

1. Prove that if $p : E \rightarrow B$ and $q : F \rightarrow C$ are covering maps, then $(p, q) : E \times F \rightarrow B \times C$ defined by $(p, q)(b, c) = (p(b), q(c))$ is also a covering map.

A covering map $p : E \rightarrow B$ is called a **k -fold covering map** if there is a $k \in \mathbb{N}$ such that $p^{-1}(b)$ has exactly k elements for every $b \in B$. In such a case, E is called a **k -fold covering space** of B . A covering map is called a **finite-fold covering map** if it is a k -fold covering map for some $k \in \mathbb{N}$. **Finite-fold covering spaces** are defined similarly.

2. Let $p : E \rightarrow B$ be a finite-fold covering map. Prove that if B is compact, then so is E .