Homework 6

1. List all coverings of the bouquet of two circles with the number of sheets equal 2.

2. Find the simplest non-regular covering of the bouquet of two circles. Describe it, and prove that it is not regular.

3. Calculate the fundamental group of the space of quadratic polynomials $x^2 + px + q$ with complex $p, q$ and no double root. Does there exist a one-dimensional cellular space homotopy equivalent to this one?

4. Calculate the fundamental groups of a handle and a sphere with three holes. Are these spaces homotopy equivalent?