Homework 2

Algebraic Topology 2025-2026

Due 18 March, 2026

EXERCISE 1

Let $p\colon E \to X$ be a covering map and $e \in E$. Show that

$$p_*\colon \pi_1(E, e) \to \pi_1(X, p(e))$$

is injective.

EXERCISE 2

Consider the map $\varphi^n\colon \mathbb{C} \to \mathbb{C}$ sending z to z^n, for $n \in \mathbb{Z}$.

- Show that φ^n restricts to a map $S^1 \to S^1$;

- Compute
$$\varphi^n_*\colon \pi_1(S^1) \to \pi_1(S_1).$$