Math 540: Exercises for Week 6

Reading: Hatcher Section 1.3

1. Hatcher 1.3.18
2. Hatcher 1.3.19
3. Hatcher 1.3.31
4. Let $M$ be a manifold (smooth or topological).
   (a) Prove that the fundamental group of $M$ is countable.
   (b) Prove that any covering space of $M$ is also a (smooth or topological) manifold.
5. Read the introduction to Chapter 2 of Hatcher, which is a leisurely discussion of the motivating ideas involved in homology, at some point before next Monday’s lecture.