MA 351: (PART OF) ASSIGNMENTS 1 AND 2

For sets A, B, and C prove that

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

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

(3) $A \times (B \cap C) = (A \times B) \cap (A \times C)$.

(4) $(A \times B) \setminus (A \times C) \subset A \times (B \setminus C)$.

For a function $f \colon X \to Y$ and subsets A and B in X prove that

(1) $f(A) \setminus f(B) \subset f(A \setminus B)$.

(2) $f^{-1}(A \cap B) = f^{-1}(A) \cap f^{-1}(B)$.