Math. 527A
First homework assignment

1) Exercises 1.0.10, 1.0.11, 1.1.8, 1.1.10, 1.1.12, 1.1.13, 1.1.23, 1.1.25, 1.1.26, 1.1.38, 1.1.49, 1.1.51, 1.1.52, 1.1.56, 1.1.58, 1.1.59, 1.3.26, 1.3.27, 1.3.29, 1.3.37 from the notes.
2) For two bounded, closed subsets, $A$ and $B$, of $R^n$, the Hausdorff distance between them is defined by the formula

$$d_H(A,B) = \max\{d_0(A,B), d_0(B,A)\}$$

where

$$d_0(A,B) = \max_{x\in A}\min_{y\in B} ||x-y||_2.$$

Prove that $d_H$ is a distance (satisfies all axioms of the distance).
3) Let $(M,d)$ be a metric space, and let $f(t)$ be a function of one real variable that is strictly increasing, concave down, and $f(0)=0$. Set $d'(x,y) = f(d(x,y))$. $x,y\in M$. Prove that $(M,d')$ is also a metric space.