Exercise sheet 6

1. Prove that every map from a simply connected space to S^1 is null homotopic.
2. Prove that every map from $\mathbb{RP}^2$ to S^1 is null homotopic.
3. Prove that if X has a simply connected cover, then given any point in $x \in X$, there exists a neighourhood U so that $i_* : \pi_1(U, x) \to \pi_1(Y, x)$ is trivial (here, i_* is the homomorphisms induced by the inclusion map $i : U \to X$.