Tutorial 3

14^{th} August, 2025

1. Prove or disprove:

$$P(S \times T) = P(S) \times P(T)$$

2. How many semantically distinct propositional logic formulae over three propositional variables p, q, r can be expressed using only the $\Rightarrow$ logical connective?

3. Given any n element set, write an order of the elements of its power set, such that two successive sets differ from each other by exactly one element, and the last set in the list also differs from the first in exactly one element.

4. Construct n subsets of the set $[n]$ such that each pair of them has exactly $n-2$ elements in common. As we take the intersection of more and more of these subsets, the intersection keeps dropping.