DISCRETE MATHEMATICS: AN INTRODUCTION TO MATHEMATICAL REASONING
by Susanna S. Epp

Great effort was made to insure as error-free a product as possible. With approximately 3 million characters in the book, however, some mistakes are inevitable. I would be grateful to learn of any errors you find so that they can be listed on this page and corrected in subsequent printings. Please send them to me at susanna.s.epp@gmail.com.

With thanks, Susanna S. Epp

ERRATA

CHAPTER 1

Text

LOCATION	CORRECTION
11 – Example 1.2.5	In the solution to part (a), change "(2.1)" to "(2,1)".

Exercises

LOCATION	CORRECTION
6 – 1.1 #3	Change "$a < c < b$" to "c is between a and b".
21 – 1.3 #4a	Change "Is (-2) V (-6)?" to "Is (-2) V 8?"
A5 – 1.3 #5a	Change the last part to "(-1) S (-2) because -1 ≥ -2."

CHAPTER 2

Text

LOCATION	CORRECTION
34–Definition	In line4, change "**Contradication" to "Contradiction"** and "contradication" to "contradiction".
40–Example 2.2.3	In line 6, change "p is true and q is false" to "p is true and r is false".
44–Top definition	Change "It p and q" to "If p and q".
45 – Example 2.2.9	Change "answes" to "answers".
49 – bottom of 1st column	Change "r unless s^n" to "r unless s".
56 – line 4	Change "by (d)" to "by (b)".

Exercises

LOCATION	CORRECTION
A-9– 2.1 #46	In line 2 of Solution 2, replace $p \oplus q$ by $p \oplus p$.

CHAPTER 3

Text

LOCATION	CORRECTION
70 – Example 3.1.10	In line 5, change "p" to "P", and in line 6 change "ε" to "$\in$".

Exercises

LOCATION	CORRECTION
A-16 – 4.1 #4	In line 2 change "$m > 0$ and $n > 0$" to "$m > 1$ and $n > 1$".

CHAPTER 4

Text

LOCATION	CORRECTION
119 – Item 4	Change “gramatically” to “grammatically” .
148 – Theorem 4.4.2	Change the title to “The Parity of Consecutive Integers”
153 – Test Yourself #1	In line 2 change "$d \geq 0$” to "$d > 0$”.

Exercises

LOCATION	CORRECTION
A-19 – 3.3 #53	Add: “Circle *b* and squares *h* and *j* have the same color.”
A-22 – 4.5 #9a	In lines 7 and 9, change “sum” to “difference”.

Text

LOCATION	CORRECTION
109 –line 12	Change “Would 1 have been...” to “Would I have been...”
168 – line 24	The Catalan conjecture was proved by Preda Mihăilescu: "Primary Cyclotomic Units and a Proof of Catalan's Conjecture." *J. reine angew. Math.* **572**, 167-195, 2004.

CHAPTER 5

Text

LOCATION	CORRECTION
183– Exercise 5.1 17b	In part (b) change “$\binom{4}{0}$” to “$\binom{4}{4}$”.
191 –lines 5 and 7 from bottom	Change “$k^2 + 3k + 1$” to “$k^2 + 3k + 2$”.
193 – general note	Following the lead of Donald Knuth, this book defines 0^0 to equal 1 for formulas used in discrete mathematics. See page 468 for an explanation.
194 – line 3 of Proof	On the right side of the equation, change *i* to *n*.
204 – line 15	Change “$n \geq 0$” to “$n \geq 1$”.
205 – line 8	Change “$k \geq 0$” to “$k \geq 1$”.
206 – line 20	Change “$k \geq 3$” to “$k \geq 1$”.
205 – lines 10 & 11	Delete the sentence “By definition of divisibility…”.
224 – line15	Change “C_{k+1}“ to “C_{k-1}“.
224 – line 18	Change “$2k – 2$)” to “$2k – 2$” (i.e. delete redundant right parenthesis).
233 – line 7	Change “$n \geq 0$” in the beginning of the solution to “$n \geq 1$”.
240 – Definition box	In line 5, change “a_0r^n” to “a_0r^n”.

