HOMEWORK 5 – 2020

Exercise 1. Prove that the space which arises by glueing the Moebius band to the boundary of a hole in the shere is the projektive plane. Compute its homology and cohomology with $\mathbb{Z}/2$ and $\mathbb{Z}/5$ coefficients.

Exercise 2. Prove that the plane X is not homeomorhic 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 $p \in X$ is a point and $q \in Y$ is a point in the intersection of planes. Use excision theorem.