(7) For a subspace $A \subset X$, a map $r : X \to A$ is called a retract if $r(X) = A$ and $r|_A = Id_A$.
   a) Show that if $i : A \hookrightarrow X$ is the inclusion of a subspace $A \subset X$ and $r : X \to A$ is a retract, then the induced map $i_* : \pi_1(A) \to \pi_1(X)$ is injective and $r_* : \pi_1(X) \to \pi_1(A)$ is surjective.
   b) Hatcher Exercise 1.1.16 (p. 39).

(8) Hatcher Exercise 1.1.18 (p. 39).