Math 145A
Winter 2014

UPDATED GENERAL INFORMATION — FEBRUARY 13, 2014

Information regarding the second quiz

The second quiz will cover the material in Chapter 6 from the cutoff for the first midterm, and continuing through Chapters 7 and 8. The quiz will contain questions about definitions and examples of basic concepts, taken from the following list:

1. Define the concept of limit point for a subset of a topological or metric space.

2. Define what it means for a function f from one topological space $(X_1, \mathcal{T}_1)$ to another space $(X_2, \mathcal{T}_2)$ to be a homeomorphism.

3. Define the indiscrete topology on a set X.

4. Define the cofinite topology on a set X.

5. Define the concept of a base for a topological space $(X, \mathcal{T})$.

6. Give an example of an open subset U in a topological space X such that U is properly contained in $\operatorname{Int} \overline{U}$. [*Hint:* There are simple examples where X is the real numbers with the usual topology.]

Note. For every open subset $U \subset X$ we have $U \subset \operatorname{Int} \overline{U}$, and for many standard examples the two subsets are equal.

7. Give an example of a closed subset F in a topological space X such that F properly contains $\overline{\operatorname{Int} F}$. [*Hint:* There are simple examples where X is the real numbers with the usual topology.]

Note. For every closed subset $F \subset X$ we have $F \supset \overline{\operatorname{Int} F}$, and for many standard examples the two subsets are equal.

8. Give examples of subsets $A, B \subset \mathbb{R}$ such that the intersection of the closures $\overline{A} \cap \overline{B}$ properly contains $\overline{A \cap B}$.

Note. For every pair of subsets $A, B \subset X$ we know that $\overline{A} \cap \overline{B}$ contains $\overline{A \cap B}$, and in some cases equality holds.

9. Give examples of subsets $A, B \subset \mathbb{R}$ such that the union of the interiors $\operatorname{Int} A \cup \operatorname{Int} B$ is properly contained in $\operatorname{Int} A \cup B$.

Note. For every pair of subsets $A, B \subset X$ we know that $\operatorname{Int} A \cup \operatorname{Int} B$ is contained in $\operatorname{Int} A \cup B$, and in some cases equality holds.

Answers for the last four questions are given in the file `quiz2review.pdf`.