

Feel free to work with other students on these problems. However all written work should be your own. Also, be sure to give written credit, on the assignment, for any ideas you get from other people.

Exercise 2.1. If $f: A \rightarrow B$ and $g: B \rightarrow C$ are injections then $g \circ f: A \rightarrow C$ is also an injection.

Exercise 2.2. If $A \preceq B$ and $B \preceq C$, then $A \preceq C$.

Exercise 2.3. If $a < b$ are reals, then $(0, 1) \sim (a, b)$. (Give an explicit bijection $f: (0, 1) \rightarrow (a, b)$. Prove that f is an injection and a surjection.)

Exercise 2.4. If $a < b$ are reals, then $(0, 1) \sim [a, b]$.

Exercise 2.5. Prove that $\mathbb{N} \sim \mathbb{N} \times \mathbb{N}$.

Exercise 2.6. Prove that if $A \sim B$ and $C \sim D$ then $A \times C \sim B \times D$.