

Quiz 1, Topology, Fall 2004
Due Wed. Sept. 15, No late Quiz will be accepted

Name-----(*last*)-----(*first*)

Problem 1. Prove that for any function $f : X \rightarrow Y$ and any subsets A, B of X ,

$$f(A \cup B) = f(A) \cup f(B)$$

Problem 2. For each $x \in \mathbf{R}$, let $A_x = [-x^2, x^2]$. Find the following sets

- (a) $\cup_{x \in \mathbf{R}} A_x$
- (b) $\cap_{\{-2 < x < 2\}} A_x$.

Problem 3. Justify that there is a bijection between the points in the unit circle and the set of all equivalence classes of \mathbf{R} under the relation xRy iff $x - y \in \mathbf{Z}$.

Problem 4. If A and B are ordered sets, show that the product order on $A \times B$ is an order.

Problem 5. Does $[0, 1] \times [0, 1)$ have the least upper bound property? What about $[0, 1) \times [0, 1]$?