

Math 8301, Manifolds and Topology  
Homework 8  
Due in-class on **Friday, Nov 14**

Part of the power of algebraic topology is in being able to actually compute things.

Here is a list of topological spaces, each of which can be triangulated. For each of these topological spaces, give a simplicial complex which realizes it, and compute—directly, without any fancy machinery that we haven't covered—the associated homology groups.

1. The complete graph on 4 vertices.
2. The 2-sphere  $S^2$ . (Triangulated as the boundary of a tetrahedron.)
3. The torus  $S^1 \times S^1$ . (Triangulated however you like.)
4.  $\mathbb{R}P^2$ . (Triangulated as in a previous assignment.)
5. The Klein bottle.