

# MA 426-001/591M-001 Homework

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Assigned February 7, 2003, due February 14, 2003

1. Sec. 3.1, problem 2. Do this problem by finding an open cover that has no finite subcover.
2. Sec. 3.1, problem 4. Ignore parts a and b. Just show that  $A$  is compact by showing that every open cover of  $A$  has a finite subcover.
3. P. 174, problem 19.
4. P. 174, problem 20. Hint: This is a proof by contradiction; you are supposed to derive a contradiction. Notice that each  $U_y$  is disjoint only from the *corresponding*  $V_y$ . Also notice that  $V_y$  is a neighborhood of  $x$ , not of  $y$ . A finite number of the  $U_y$ 's cover  $A$  (why?). Think about the intersection of the corresponding  $V_y$ 's.
5. In our "Easy Theorem 4.1.4," prove directly that (1) implies (3). (We know this only by the very indirect route (1) implies (2) implies (4) implies (3).)