

Errors in *Techniques Book*

Page viii, line 20: Mark Bridger has pointed out that our construction of the real numbers is not new, but goes back to unpublished work of Stolzenberg that was around the faculty at Northeastern University in 1980 or earlier.

Page ix, line 22: Delete “within Weihrauch’s theory”.

Page xiv, line 5: Spell “Jordens” correctly.

Page 14, line (-9): Replace the entire sentence beginning “Note that ...” by this: “Markov’s principle implies that all functions from \mathbb{R} to \mathbb{R} are strongly extensional”. (Bob Lubarsky)

Page 21, Exercise 15: Replace “countably infinite” by “countable”. (BL)

Page 21, Exercise 18: Prove that the intersection of two countable subsets of a discrete set is countable.

Page 22, Exercise 20: Bob Lubarsky and Fred Richman (henceforth known as “BLFR”) have pointed out that the existence of an ultrafilter on $\{0, 1\}$ implies the law of excluded middle.

Page 33, line (-4): The definition of subtraction of real numbers is wrong (BLFR). It should read

$$\mathbf{x} - \mathbf{y} = \{(s, s') : \exists (q, q') \in \mathbf{x} \exists (r, r') \in \mathbf{y} (s = q - r' \wedge s' = q' - r)\}.$$

Page 35, lines 1–2: At the end of the definition of \mathbf{x}/\mathbf{y} in the case $\mathbf{y} > \mathbf{0}$, we need to be more careful (BLFR). Replace the first sentence on this page by the following:

We pick $(q, q') \in \mathbf{x}$ and $(r, r') \in \mathbf{y}$ such that $r > 0$. If $q \geq 0$, we set $s = q/r'$, $s' = q'/r$; if $q < 0$ and $q' < 0$, we set $s = q/r$, $s' = q'/r'$; and if $q < 0$ and $q' > 0$, set $s = q/r$, $s' = q'/r$.

Page 35, line 5: BLFR comment that we have not included proofs of the arithmetic properties like associativity and distributivity for real number algebraic operations. It would be appropriate to include at this point in the book the following sentence: “The basic arithmetic properties, like associativity of addition and distributivity of multiplication over addition, can readily be derived using our definitions. The details are left as an exercise.” It would then, of course, be equally appropriate to include such an exercise among those at the end of the chapter.

Page 41, line (-5): Should read “We write $\{1, \dots, n\}$ as a union of disjoint sets P, Q such that ...” (BLFR).

Page 42, line 5: Should read “write $\{1, \dots, n\}$ as a union of two disjoint sets P and Q , where ...” (BLFR)

Page 45, line 7: Should read “If $(i, j) \in P$ for all i and j , then, by the triangle inequality ...”. (BL)

Page 46, line 4: Should be

$$m_{A,B} = \sup \{ \rho(x, B) : x \in A \} .$$

Page 76, Exercise 3: Should read “Prove also that every linear mapping from a normed space onto a Banach space is well behaved.”