1. Let f and g be continuous mappings from a topological space X to $\mathbb{R}$ and define

$$h \ : \ X \to \mathbb{R}$$

by $h(x) = \max\{f(x), g(x)\}$. Prove that h is continuous.

2. Let $\emptyset \neq U \subset \mathbb{R}^n$ and $x \in \mathbb{R}^n$. Define the distance from x to U to be

$$\rho_U(x) = \inf_{u \in U} |x - u|$$

Show that $\rho_U^{-1}((a, b))$ is open for every $a < b$.

3. Textbook exercise 6.1
4. Textbook exercise 6.2
5. Textbook exercise 6.3
6. Textbook exercise 6.5