

**ALGEBRAIC TOPOLOGY PROBLEMS**  
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(From Hatcher) 1, 3, 5, 7, 8, 11, 12, 15, 16, 17, 27, 29, 30

1. Compute the simplicial homology groups of a surface of genus  $\geq 1$ .
2. For any topological space  $X$  and  $p \in X$ , show that the natural map from  $\pi_1(X, p)$  to  $H_1(X)$  is a well-defined homomorphism.
3. Compute the singular homology groups of  $S^n \times S^m$  for any  $n, m \geq 1$ .