Math 145B
Spring 2017

UPDATED GENERAL INFORMATION — APRIL 11, 2017

File additions and name changes

The names of the files with handwritten course notes have been changed from `notes∗.pdf` to `math145Bnotes∗.pdf` so that all the notes for lectures are grouped together. There have also been some minor changes (mainly insertions of zeros) so that the listing of files better reflects the order in which their contents are covered.

An additional file of exercises `exercises000s17.pdf` has been added for two purposes, one of which is to provide statements for the assigned exercises from Munkres, *Topology*, and the other of which is to list recommended problems from Sutherland. Also, files with solutions to the exercises in Sutherland have been added (see the files `solutions∗s17.pdf`).

Finally, here is an important correction for page 2 of `exercises06w14.pdf`: The inequality should read $|f(t)| \leq A$ instead of $|f(t)| \geq A$.

Additional reading for Section S.14

The Lebesgue Covering Lemma (Sutherland, Theorem 14.12) and the Heine-Cantor Theorem (Sutherland, Theorem 13.24) will play an important role in subsequent units, so their proofs should be read and understood at least passively and their statements should be understood actively. These two results are also discussed as Theorems 13 and 14 on page 46 and the immediately following pages in `gentop-notes.pdf`. Here are two exercises that should be solved:

1. Let $f : [a, b] \to \mathbb{R}$ be a nonconstant function with a continuous derivative everywhere. Given $\varepsilon > 0$ and $M =$ the maximum value of $|f'|$, explain why $|x - y| < \varepsilon/M$ implies $|f(x) - f(y)| < \varepsilon$.

2. Let I be the unit interval, let $f : I \to Y$ be continuous, and let $\mathcal{U}$ be an open covering of Y. Prove that there is some sufficiently large positive integer n such that for each integer k satisfying $1 \leq k \leq n$, the mapping f sends each subinterval $\left[\frac{k-1}{n}, \frac{k}{n}\right]$ into some open subset U_α in $\mathcal{U}$.