Additions and corrections to 8th Printing

Problem 19-0 Theorem 19.2 says a real number I exists – the integral of $f(x)$ on $[a, b]$. So any proof of the Theorem must use the Completeness Principle.

The book's proof uses the Nested Interval Theorem 6.1. for the C.P.

To get the nested intervals, it uses a particular sequence of partitions P_n whose mesh $|P_n| \to 0$. Could I depend on the this (arbitrary) choice of P_n?

a) How does the proof show there cannot be two $I_1 \neq I_2$ that satisfy (7)?

b) Prove Theorem 19.2 in a closely related but different way (one not needing any arbitrary choices) by using instead the C.P. for Sets: – Theorem 6.5 (existence of $\sup S$ and $\inf S$).

(Use anything in 19.1, and the result in Exercise 6.5/4.).