

# Corrections for the book *Set Theory: A First Course*, by Daniel W. Cunningham

## Errata for Chapter 1

1. On page 1, in line  $-7$ , replace the word “usually” with the word “sometimes”.
2. On page 3, after the last sentence above Problem 1, add the sentence:

The set  $\{x \in A : P(x)\}$  can also be written as  $\{x : x \in A \text{ and } P(x)\}$ .

3. On page 3, just prior to Definition 1.1.2, add the paragraph:

We will occasionally identify a set by the method of *comprehension*. In this method one defines a set to be the collection of all the elements  $x$  that satisfy a property  $P(x)$ . The notation  $\{x : P(x)\}$  will be used to identify this set.

4. On page 5, at the end of Section 1.1 (prior to the exercises), add the paragraph:

We employed the method of comprehension to identify the sets  $\mathcal{P}(A)$  and  $A \cup B$ ; however, one must use this method with caution. For certain (bizarre) properties  $P(x)$ , the collection  $\{x : P(x)\}$  is not a set (see Russell’s Paradox on page 20). On the other hand, Theorem 2.1.3 presents a condition under which one can correctly produce a set by the method of comprehension.

5. On page 6, in the first three numbered items, the indefinite article “a” needs to be inserted as follows:

1.  $P \wedge Q$  (means “ $P$  and  $Q$ ” and is called a *conjunction*).
2.  $P \vee Q$  (means “ $P$  or  $Q$ ” and is called a *disjunction*).
3.  $\neg P$  (means “not  $P$ ” and is called a *negation*).

6. On page 13, in Exercise 4 replace “ $(P \vee Q) \wedge R \Leftrightarrow (P \wedge R) \vee (Q \wedge R)$ ” with “ $(P \vee Q) \wedge R \Leftrightarrow (P \wedge R) \vee (Q \wedge R)$ ”.

7. On page 23, in Exercise 6 the variable “ $x$ ” appearing in the formula

$$\forall z \forall y ((\varphi(x) \wedge \varphi(y)) \rightarrow z = y)$$

should be replaced with the variable “ $z$ ” as follows:

$$\forall z \forall y ((\varphi(z) \wedge \varphi(y)) \rightarrow z = y).$$

## Errata for Chapter 2

1. On page 35, in the third line of the last paragraph before Exercises 2.1, the expression

Clearly, the set  $X = \{1, 3\}$  is subset of  $A \cup B, \dots$

is missing the indefinite article “a” which needs to be inserted as follows:

Clearly, the set  $X = \{1, 3\}$  is a subset of  $A \cup B, \dots$

2. On page 35, in item 1 of Exercises 2.1, delete “If  $A \subseteq B$ , then”.
3. On page 36, delete item 15 of Exercises 2.1 (remove duplicate exercise).
4. On page 36, in item 24 of Exercises 2.1, replace “Let  $A$  be a set.” with “Let  $A$  and  $B$  be a sets.”
5. On page 40, delete item 7 of Exercises 2.2 (remove duplicate exercise).

## Errata for Chapter 3

1. On page 55, in item 13 of Exercises 3.2 replace  $R \circ R^{-1}$  with  $R \cap R^{-1}$ .
2. On page 57, in the 5th line from the bottom, replace “ $\langle b, 7 \rangle \in g$  and  $\langle b, 8 \rangle \in g$ ” with “ $\langle b, 7 \rangle \in G$  and  $\langle b, 8 \rangle \in G$ ”.

## Errata for Chapter 4

1. On page 100, replace the last line of the proof of Theorem 4.3.11 with  
“Hence,  $m \cdot (n + p^+) = m \cdot n + m \cdot p^+$ , and thus,  $p^+ \in I$ .”

### Errata for Chapter 5

1. On page 120, in the third to the last line of the proof of Theorem 5.2.9, replace “ $p(i, f_i(x)) = p(j, f_j(x))$ ” with “ $p(i, f_i(x)) = p(j, f_j(y))$ ”.
2. On page 122, in the first line, the expression “Let  $F_A$  be set” should be “Let  $F_A$  be the set”.
3. On page 130, in the fourth line of the proof of Theorem 5.4.5, replace “ $Y \in \mathcal{P}(A)$ ” with “ $Y \in \mathcal{P}(B)$ ”.

### Errata for Chapter 8

1. On page 178, in the 2nd and 3rd lines, the statements “Hence,  $x \preceq y$ . Thus, by Claim 3,  $H(x) \subseteq H(y)$ ” should be “Hence,  $x \preceq z$ . Thus, by Claim 3,  $H(x) \subseteq H(z)$ ”.

### Errata for Chapter 9

1. On page 213, in Theorem 9.1.11 the expression “ $\aleph_\alpha \in \aleph_\alpha$ ” should be “ $\aleph_\alpha \in \aleph_\beta$ ”.

Thank you Professor Kevin Easley (Truman State University), Alexander Chekalin, Humberto Ojeda, and Lluís Maestre Coral for contributing to this errata sheet.

Dear Reader, please notify me about other errors that you may find, at [cunnindw@buffalostate.edu](mailto:cunnindw@buffalostate.edu)