Exercises:

1. Suppose that a space X has the fixed point property, is it necessary that it be connected? Does it have to be path-connected?
2. Explain why a non-trivial topological group cannot have the fixed point property.
3. Prove the Brouwer's fixed point theorem for the closed unit ball in $\mathbb{R}^n$ given that that there exists a functor T from the category $\mathbf{Top}$ to the category $\mathbf{AbGr}$ such that

   $T(X)$ is the trivial group for every convex subset X of a Euclidean space and

   $T(S^{n-1})$ is a non-trivial group.
4. Show that the Brouwer's fixed point theorem implies the no retraction theorem.
5. Explain how the homotopies F_j in the proof of theorem 10.4 can be juxtaposed.
6. Show that the circle S^1 is not a retract of the sphere S^2.