

Justify all answers!

(8 pts)

- (1) [+4] Let S and T be sets whose elements are sets, themselves. For example, maybe S and T are powersets. Prove that if $S \subseteq T$, then

$$\bigcup_{X \in S} X \subseteq \bigcup_{Y \in T} Y.$$

- (2) [+4] For sets A, B, C, D , prove that $(A \times B) \cap (C \times D) \subseteq (A \cap C) \times (B \cap D)$.