Read the section 1.4, 1.5, 1.6. Make sure you know how to answer the following questions.

1. Negate the statement: For every $\varepsilon > 0$ there exists a $\delta > 0$ such that whenever $x$ and $t$ are in $D$ and satisfy $|x - t| < \delta$, then $|f(x) - f(t)| < \varepsilon$.

2. Suppose that $f : A \to B$. If there exists a function $g : B \to A$ such that $(g \circ f)(x) = x$ for all $x \in A$ then show that $f$ is injective.

3. Do even functions have inverses? Do odd functions have inverses?

4. Show that the following pairs of sets $S$ and $T$ are equinumerous by finding a specific bijection between $S$ and $T$.

   (i) $S = [0, 1], T = [0, 1)$.  
   (ii) $S = (0, 1), T = (0, \infty)$

5. If $S$ is denumerable show that $S$ is equinumerous with a proper subset of itself.

6. Prove that if a set $A$ has a supremum, then $\text{sup } A$ is unique.

7. If possible, give an example of a nonempty bounded subset of $\mathbb{Q}$ that

   (a) has a least upper bound and a maximum in $\mathbb{Q}$.
   (b) has a least upper bound but no maximum in $\mathbb{Q}$.
   (c) does not have a least upper bound in $\mathbb{Q}$.

8. Let $x, y \in \mathbb{R}$ such that $x \leq y + \varepsilon$ for every $\varepsilon > 0$. Then show that $x \leq y$. 