Countability

Definition (Equipollent Sets) Two sets A and B are called *equipollent*, shown by $A \sim B$ if there is a one-to-one onto function between them.

Loosely speaking, equipollency of two sets means that they have both the same number of elements.

Definition (Infinite and Finite Sets) A non-empty set A is called an *infinite set*, if it is equipollent with a proper subset of itself. Otherwise it is called a *finite set*.

1. Show That the set $\mathbb{N}_k = \{1, 2, \ldots, k\}$ is a finite set.
2. Show That the sets $\mathbb{N}$, $\mathbb{Z}$ and $\mathbb{Q}$ are all infinity sets.

Definition (Countable Set) A non-empty set A is called a *countable set*, if it is equipollent to the set of natural numbers $\mathbb{N}$. A set B which is either a finite set or a countable set is called an *at most countable set*.

- Prove that the sets $\mathbb{N}$ and $\mathbb{Z}$ are countable. What about $\mathbb{Q}$?

Please send your answers to "ayse.bilge@khas.edu.tr".

References

[1] Hungerford, T. W. (1980). Algebra, volume 73 of. Graduate Texts in Mathematics.