

Math 104 Homework 5 (Vaintrob)

Due Tuesday, 2/26

Midterm 1 prep. Look over your old problems and solutions. Midterm 1 will feature problems which are very close to what you saw on the homeworks. Main topics:

- sequences and sets of real numbers: boundedness, upper/lower bounds, inf, and sup
- checking the limit statement $\lim(s_n) = s$ in specific cases (i.e. finding N depending on ϵ)
- finding limits using algebraic manipulations of other sequences whose limits are known
- monotonic (increasing or decreasing) sequences and their convergence properties (converge if bounded, limits are the same as infs or sups)
- finding limits of sequences defined using a recursive procedure
- subsequences, lim sup and lim inf (definition, computation, the fact that these are both subsequential limits).
- anything in chapters 1-11, and basic facts about lim inf and lim sup (how they're defined as limits of monotonic sequences, the fact that $\liminf \leq \limsup$),
- Although the book goes in some depth into manipulations with “infinite limits” (when a sequence diverges to $\pm\infty$), I will not ask you to know more than the definition of what it means for $\lim(s_n) = \infty$ (with s_n a sequence) and $\inf(S) = -\infty$ for $S \subseteq \mathbb{R}$ a subset.

1 Exercise 9.5

2 Exercises 9.12, 9.13

3 Exercise 10.6

4 Exercises 11.1, 11.2

Reading exercises: check back in a bit