at $x_o \in X$ in terms of ε and δ?

2) Define a function $f : (0,1) \to \mathbb{R}$ in the following way: for irrational $x \in (0,1)$ put $f(x) = 0$; and for rational $x \in (0,1)$, write x in the form $x = \frac{p}{q}$ (with p,q relatively prime natural numbers), and put $f(x) = \frac{1}{q}$. Determine all the points $x_o \in (0,1)$ at which f is continuous.

C. Subspaces

Let A be a subset of a topological space Y.

Def.: A set U in A is called open in A $\Longleftrightarrow$ $\exists$ V open in Y such that $U = V \cap A$.

The open subsets in A form a topology of A, the "subspace topology" of "induced topology". Henceforth all subsets of topological spaces are considered as topological spaces with the induced topology.

$\vdash$: The inclusion map $i : A \hookrightarrow Y$ (with $i(y) = Y$) is continuous; furthermore a map $f : X \to A$ from a topological space X into A is continuous iff $i \circ f : X \to Y$ is continuous.

Problem:

1) Which of the following is true:

(i) each subspace of a Hausdorff space is Hausdorff?

(ii) " " " " compact " " compact?

(iii) " " " " metric " " metric?

(iv) " " " " connected " " connected?

Def.: If $f : X \to Y$ is a map, and $U \subset X$, then the restriction of f to U is denoted by $f|U : U \to Y$ (and defined by $f|U(x) = f(x)$ for all $x \in U$).

Problems:

2) Let X,Y be topological spaces, $f : X \to Y$ a map,