

**Recitation 1**  
**2016-08-26**

**Exercise 0.3 from Sipser page 26**

**Exercise 0.4 from Sipser**

**Exercise 0.5 from Sipser**

**Exercise 4**

Determine whether each of the following is true or false. Explain why or how to fix them.

1.  $\emptyset \subseteq \emptyset$
2.  $\emptyset \in \emptyset$
3.  $\emptyset \in \{\emptyset\}$
4.  $\emptyset \subseteq \{\emptyset\}$
5.  $\{a, b\} \in \{a, b, c, \{a, b\}\}$
6.  $\{a, b\} \subseteq \{a, b, \{a, b\}\}$
7.  $\{a, b\} \subseteq \text{PowerSet}(\{a, b, \{a, b\}\})$
8.  $\{\{a, b\}\} \in \text{PowerSet}(\{a, b, \{a, b\}\})$
9.  $\{a, b, \{a, b\}\} - \{a, b\} = \{a, b\}$

**Exercise 5**

Prove the following

1.  $A \cup (B \cap C) = (A \cup B) \cap (A \cup C)$
2.  $A - (B \cap C) = (A - B) \cup (A - C)$

**Exercise 6**

Let  $S = \{a, b, c, d\}$ .

1. Among all the partitions of  $S$ , which one has the fewest members? The most members?
2. List all partitions of  $S$  with exactly two members.