Assignment 7

Coverage: 16.1 in Text.

Exercises: 16.1 no 10, 12, 15, 21, 22, 25, 27, 30, 32.

Hand in 16.1 no 15, 25, 30, and Supplementary Problem no 4.

Supplementary Problems

1. Let φ be a continuous map from $[0,1]$ to itself. Use elementary arguments to show that it must admit one fixed point.

2. A region is homeomorphic to the ball if there is a continuous map maps it one-to-one onto the ball. Show that a continuous map from a region homeomorphic to the call to the region itself has a fixed point.

3. Take a map of CUHK and make a copy of it with one tenth size. Then put the shrunk copy on top of the original map in an arbitrary manner. Show that there is a spot at which two maps coincide.

4. Find a parametric curve $\gamma(t),\ t \in [0,1]$, which describes the triangle with vertices at $(0,0), (2,0)$ and $(2,5)$ in anticlockwise direction.

5. Find the arc-length parametrization of the line segment $y = ax + b,\ x \in [0,2]$.