Homework #11

Due Thursday, December 14, in class

Problem 1 Construct a homeomorphism between annulus $\{(x, y) : 1 < x^2 + y^2 < 2\}$ and the disk without center $\{(x, y) : 0 < x^2 + y^2 < 1\}$.

Problem 2 Show that the intersection of any number of Hausdorff compact spaces is again Hausdorff compact (or empty).

Problem 3 Show that any continuous map of a compact to a Hausdorff space maps closed sets to closed sets.

Problem 4 Let X be the annulus $\{(x, y) : 1 \leq x^2 + y^2 < 2\}$ and $K = \{(x, y) : x^2 + y^2 = 1\}$. Describe X/K.

Problem 5 Let X be the unit circle, and $K = \{(1, 0), (0, 1), (-1, 0), (0, -1)\}$. Describe X/K.

Problem 6 Show that the unit spere without a point is not homeomorphic to the closed unit disk.