Re: Bringing back an old tetration curiosity?

Source: http://sci.tech−archive.net/Archive/sci.math/2007−09/msg04822.html

- *From*: mike3 <mike4ty4@xxxxxxxxx>
- *Date*: Fri, 21 Sep 2007 18:34:58 −0700

On Sep 21, 5:20 pm, "I.N. Galidakis" <morph...@xxxxxxxxxxxx> wrote:

> mike3 wrote:
>
> [snip]
>
> > > For example, one should expect x^^(0.49999....) to be
> > > exactly
> > > x^^(0.5)=x^^(1/2).
>
> > And it is, since the function is defined using *real* arguments, not
> > "decimal" arguments. It's defined on the set R of real numbers, like
> > I said, not on the set D of decimal expansions.
>
> In order to define a function with a *real* argument, you have to tell me what
> the function *does* to the argument (preferably in terms of Cauchy sequences and
> limits). I'll make it easier for you: You have to tell me FIRST what the
> function does to a *rational* argument, like m/n.

Yes!

> I asked you "what does the function do for x^^(2/30)"?, and you agreed to, "let
> y=m/n be the corresponding value and then evaluate x^^y".

Yes, since m/n, y, are all referring to the same abstract number, in
fact from the abstract standpoint of numbers *they are exactly the
same*! That abstract number, the number "itself", is what a function
like this acts upon.

> I responded: "This is an ambiguous way to tell me what the function does,
> because y might not have a unique decimal representation".
>
> If you cannot tell me what the function does to a *rational* argument, you
> _cannot_ tell me what it does to a (generally) real argument.

I know, you have to define what it does to the rational argument. But
that means we define it *for an element in Q*, not for an element in
the
set of quotient expressions. 2/30 is the exact same element of Q as
1/15, so the function's value for the two must be *exactly the same*!
Why can it not be? The two are just two ways of writing the same
rational number in Q.

> Sorry, I am through arguing. You don't see the problem.

I'm trying to see the problem.

> [snip]
> --
> I.N. Galidakis

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