Year 5. Session 112 (2009-2010 school year).
Set Theory.

Reminders:
Def: Two infinite sets *A* and *B* are ***equal*** if there it is possible to find one-to-one correspondence between the elements of these sets.
Terminology: Sets *A* and *B* have ***same cardinality***, Sets *A* and *B* have ***are equivalent.***

Def: Any set that is equivalent to the set of natural numbers ℕ is called ***countable***.

Theorem: The set of all rational numbers is countable. (The set of natural numbers is equivalent to the set of rational numbers).

Theorem: A sum of any number of countable sets is countable.

Non-equal sets.

Lemma: **Any infinite set has a countable subset.**
Proof:

Theorem: **Countable set is a smallest of all the infinite sets. (A cardinality of a countable set is not greater that the cardinality of any other infinite set).**
Proof:

Theorem: **Cardinality of an infinite set does not change if we add a countable set to it.**
Proof:

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Theorem: **Cardinality of an uncountable set does not change if we subtract a countable set from it.**
Proof:

Question: Are all infinite sets countable? Cantor's diagonal argument (1877)

Theorem: The set of all points on the line is uncountable.

Question: which of two segments below has more points?