1. In this problem, just find an appropriate map; you do not need to prove it's a homeomorphism.
   (a) Find a homeomorphism from the closed unit interval $[0, 1]$ to $[3, 5]$. (Hint: First find a homeomorphism from $[0, 1]$ to $[0, 2]$, and then one from $[0, 2]$ to $[3, 5]$.)
   (b) Prove that any two closed intervals $[a, b]$ and $[c, d]$ are homeomorphic.
   (c) Prove that any two closed disks in $\mathbb{R}^2$ are homeomorphic.
2. Prove $(0, 1) \simeq \mathbb{R}$. Just find an appropriate map; you do not need to prove it's a homeomorphism.
3. (a) Prove the Restriction of Continuous Maps Lemma: Let $f : X \to Y$ be a continuous map between two topological spaces. Then for every subspace $A \subseteq X$, the restriction of f to A, i.e., $f|_A : A \to Y$, is continuous.
   (b) Prove that if $f : X \to Y$ is a homeomorphism, then $\forall A \subseteq X$, $f|_A : A \to f(A)$ is a homeomorphism.
4. Consider each of the following letters as a subset of $\mathbb{R}^2$, with the subspace topology. Separate the them into groups of homeomorphic letters.

   A B C D E F G H I J K L M N O P Q R S T U V W X Y Z

   (For example, E and F are homeomorphic; so are C and W; but O and Q are not. Note that all the letters are in Sans Serif typeface.)
5. Do problem 5.6 on page 37 of Intuitive Topology.