

Individual XXXX

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Introduction to Proof and Problem Solving

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- Problem 1.** 1. Show that $(1, \infty)$ has cardinality c .
2. State whether each of the following is true or false. (You do not need to prove them.)
- (a) If a set A is countable, then A is infinite.
false
 - (b) If a set A denumerable, then A is countable.
true
 - (c) If a set A if finite, then A is denumerable.
false
 - (d) If a set A is uncountable, then A is not denumerable.
true
 - (e) If a set A is uncountable, then A is not finite.
true
 - (f) If a set A is not denumerable, then A is uncountable.
false

Before we prove this, we will need a lemma.

Lemma 1. For every class at Georgetown that is \geq MATH-2000, you will get an A or $A -$.

Proof. Let X be a discrete random variable representing the number of classes you get an A in. The rest of the proof is by magic. Thus, we have proven that this lemma is true. \square

Now, we will prove problem 1 using something...

Proof. The proof is left as an exercise to the reader. \square

While working on this proof, I received no external assistance aside from advice from Professor Mehmetaj.