## Maths 212, Homework #18

First three problems: due Thursday, May 4

- 132. Compute the simplicial homology groups of the cylinder  $S^1 \times [0, 1]$ .
- 133. Compute the simplicial homology groups of the unit disc  $B^2$ .
- 134. Compute the simplicial homology groups of the Möbius strip.
- 135. Compute the simplicial homology groups of the torus.
- 136. Compute the simplicial homology groups of the figure eight.
- 137. Compute the simplicial homology groups of the Klein bottle.
- 138. Compute the simplicial homology groups of the real projective space  $\mathbb{R}P^2$ .
- 139. Compute the simplicial homology groups of the unit circle  $S^1$ .
- 140. Compute the Euler characteristic of the torus.

## Answers

- 132. The only nontrivial homology groups are  $H_0 = H_1 = \mathbb{Z}$ .
- 133. The only nontrivial homology group is  $H_0 = \mathbb{Z}$ .
- 134. The only nontrivial homology groups are  $H_0 = H_1 = \mathbb{Z}$ .
- 135. The only nontrivial homology groups are  $H_0 = H_2 = \mathbb{Z}$  and  $H_1 = \mathbb{Z}^2$ .
- 136. The only nontrivial homology groups are  $H_0 = \mathbb{Z}$  and  $H_1 = \mathbb{Z}^2$ .
- 137. The only nontrivial homology groups are  $H_0 = \mathbb{Z}$  and  $H_1 = \mathbb{Z} \times (\mathbb{Z}/2\mathbb{Z})$ .
- 138. The only nontrivial homology groups are  $H_0 = \mathbb{Z}$  and  $H_1 = \mathbb{Z}/2\mathbb{Z}$ .
- 139. The only nontrivial homology groups are  $H_0 = H_1 = \mathbb{Z}$ .
- 140. According to Problem 135, the Euler characteristic is 1 2 + 1 = 0.