

# MATH 611 (DUE 10/23)

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## 1. SIMPLICIAL AND SINGULAR HOMOLOGY

**Exercise.** (Problem 2) Show that the  $\Delta$ -complex obtained from  $\Delta^3$  by performing the edge identifications  $[v_0, v_1] \sim [v_1, v_3]$  and  $[v_0, v_2] \sim [v_2, v_3]$  deformation retracts onto a Klein bottle. Find other pairs of identifications of edges that produce  $\Delta$ -complexes deformation retracting onto a torus, a 2-sphere, and  $\mathbb{RP}^2$ .

*Proof.* Solve this!

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