

HOMEWORK 6

1. Show that a space X is contractible if and only if the identity map, $\text{id}_X: X \rightarrow X$, is homotopic to a constant map.

2. Show that a contractible space X must be path-connected.

3. Suppose X is a contractible space, and Y is a path-connected space. Show that $[X, Y]$ consists of a single element.

4. Prove that a discrete space consisting of m points is homotopy equivalent to a discrete space consisting of n points if, and only if, $m = n$.