# Re: "Number" of elements; was: Distinct linear orderings on Z

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***Date:*** 03/22/05

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Date: Mon, 21 Mar 2005 20:21:13 −0500
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"Stephen J. Herschkorn" <sjherschko@netscape.net> wrote in message
news:423E01FA.1030705@netscape.net...
> *Allan C Cybulskie wrote:*
>
> >*"Stephen J. Herschkorn" <sjherschko@netscape.net> wrote in message*
> >*news:423C653F.1030801@netscape.net...*
> >
> >
> >> *What is "the number" of elements in each of these cases? Do {0,*
> >> *2,4,...} and {1, 3, 5,...} have the same "number" of elements?*
> >
> >
> >*I think so. Both basically have the number of elements equal to one−half*
> >*the set of positive integers.*
> >
> >
> *What is this number?*

Since the set is infinite, I can't tell you.

>
> *More comparisons: How do the number of elements compare in each case?*
>
> *i) {0, 2, 4, 6,...} vs. {0, 3, 6, 9, ....}*

The first is larger.

> *ii) {1/2, 3/2, 5/2,...} vs. {1/3, 4/3, 7/3, 10/3,...}*

The first is larger again.

I don't time to work through all the others and fail to see the point at any
rate/

> *Another tack:*

> {0} and {1} have the same number of elements, no?
> {0, 1} and {1, 2} have the same number of elements, no?
> {0, 1, 2} and {1, 2, 3} have the same number of elements, no?
> {0, 1, 2,..., n} and {1, 2, 3,..., n+1} have the same number of
> elements for any given n, no?
> Yet somehow you insist that {0, 1, 2,...} has a greater number of
> elements than {1, 2, 3,...}. Is this not also a "conflicting
> conclusion" (ACC's words from another post)?

If the definition of the second set really does end at "n+1" relative to the
other set, then they would have the same number of elements. But generally
the set I was talking about seems to be defined as {0, 1, 2 ..., n} and {1,
2, 3, ... n}, and so there is clearly one less element in the second set
than in the first. So, no contradiction.

>
> > Does
> >
> >
> >>[2, 4] have "more" elements than [0,1]?
> >>
> >>
> >
> >Yes. [2, 4] contains all rationals contained between 2 integer numbers,
> >whereas [0,1] contains all of the ones in a 1 integer range.
> >
> >
>
> Why do you confuse one measure (length) with another (counting)?

I am not. I am saying that if you counted you would be counting all the
elements in the range of two integer numbers for [2,4] and all the elements
in a one integer range for [0,1]. How is that not talking about counting?

> >The reason I didn't answer them is because I don't. For the first
question,
> >I see the move to apply the bijection method to both sets just as much an
> >insistence that finite and infinite sets work the same way as anything
I'm
> >doing, and so fail to see why this is an objection that _I_ alone must
> >answer.
> >
> Suppose you are in a store buying some items and your total comes to
> $6.72. (Pardon my US currency bias.) You happen to have lots of
> singles (= one−dollar bills) in your pocket, so you decide to pay with
> them. What do you do? You count them out − 1, 2, 3, 4, 5, 6, 7 − and
> hand them to the cashier. I .e., you have set up a bijection between
> the set {1, 2, 3, 4, 5, 6, 7} and the collection of bills you hand to
> the cashier. That is how one counts, i.e., determines the number of
> items in a collection.

I don't want to again show that this is not generally what people consider
to be counting, since they consider the set argument utterly irrelevant to
the issue. I could have them all grouped into groups of seven by the banker
and still perform just as well without any such mapping. And what do you
claim happens when someone counts by twos? It ain't the bijection to all
integers that we are doing in that caes.

>
> >*As for the second, my argument never relied on the proper subset*
> >*argument −− despite Stephen's insistence −− and so I clearly don't*
confuse
> >*those concepts.*
> >
> >
>
> *But you do. You insist that N has more elements than N \ {0} and*
> *[0,2] has more elements than [0,1]. As far as I can tell, your*
> *rationale is that in each case, the latter set is a proper subset of the*
> *former. If not, what is your rationale?*

My claim is that I do not insist that just because something is a proper
subset it must have less elements than the superset. It is the
mathematicians who have argued that I am merely using that definition
without ever refuting the reasoning behind my usage of something that looks
like that definition. If my reasoning is one that must hold for all proper
subsets, the problem is not with me, but with the mathematicians who want to
use BOTH proper subset AND the cardinality theory, and so they must provide
the proof for why the reasoning does not hold.

> >
> >*Because it leads to conclusions that seem to violate the notion of number*
of
> >*elements as used in common terminology and likely in the concept that we*
> >
> >
> >*used to form the notion of number of elements for sets in the first*
place.
> >
> >
>
> *What notion, exactly, are we violating?*

The notion that if a set is defined to have half the elements of another −−
no matter how we discover that −− then it cannot have the same amount of
elements as the set by the meaning of number of elements.

> >
> >*My answer: Yes. There is at least one more seat and one more passenger*
than
> >*you had before, even though we would still have to call is "infinite". I*
> >*agree that infinity + 1 = infinity, but that using that term in that way*

is
*> >meaningless since all it really means, I suppose, is an uncountable*
number.
*> >*
*> >*
*>*
*> Huh?? How is there one more seat? None has appeared in this set up.*

If all the seats are taken, in order to have someone else sit down you need another seat, right?

*> And if 1 + infinity = infinity, why do you claim that 1 + inifinity is*
*> more than infinity (as you do when you claim that N has more elements*
*> than N \ {0}).*

I claim that that conclusion is a trick of the term infinity (possibly because of a notion that adding one to the huge number of infinity is relatively meaningless and a rounding error) and so isn't appropriate to be used as a proof of practical applications.