

# Re: Ultimate debunking of Cantor's Theory

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- *From:* Rotwang <[sg552@xxxxxxxxxxxxxxxx](mailto:sg552@xxxxxxxxxxxxxxxx)>
  - *Date:* Fri, 13 Jul 2007 12:38:12 -0700
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WM wrote:

[Peter Webb]

When you do the Cantor trick in base 10, you can prove to yourself that it always produces a number not on the list. Even if you have 0.500.. somewhere on the list, you can be certain that you will never get the same number in a different form, such as 0.49999.. as a result of the construction.

If you could find a single example where the Cantor construction failed to produce a different number – if for example it generated 0.4999.. when 0.5 was on the list – then you can no longer claim that the Cantor construction ALWAYS produces a new number.

Such an example is easy to find. Consider the list

0.0  
0.1  
0.11  
0.111  
...

and switch 0 to 1 on the diagonal. Then you have at the diagonal the number 0.111..., but only if this number (with one digit less) is also in the list.

The guy to whom you are replying has already given an example where the Cantor construction fails in base 2. However he was writing about base 10 above, and with a sensible definition of the construction it is impossible to find an example where it fails to find a new number. For example one can define the construction so that the decimal expansion it gives contains only the digits 4 and 7. The only way that two different decimal expansions can define the same number is if one of them contains an infinite string of 9's and the other contains an infinite string of 0's.

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