Math 3240
Topology 1, Assignment 5.

Due any time before the final exam.

Questions from textbook:
Section 7.1: 9, 14
Section 7.2: 5, 6, 8
Section 7.3: 5, 6, 7
Section 7.4: 3

The following questions are from Munkres:

Question A. Show that if Y is compact, then the projection $p_1 : X \times Y \to X$ is a closed map.

Question B. Prove the following, using question A:

Theorem 1 *Let $f : X \to Y$ be any function, and Y a compact Hausdorff space. Then f is continuous if and only if the graph of f, defined as*

$$G_f = \{(x, f(x)) : x \in X\}$$

is closed in $X \times Y$. (Hint: If G_f is closed and V is a neighbourhood of $f(x_0)$, then the intersection of G_f and $X \times (Y \setminus V)$ is closed. Then apply A.)