

Math 215a Homework #2, Due Thursday 9/29 at 9:40 AM

1. Hatcher, section 1.3, exercise 4.
2. Hatcher, section 1.3, exercise 12.
3. Hatcher, section 1.3, exercise 14. (See the discussion of $\mathbb{Z}_2 * \mathbb{Z}_2$ on page 42 of Hatcher.)
4. Hatcher, section 1.3, exercise 26.
5. Hatcher, section 1.A, exercise 6.
6. Let $X = T^n = \mathbb{R}^n / \mathbb{Z}^n$. Let \tilde{X} be a path connected covering space of X . Show that \tilde{X} is homeomorphic to $T^m \times \mathbb{R}^{n-m}$ for some m . (Here we interpret $T^0 = \{pt\}$.)
7. Let n and k be positive integers, and let F_n denote the free group on n generators. Show that if G is an index k subgroup of F_n , then $G \simeq F_{kn-k+1}$.
8. How difficult was this assignment? (1 = very easy, 5 = very hard)