

**MATH 634 HOMEWORK 2**  
**DUE OCTOBER 3, 2018.**  
INSTRUCTOR: ROBERT LIPSHITZ

**Updated September 16, 2018**

Reminder: homework is due at the *beginning* of class, handed to me or in my mailbox on the second floor of Fenton.

- (1) Describe (precisely) a CW complex homeomorphic to  $\mathbb{R}$ , and prove it is homeomorphic to  $\mathbb{R}$ .
- (2) Prove that any CW complex is locally path connected. Deduce that not every subspace of  $\mathbb{R}$  is homeomorphic to a CW complex.
- (3) Prove that any CW complex is Hausdorff.
- (4) Let  $f: S^2 \rightarrow S^2$  be  $f(x, y, z) = (-x, -y, -z)$  (the antipodal map). Let  $X = S^2 \times [0, 1]/\sim$  where  $(p, 0) \sim (f(p), 1)$ . Give a CW complex homeomorphic to  $X$ . (Well-drawn pictures may help.)

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