MATH W4051 PROBLEM SET 5
DUE OCTOBER 8, 2008.

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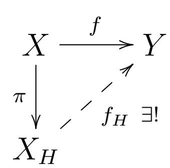
(1) Munkres 30.3.
(2) Munkres 30.4.
(3) Munkres 30.13.
(4) Let M be a topological manifold. Prove:
  (a) M is first-countable.
  (b) If M is Hausdorff then M is regular.
(5) Munkres 31.1
(6) Munkres 31.2
(7) Munkres 31.5
(8) Munkres 32.3
(9) Prove: given a topological space X, there is a topological space X_H, the *Hausdorffification of* X, together with a map $\pi\colon X \to X_H$ such that:
  - X_H is Hausdorff and
  - Given any Hausdorff topological space Y and continuous map $f\colon X \to Y$ there is a unique map $f_H\colon X_H \to Y$ so that $f = g \circ \pi$, i.e.,



(Hint: construct X_H as a quotient space of X.)

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