Homework due on Friday, March 4

Read carefully the notes on sets linked on the course web page and sections 5.1-5.3 in the book. Solve the following problems.

Problem 1. a) Let A, B, C, D be sets. Prove that $(A \cap C) \div (B \cap D) \subseteq (A \div B) \cup (C \div D)$.

b) Prove by induction on n that

$$(A_1 \cap A_2 \cap \ldots \cap A_n) \div (B_1 \cap B_2 \cap \ldots \cap B_n) \subseteq (A_1 \div B_1) \cup (A_2 \div B_2) \cup \ldots \cup (A_n \div B_n)$$

Problem 2. a) Prove that $(A \cap B) \times C = A \times C \cap B \times C$.

b) In class we started a proof of the following identity

$$(A \setminus B) \times (C \setminus D) = (A \times C) \setminus (A \times D \cup B \times C)$$

by proving that the left hand side is always contained in the right hand side. Prove the converse, that the right hand side is contained in the left hand side (thus completing the proof).