Homework #2 - MATH 271 - L01 & L02

Follow instructions available in the Assignment Policy document!

Question 1   Write a detailed but pseudo-algorithm (in the style of the text) which on input of two sets A and B computes their intersection $A \cap B$.

Question 2   For each true statement below, give a proof. For each false statement below, write out its negation, then give a proof of the negation.
Assume all sets are subsets of a universal set U.

  a: For all sets A, B and C, $A - (B - C) = (A - B) - C$.

  b: For all sets A, B and C, $A \times (B - C) = (A \times B) - (A \times C)$.

  c: For all sets A, B, C and D, $(A - B) \times (C - D) = (A \times C) - (B \times D)$.

  d: For all sets A, B and C, $(A - B) \cup (B - C) = (A \cup B) - (B \cap C)$.

Question 3   Assume that B is a Boolean algebra with operations $+$ and $\cdot$.
For each true statement below, give a detailed proof. For each false statement below, write out its negation, then give a proof of the negation.
In your arguments, you can use any part of the denition of a Boolean algebra and the properties listed in Theorem 5.3.2.

  a: $(\forall a, b \in B)(a + b = 1 \longleftrightarrow b \cdot \bar{a} = \bar{a})$.

  b: $(\forall a, b \in B)(a \cdot b = 0 \longleftrightarrow b + \bar{a} = \bar{a})$.

  c: $(\forall a, b, c \in B)(a + b = a + c \longrightarrow b = c)$.