Worksheet 1

Math 634, Algebraic Topology

Wednesday, September 30, 2020

Don't turn this in, just work through it with your colleagues.

0. Introduce yourself to your colleagues. What other courses are they taking this term?

1. In lecture we sketched a proof that for every continuous map $f\colon S^2 \to \mathbb{R}$, there is a point $x \in S^2$ with $f(x) = f(-x)$, using the intermediate value theorem. Write a nice, clean proof.

2. We also sketched a proof that for the analogous statement about a map $f\colon S^2 \to \mathbb{R}^2$, using winding numbers. See if you can come up with an elementary proof, not using anything fancier than you did in #1.