Homework 9: due Friday October 27, 2022

Algebraic Topology, M382C, U.T. Austin, Daniel Allcock

Hatcher section 2.1 (p. 131): 20, 21, 23, 29

(on 29, compute the homology groups using singular homology, eg via Mayer-Vietoris.)

Hatcher section 2.2 (p. 155): 28, 31, 36

(on 36, you can use Mayer-Vietoris, rather than following the relative homology argument that Hatcher sketches for you. Also, some people prefer to understand the statement as "$H_*(X \times S^n) \cong H_*(X) \oplus H_{*-n}(X)$". This is not very different, indeed it is literally the statement of the problem with $*$ in place of i. But it communicates more emphatically that to get the homology of $X \times S^n$, you take sum two copies of $H_*(X)$, with one of them "slid up" by increasing subscripts by n. This problem, and its generalization to $H_*(X \times Y)$, called the Künneth formula, cannot be stated cleanly in terms of reduced homology. Since suspensions are so much cleaner using reduced homology, we keep both theories.)