

## Precept 8 Sample of Solutions

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**Exercise 1a.** The inference from 2 to 3 is invalid because 2 is a negated claim and not a universal one. The inference from 5 to 6 is invalid because 6 depends on 2 which has an occurrence of  $a$ , the term generalized on in 5 to get 6. The inference from 1, 2 and 6 to 7 is invalid because none of the justification numbers are existential claims.

**Exercise 1b.** The inference from 1, 2, and 7 to 8 is invalid because 8 has an occurrence of  $b$ , the term used as the instance of 1 in 2. We could fix this problem by inferring  $\neg Fa$  by EE from 1, 2, and 6. We could then use negative paradox to get the sentence of 7 and 8.

**Problem 2.** Prove that  $A \cap B = B \cap A$ .

*Proof.* To prove that  $A \cap B = B \cap A$ , it is sufficient to show that  $A \cap B \subseteq B \cap A$  and  $B \cap A \subseteq A \cap B$ . Let  $a \in A \cap B$ . By definition of intersection, this means that  $a \in A$  and  $a \in B$ . Conjunction commutes, and so it is true that  $a \in B$  and  $a \in A$ . Again by definition,  $a \in B \cap A$ . Since  $a$  was arbitrary,  $A \cap B \subseteq B \cap A$ . The proof of  $B \cap A \subseteq A \cap B$  is symmetric.  $\square$