

Tutorial 2

- Solve all questions. Discuss solutions with TAs during TA meeting hours.
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1. Prove or disprove the following:
 - (a) If A, B are countable then so is $A \cup B$
 - (b) Let A, B be two nonempty sets. If there is a bijection from A to B then there is a bijection from $A \times A$ to $B \times B$.
2. Give a bijection from \mathbb{R} to set of all subsets of \mathbb{N} .
3. For any set A, B, C
 - There exists a surjection from A to B iff there exists an injection from B to A .
 - If there is a surjection from A to B and another surjection from B to C then there is a surjection from A to C .
4. Give a bijection from $\mathbb{N} \times \mathbb{N} \times \mathbb{N}$ to \mathbb{N}
5. Prove that if A is countably infinite and B is a finite set then $A \cup B$ is countably infinite.