# Re: .999... ?= 1

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`Date: Wed, 09 Jun 2004 07:49:11 +0100`

Dik T. Winter wrote:

> *Depends on what you define as a number (I have not seen a definition in*
> *this thread yet),*

Being a layman, I looked for such definition and was disappointed, too.
So I came to the idae a number has at least two applications: Providing
an order for counting and providing a measure. Does this lead on the
right track?

and how you define inverse/reciprocal.

I naively imagine the reciplocal of a number might be related to but not
the same as the reciprocal of a function or a graph. Isn't ln(x) the
inverse of exp(x) in the sense of symmetry with respect to y=x?
I wonder why y=exp(x) within IR can be one−to−one translated into
y=ln(x) within IR+ while changing multiplication of x values into
addition, etc of belonging y values.
I also wonder why Fourier transform of a continuous periodic function
(aleph2) consists of dicrete values (aleph1) and vice versa no matter
whether or not it is compex−valued.

> *Commonly in*
> *the definition−process, there are only two starting operations:*
> *addition and multiplication, and how they hang together in a ring.*
> *At some point the reciprocal of a number a is defined as the number*
> *ra such that a * ra = 1 (the unity of the multiplication). It is*
> *only after that that division is defined as a shorthand for multiplication*
> *by the reciprocal. Similarly, negative numbers are defined as numbers*
> *that add up to the original, such that their sum is 0 (the unity of the*
> *addition). Only after that subtraction is defined.*
>
> *Now let's see how that works in a ring where 0 (the unity of the addition)*
> *has an inverse, say oo. So 1/0 = oo*

This looks reasonable to me.

and 0.oo = 1.

I know, this is not allowed. Nonetheless it might be pointless while
also reasonable.

Now what is 2/0?
*> If it is also oo, we have:*
*> 1. oo + oo = 1/0 + 1/0 = 2/0 = oo (using the distributive property)*
*> 2. oo + oo = oo*

I see this correct because the relation a>b fails at oo.

−> oo = 0 (using the property of the additive inverse)

Once having lost the a>b property you must not expect getting it back
with a return.

*> So that will not work. We need more infinities to make it work.*

???

*> (Unless you throw away one of the two properties used above.)*

I am a miser who does not throw away anything. Loss of a>b is the price
for crossing the border between finite and infinite.

*> But the strange thing is, it does not matter how many infinities we add,*
*> we can not get something consistent (David Cantrell argues otherwise,*
*> yes, I know).*

So called counterintuitive strangeness is not strange to me at all.
I am an engineer. To my understanding "no matter how _many_" implies a
finite number.

*>>I vaguely recall: Only a few experts do not consider zero a number. Is this correct?*
*>*
*> Not as far as I know, I have never met an expert who did consider 0 not*
*> a number.*

I merely found this within at least one book on Cauchy(?) written as or
more likely based on a thesis by an outsider. Don't ask me which one.
Also I was told that zero is not necessarily a number, and if I recall
correctly, I found that zero is the only infinitesimal within the
hyperreal numbers.

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