Set Theory Enderton - Solutions Manual

Mingruifu Lin

September 2023

Contents

Chapter 1

Introduction

Exercise 1

(a) Both $\in$ and $\subseteq$.
(b) Only $\subseteq$.
(c) Only $\subseteq$.
(d) Only $\in$.
(e) None works.

Exercise 2

The empty set contains no element, whereas the others both contain something. The second set contains the empty set, but the third does not. Hence, they are pairwise unequal.

Exercise 3

$$a \in \mathcal{P}(B) \Rightarrow a \subseteq B \Rightarrow a \subseteq C \Rightarrow a \in \mathcal{P}(C)$$

where the second implication comes from the transitivity of the subset relation.

Exercise 4

$$x, y \in B \Rightarrow \{x, y\}, \{x\} \in \mathcal{P}(B) \Rightarrow \{\{x, y\}, \{x\}\} \in \mathcal{P}\mathcal{P}(B)$$

Exercise 5

The rank of $\{\{\varnothing\}\}$ is 2. The rank of $\{\varnothing, \{\varnothing\}, \{\varnothing, \{\varnothing\}\}\}$ is 3.

Exercise 6

I don't understand the question.

Exercise 7

Fuh naw.

Chapter 2

Axioms and Operations

Exercise 1

Set of integers divisible by 180.

Exercise 2

Let $A = \{\{1\}, \varnothing\}$ and $B = \{\{1\}\}$.

Exercise 3