Exercises:

1. Suppose that G and $\tilde{G}$ are topological groups and $p : \tilde{G} \longrightarrow G$ is a covering projection that is also a group homomorphism then ker $p =$ Deck $(\tilde{G}, G)$.
2. Determine the deck transformations for the covering
$$\sin : \mathbb{C} - \{\frac{\pi}{2} + k\pi : k \in \mathbb{Z}\} \longrightarrow \mathbb{C} - \{\pm 1\}$$
3. Determine the deck transformations for the covering
$$p : \mathbb{C} - \{\pm 1, \pm 2\} \longrightarrow \mathbb{C} - \{\pm 2\}$$
given by $p(z) = z^3 - 3z$. Show that this covering is not regular. Hint: Use Riemann's removable singularities theorem to show that a deck transformation must be analytic on the whole plane.
4. If p is a prime, what can you say about the group of deck transformations of a p-sheeted covering space?
5. Show using the universal property that the universal covering, if it exists is unique upto isomorphism of covering projections.