Exercises

LOCATION	CORRECTION
A-25 – 5.1 #32	Change the lower index of the summation from *k* to *i.*
A-25 – 5.1 #35	Change the lower index of the summation from *k* to *i.*
A-28 – 5.2 #13	In the last line, change “$n \geq 0$” to “$n \geq 2$”.
A-29 – 5.2 #35	Change “page 254” to “page 195”.

A-32– 5.3 #37, last line	Change “Theorem 4.2.2” to “Theorem 5.2.2”.
220 – 8, line 7	Change “$2 > s > 1.83$” to “$s > 1.83$”.
221 – 5.4 #29	The exercise letters a and b should be boldface blue to indicate that there are answers in Appendix B.
A34 – 5.4 #29	Insert the following: 29. a. $1110_2 = 1\cdot2^3 + 1\cdot2^2 + 1\cdot2^1 + 0\cdot2^0 = 8 + 4 + 2 = 14_{10}$ b. $10111_2 = 1\cdot2^4 + 0\cdot2^3 + 1\cdot2^2 + 1\cdot2^1 + 1\cdot2^0 = 16 + 4 + 2 + 1 = 23_{10}$
235 – 5.5 #27	The right-hand side of the equation should be F_kF_{K+1}-$F_{k-1}F_{k+1}$.
236 – 5.6 #39	Change “Let t” to “Let t_n”.
247 – 5.7 #16	Change “18(c)” to “17(c)”.

CHAPTER 6

Text

LOCATION	CORRECTION
255 – Notation box	In the bottom line, right side, change “$[-\infty,b)$” to “$(-\infty,b]$”.
258 – line 16	Change “Suppose further that boundaries are assigned to the regions representing A_2, A_3, and A_4” to “Suppose further that boundaries are assigned to the regions representing A_1, A_2, A_3, and A_4”.
280 – line 15	Change “not in A” to “not in either A or C.”
286 – table, right column	In boxes 2, 3, and 10 (of set properties) change the symbol “≡” to “=”.

Exercises

LOCATION	CORRECTION
372 – 8.3 #10	In line 2 change “**Z**” to “A”.
A-46 – 6.3 #36	In line 1, change “A, B, and C” to “A and B”.
A-47 – 6.4 #12	Change Hint (1) to: “The universal bound law $a + 1 = 1$ can be derived without using the associative law by using $(a + 1)\cdot(a + \bar{a}) = a + 1\cdot\bar{a}$. Similarly, $a\cdot0 = 0$ can be derived using $(a\cdot1) + (a\cdot\bar{a}) = a\cdot(1 + \bar{a})$. To derive the absorption laws without using the associative law, note that $a + a\cdot b = a\cdot1 + a\cdot b = a\cdot(1 + b) = a\cdot(b + 1) = a\cdot1 = a$. The other absorption law can be derived using the same sequence of steps but changing each + to · and each · to +.” Change Hint (4) to “The other associative law can be derived using the hints (2) and (3) but changing each + to · and each · to +.”

CHAPTER 7

Text

LOCATION	CORRECTION
295 – bottom figure	The bottom figure should be labeled 7.1.2.
296 – figure	The figure should be labeled 7.1.3.
296 – line 8 from bottom	Delete the word “binary”.
305 – above the Definition	Change “each element of the range” to “each element of the co-domain”.
313 – Theorem 7.2.1	In the statement of the theorem add: “and for any real numbers y and a with $y > 0$”.
313 – line 8 from bottom	Change “$b \neq 0$ and $c \neq 0$” to “$b \neq 1$ and $c \neq 1$”.
316 – lines 4 & 5 from	Interchange the reasons for the steps on these lines.

bottom	
317 – line 14	Change "with base $b > 0$" to "with base $b > 0$ and $b \neq 1$".

Exercises

LOCATION	CORRECTION
303 – 7.1 #29	In line 2, change "R: $J_5 - \{0\} \to J_5 - \{0\}$" to "$R$: $J_5 - \{0\} \to \mathbf{Z}$".
304 – 7.1 #30	In line 2, change "R: $J_4 - \{0\} \to J_4 - \{0\}$" to "$R$: $J_4 - \{0\} \to \mathbf{Z}$".
A-49– 7.2 #7	In lines 1, 3, and 4, change "*x*, *y*, and *z*" to "*e*, *f*, and *g*".
A-50 – 7.2 #21a	Change the hint to "*T* is one-to-one."
A-51 – 7.2 #32	Change "Let *b* be a function" to "Let *f* be a function".
344 – 7.4 #35	In the last line, change "from $\mathcal{P}(S)$ to S" to "from S to $\mathcal{P}(S)$".

