing the Moebius band to the boundary of a hole in the sphere is the projektive plane.

**Exercise 2.** Prove that the plane  $X$  is not homeomorphic with the union  $Y$  of two planes which have a line as an intersection. Hint: Compute homology groups of pairs  $(X, X - \{p\})$  and  $(Y, Y - \{q\})$ , where  $p \in X$  and  $q \in Y$  are points. Use excision theorem.