

Ideas... problems for tutorials week 21

- I-21.1.** Give an example of finite sets A, B, X, Y such that $(A \times X) \cup (B \times Y) \neq (A \cup B) \times (X \cup Y)$. (*Hint:* try small sets, say, subsets of $\{1, 2, 3, 4\}$.)
- I-21.2.** For a fixed set S , consider $\mathcal{P}(S)$ (set of all subsets of S) ordered by inclusion. For $A, B \subseteq S$, what is $\sup\{A, B\}$ with respect to this order? what is $\inf\{A, B\}$?
- I-21.3.** How to tie a goat so as it can eat grass exactly within a square? It is allowed to use several leashes, with several pegs. For example, one peg and leash mean that the goat eats within a circle. It is also allowed to string one rope tightly between two pegs, and to tie the goat with leash to a small ring sliding on the first rope. [*Hint:* use intersections of sets.]