

Math 525, HW2

Due Fri., September 12, 2008

- (1) H1.1 1.
- (2) H1.1 3.
- (3) Describe explicitly a CW structure on $\mathbb{R}P^2 \times \mathbb{R}P^2$.
- (4) Let X deformation retract to a point x_0 . Prove $\pi_1(X, x_0) = 0$.
- (5) Describe a space $X \subset \mathbb{R}^2$ which is **not** convex with $\pi_1(X, x_0) = 0$. Prove it!
- (6) Let $X = S^1$ with two 1-cells. Let A be the closure of one 1-cell.
 - Describe the retract from $X \times I$ to $X \times \{0\} \cup A \times I$ given by proposition.
 - Pick a contraction of A ; use to find the homotopy $f_t: X \rightarrow X$ with $f_0 = 1$ extending it given by corollary.
 - Find the homotopy equivalence of X and X/A given by “proposition 1.”