1. a) State the definition of an increasing function

   b) Give an example of a set which is not countable.

2. Is the product of an even function with an odd function even or odd? Support your answer.

3. Let $f{:}A \to B$ and $g{:}B \to C$ both be injections. Show that $g \circ f$ is injective.

4. Suppose that A is a denumerable set, and let $B = \{1,2,3\}$. Prove that $A \times B$ is denumerable, or prove that it isn't.

5. Show that for any $a, b \in \mathbb{R}$ with $a < b$, (a, b) and $\mathbb{R}$ are equipollent.