Corrections and Changes to the Third and Fourth Printings

Revised July 29, 2004

The third printing has 10 9 8 7 6 5 4 3 on the first left-hand page.
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Bullets mark the more significant changes or corrections: altered hypotheses, non-evident typos, hints or simplifications, etc.

p. 10, Def. 1.6B: read: Any such C...

- p. 30, Ex. 2.1/3: replace: change the hypothesis on \( \{b_n\} \) by: strengthen the hypotheses (cf. p. 405, Example A.1E for the meaning of “stronger”)
- p. 47, Ex. 3.3/1d: delete the semicolons

- p. 48 Add:
  3-5 Given any c in \( \mathbb{R} \), prove there is a strictly increasing sequence \( \{a_n\} \) and a strictly decreasing sequence \( \{b_n\} \), both of which converge to c, and such that all the \( a_n \) and \( b_n \) are
  (i) rational numbers; (ii) irrational numbers. (Theorem 2.5 is helpful.)

- p. 58, Ex. 4.3/2: Omit. (too hard)
- p. 60, Ans. 4.3/2: read: 1024
- p. 63, display (9): delete: > 0
- p. 63, line 11 from bottom: read: 5.1/4
- p. 68, line 10: replace: hypotheses by: symbols

- p. 74, Ex. 5.4/1 Add two preliminary warm-up exercises:
  a) Prove the theorem if \( k = 2 \), and the two subsequences are the sequence of odd terms \( a_{2i+1} \), and the sequence of even terms \( a_{2i} \).
  b) Prove it in general if \( k = 2 \).
  c) Prove it for any \( k \geq 2 \).

- p. 75, Prob. 5-1(a): replace the first line of the “proof” by:
  Let \( \sqrt{a_n} \to M \). Then by the Product Theorem for limits, \( a_n \to M^2 \), so that

- p. 82, Proof (line 2): change: \( a_n \) to \( x_n \)
- p. 89, Ex. 6.1/1a: change \( c_n \) to \( a_n \)
- p. 89, Ex. 6.1/1b add: to the limit \( L \) given in the Nested Intervals Theorem.

- p. 89, bottom add: 3. Find the cluster points of the sequence \( \{\nu(n)\} \) of Problem 5-4.
- p. 90, add Ex. 6.3/2: 2. Prove the Bolzano-Weierstrass Theorem without using the Cluster Point Theorem (show you can pick an \( x_n \), \( [a_i, b_i] \)).

- p. 90, Ex. 6.5/4: read: non-empty bounded subsets
- p. 95, Display (6): delete: c
- p. 106, l. 10 read: \( - \sum (-1)^n a_n \)
- p. 107, l. 2,3 insert: this follows by Exercise 6.1/1b, or reasoning directly, the picture
- p. 108, bottom half of the page replace everywhere: “positive” and “negative” by “non-negative” and “non-positive” respectively

- p. 148, Ex. 10.1/7a(ii) read: is strictly decreasing

- p. 154, line 8 from bottom insert paragraph:
  On the other hand, functions like the one in Exercise 11.5/4 which are discontinuous (i.e., not continuous) at every point of some interval are somewhat pathological and not generally useful in applications; in this book we won’t refer to their \( x \)-values as points of discontinuity since “when everybody’s somebody, then no one’s anybody”.

Theorem 11.4D' Let \( x = g(t) \), and \( I \) and \( J \) be intervals. Then
\[
g(t) \text{ continuous on } I, \quad g(I) \subseteq J, \quad f(x) \text{ continuous on } J \Rightarrow f(g(t)) \text{ continuous on } I.
\]

p. 168, Ex. 11.5/2: rewrite: Prove \( \lim_{x \to \infty} \sin x \) does not exist by using Theorem 11.5A.

p. 192, Ex. 13.1/2 renumber as 13.2/2, and change part (b) to:
13.2/2b Prove the function of part (a) cannot be continuous.

p. 204, line 4: read: an open \( I \)

p. 248, Ex. 18.2/1 add: Hint: cf. Question 18.2/4; use \( x^2 - x^2_i = (x_i + x_{i-1})(x_i - x_{i-1}) \).

p. 310, Theorem 22.B read: Show: as \( n \to \infty \),
\[
\frac{1}{n} + n x \to \ldots
\]

p. 322, Ex. 22.1/3 read: \( u_k(x) \)

p. 332, middle delete both \( \delta_1 \), replace the second by \( N(R) \)

p. 357, Theorem 24.7B, line 2 read: non-empty compact set \( S \); line 6 read: bounded and non-empty;

p. 385, line 2- read: \( \int_0^1 \)

p. 404, Example A.1C(i): read: \( a^2 + b^2 = c^2 \)