

Math 215a Homework #6, Due Tuesday 11/29 at 9:40 AM

1. Hatcher section 3.2 exercises 4, 10, 11.
2. Hatcher section 3.3 exercises 5, 7.
3. Let Σ_g denote the compact orientable surface of genus g . Show that if $g < h$, then any map $f : \Sigma_g \rightarrow \Sigma_h$ has degree zero.
4. Let A be an $n \times n$ matrix with integer entries. Then A induces a map $\phi : \mathbb{R}^n/\mathbb{Z}^n \rightarrow \mathbb{R}^n/\mathbb{Z}^n$.
 - (a) Show that under the obvious identification $H^1(T^n; \mathbb{Z}) \simeq \mathbb{Z}^n$, the pullback $\phi^* : H^1(T^n; \mathbb{Z}) \rightarrow H^1(T^n; \mathbb{Z})$ is equal to the transpose of A .
 - (b) Show that the degree of ϕ equals the determinant of A .