

Quiz 8, Math 441
Due Wed. Nov. 10, No late quiz will be accepted

Name - - - - - (Last) - - - - - (First)

Problem 1 (6pts).

(a) Consider the dictionary order topology on $R \times R$. Show that if X is a connected subspace of $R \times R$, then X lies in a vertical line, i.e., $X \subset \{a\} \times R$ for some a .

(b) Let A_n be a sequence of connected subspaces of X so that $A_n \cap A_{n+1} \neq \emptyset$ for all $n \geq 1$. Show that $Y = \cup_{n=1}^{\infty} A_n$ is connected.

Problem. 2 (4pts). Show that if U is an open connected subset of \mathbb{R}^2 , then U is path connected.

Problem 3.(4pts) If $f : S^1 \rightarrow \mathbb{R}$ is continuous, show that there is a point $x \in S^1$ so that $f(x) = f(-x)$. (hint: use intermediate value theorem).

Problem 4 (6pts). (a) Show that the product of two path connected spaces is path connected.

(b) If $f : X \rightarrow Y$ is an onto continuous map so that X is path connected, is it true that Y is path connected? (Justify your assertions)