

Name: _____

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Quiz 1 - Topology – Fall 2015

1. (9 pts) Define each of the following notions:

(a) connected topological space;

(b) path connected topological space (you can assume known the definition of a path);

(c) locally path connected topological space;

2. (4 pts) Make a diagram (or a list) resuming implications among the notions in Problem 1.

3. (12 pts) True or False? Answer (2 pts) and give a brief justification (2 pts) in each case.

(a) A square is homeomorphic to a circle.

(b) Letters “ T ” and “ X ” are homeomorphic.

(c) There exists a non-connected set $A \subseteq \mathbb{R}^2$, so that both $p_1(A)$ and $p_2(A)$ are connected sets in \mathbb{R} . Here $p_1, p_2 : \mathbb{R}^2 \rightarrow \mathbb{R}$ denote the projections on the first, respectively, second components $p_1((x, y)) = x$, $p_2((x, y)) = y$.