

## Homework 8 – Math 446 – Spring 09

Write up solutions for the exercises below.

1. Show that if a path-connected, locally path-connected topological space  $X$  has finite fundamental group, then every map  $\varphi : X \rightarrow S^1$  is nullhomotopic.
2. Construct a simply connected covering space of the space  $X$  given as the union of  $S^2 \subset \mathbb{R}^3$  and the straight line in  $\mathbb{R}^3$  from the north to the south pole.
3. Solve exercises 1, 2 in Section 73 of the textbook.
4. Solve exercises 2, 3, 4, 5 in Section 79 of the textbook.

**Due date:** Tuesday, March 17th, 2009 (at 5pm)