MATH 304 **Homework** **Due February 5, 2008**

Problem 1. Prove the statement in Problem 2.17 in Solow, but explain how you went about finding the proof.

Problem 2. Say two triangles are *friendly* if they have two sides that are the same length. In other words if a triangle has sides of length $2, 4, 5$ and another triangle has sides of length $2, 3, 4$ they are friendly. Is being friendly an equivalence relation? Explain.

Problem 3. We say that two real numbers x and y are *rationally different* if $x - y$ is rational.

(a) Show that being rationally different is an equivalence relation.

(b) If we "define" the sum of equivalence classes by $[x] + [y] = [x + y]$, is this well-defined? Explain.

(c) If we "define" the product of equivalence classes by $[x] \cdot [y] = [x \cdot y]$, is this well-defined? Explain.