CHAPTER 8

Text

LOCATION	CORRECTION
346 – Example 8.1.3	Change "relation **S** from $\mathcal{P}(X)$ to $\mathbf{Z}$" to "relation **S** from $\mathcal{P}(X)$ to $\mathcal{P}(X)$".
355 – Example 8.2.2	In the bottom line of the example statement, replace a comma by a period: that is, change "c, Is *R...*" to "c. Is *R...*".
378 – Theorem 8.4.3	In part 4, change "integers" to "positive integers".
379 – line 2	Change "$a \equiv b \pmod{n}$ and $c \equiv d \pmod{n}$" to "$a \equiv c \pmod{n}$ and $b \equiv d \pmod{n}$".

Exercises

LOCATION	CORRECTION
372 – 8.3 #10	In line 2 change "**Z**" to "*A*".
386 – 8.4 #17-19	In the directions for these problems, change "simultaneous solution" to "simultaneous solution in integers".
A-58 – 8.3 #25	In lines 12-13, change "u = w" to "u = y" and "(u, v) P (w, x)" to "(u, v) P (y, x)".
A-60 – 8.4 #26	In line 1 add "where *a* and *b* are rational numbers," and in line 6 add "since products and sums of rational numbers are rational".
402- 8.5 #30	Change "2184" to "2184*x*".

CHAPTER 9

Text

LOCATION	CORRECTION
405 – lines 8-10	Delete the last two sentences in the paragraph under the definition.
430 – line 4	Interchange the numbers 26 and 18.
430 – lines 15 & 16	Change to: "16 students took precalculus and Java" and "10 students took precalculus and Java but not calculus."
455 – line 5 from bottom	Add "not a royal flush" to the list of those excluded for the *No pairs* category.

Exercises

LOCATION	CORRECTION
A-65 – 9.2 #14b	The answer should be 1,757,600.
A-67 – 9.3 #7	Change to "*Hint*: See the solutions to exercises 9.2.2, 9.2.4, and 9.3.3. The answers are as follows: (a) 2,238,928,128, (b) 1,449,063,000, (c) 789,865,128, (d) approximately 35.3%."
A-68 – 9.3 #31a	Change lines 3 and 4 to: "– $N(H \cap D) – N(C \cap D) + N(H \cap C \cap D) = 28 + 26 + 14 – 8 – 4 – 3 + 2 = 55$."
A-68 – 9.3 #31b	Change "100 – 45 = 55" to "100 – 55 = 45".
A-69 – 9.3 #31d	Change line 2 to: "#3 is $N(H \cap D) – N(H \cap C \cap D) = 8 – 2 = 6$."
A-75 – 9.6 #41	Change "a = -(1/2) and b = 1" to "a = 1 and b = – (1/2)".

CHAPTER 10

Text

LOCATION	CORRECTION
477 – line 1	Change "Gia and Ira" to "Gia or Ira".
494 –Figure 10.2.1	The blue marking on one of the seven bridges is missing.
494 – lines 10 & 11 from bottom	Change to: "Is it possible to trace this entire graph, starting and ending at the same point, without either lifting your pencil from the paper or crossing an edge more than once?"
504 – line 3	Change "Euler path" to "Euler trail".
504 – line 9 from bottom	Change "Euler path" to "Euler trail".
504 – portrait in margin	This portrait is not of the Sir Wm. Hamilton after whom Hamiltonian circuits are named. You can see a correct portrait at http://en.wikipedia.org/wiki/William_Rowan_Hamilton.

Exercises

LOCATION	CORRECTION
509 – 10.2 #19-21	In the directions for these exercises, change "path" to "trail".
522 – 10.3 #7	The number 7 should be black; only part a has a solution.

INSTRUCTOR'S SOLUTION MANUAL

Exercise 1.3.2: Change "3 S (-3)" to "2 S (-2)".
Exercise 2.1.22: Change *F* to *T* in the bottom right corner of the truth table.
Exercise 3.1.25: Change "triangles" and "a triangle" to "an irrational number" and change the remainder of the sentences accordingly.
Exercise 7.2.45: The answer should refer to the function defined in exercise 23 rather than 21.