Assignment 6 is split as before into 6A and 6B, with different graders; label and staple the two parts separately, and put your name on each.

The directions are the same as on previous problem sets: list collaborators, write up solutions independently; cite significant theorems by name or number; consulting assignment solutions from previous semesters is not allowed.

**Assignment 6A**

**Reading:** Mon. 6.5  Set-language: sup, inf, max, min; Completeness Principle for sets.

**Problem 1A.**  (1) Work 6.5/1ac

**Problem 2A.** (2) Work 6.5/3ag

(For example, to do (a), show sup $B$ satisfies sup-$1$ for $A$. At each step of (a) or (g), indicate what property of sup or inf is being used, and for which set (e.g., “by inf-$2$ for $B$”).

**Problem 3A.** (4: 2,2) Work P6-2ab. This is an important problem; more hints and warnings than usual are being given for both parts to help you. Try it first by yourself without the hints, checking your proofs vis-a-vis the warnings. If stuck, consult the hints; if still stuck, you can consult with others.

Warning: For part (a), the most common faults with the sequence $\{a_n\}$ constructed are that the $a_n$ are not necessarily in $S$, or that the sequence does not necessarily have sup($S$) as its limit.

Hints: The construction should describe what to do, say why it is possible to do it, and why the resulting sequence has the desired properties.

The construction of a subsequence having as limit a cluster point might give you ideas (Theorem 6.2, Problem 5A on Assignment 5).

For part (b), Problem 2 (3g) above does half the work for you. The other half can be done using sequences; part (a) will help. (There are also other ways of doing this.)

**Assignment 6B**

**Reading:** Wed.: 7.1-.2, 7.4-.5  Infinite series; convergence and divergence tests for series with non-negative terms.

**Problem 1B.** (2) Citing theorems used: a) Work 7.2/1 Work 7.2/2

**Problem 2B.** (1.5) Work 7.2/5, using subsequences and the definition of convergence.

**Problem 3B.** (2: 1.5, 1)

a) Prove the n-th root test for convergence, for the case $L < 1$ only, with the added assumption that the series are non-negative (so the absolute-value signs are not needed in the statement or the proof). Study the proof of the ratio test first (again assuming the series are non-negative).

b) Work 7.4-.5/3b; (you can cite and use P4-1 (p. 59), but only for one of the examples).

**Problem 4B.** (2: .5, .5, 1) In this problem, use any of the tests in section 7.4, but omit the absolute value signs, since the three series involved are all positive. Show enough work so a reader can see how the tests are being used. Note the first two lines of 7.4-.5/1.

Work in 7.4-7.5/1 the Exercises: i) 1b ii) 1e (iii) 1h