Book exercises, pages 52-54: #2, 3, 4, 8, 10, 17.

One additional problem:

A1. Let $X$ be a disk, annulus, or Moebius band, including the boundary circle or circles, which we denote $\partial X$.

(a) For each point $x$ in $X$, show that the inclusion map $X - \{x\} \hookrightarrow X$ induces an isomorphism on $\pi_1$ if and only if $x$ is a point in $\partial X$.

(b) If $Y$ is also a disk, annulus, or Moebius band, and if $f: X \to Y$ is a homeomorphism, show that $f$ restricts to a homeomorphism $\partial X \to \partial Y$.

(c) Show that the Moebius band is not homeomorphic to an annulus.