Re: abundance of irrationals!)

Source: http://sci.tech−archive.net/Archive/sci.math/2005−05/msg01354.html

- *From*: "Dik T. Winter" <Dik.Winter@xxxxxx>
- *Date*: Sun, 8 May 2005 01:19:31 GMT

In article <MPG.1ce57c9143cb687989bdd@xxxxxxxxxxxxxxxxxxxxxxxxx> Tony Orlow (aeo6) <aeo6@xxxxxxxxxxx> writes:
> Dik T. Winter said:
> > In article <MPG.1ce41773427854f7989bc0@xxxxxxxxxxxxxxxxxxxxxxxxx> Tony Orlow (aeo6) <aeo6@xxxxxxxxxxx> writes:
> > ...
> > > I don't tend to deal with these axioms much. The only reason I am dealing
> > > with them now is that mathematicians seem not to be able to do without
> > > them.
> >
> > Well, you know, without axioms, no mathematics... You have to start with
> > some basic truths, otherwise you can not logically reason to conclusions.
> > The basic truths are the axioms.
>
> Axioms are not "basic truths". The axioms are assertions which, within the
> logic of the axiomatic system are atomic statements assumed to be true, and
> treated in that system as "basic truths".

Yup, within an axiom system the axioms are basic truths.

> eated in that system as "basic truths". HOWEVER, the "basic truths" are NOT
> the axioms. The axioms are statements that we agree are true, based on
> reasons OUTSIDE of the particular axiomatic system.

Not so. There are no reasons OUTSIDE an axiomatic system for either of the
three possible variants of the parallel axiom.

> This is true when dealing with logic in general. We start with a certain
> set of given "facts", each with a certain truth value (generally 1, or
> 100% true), and a logical statement using those atomic facts, and evaluate
> the truth value of the logical statement, by plugging in truth values and
> evaluating the logical construction. Now, if all our facts are true, and
> all our logical operations are correctly performed, we will get an correct
> answer. IF, however, any of our assertions is FALSE, then no matter how
> well we perform our oeprations on the truth values of those "facts", we
> are going to get an erroneous result.

How do you measure whether an axiom is false or not? What does it *mean*
that an axiom is false?

> Axiomatic mathematics IS logical inference. ASSUMING all the axioms we have
> asserted are CORRECT, then we can prove a given logical statement involving
> them. If we get results that make no sense, then we can examine our logic to
> see if we made a mistake.

What does it mean that a result makes no sense? If a result is not in conflict
with the axioms used, it makes sense, in that axiomatic system. I have no
idea what is the case outside the axiomatic system.

....
> The truth of axioms can be tested, as I said before, by their compatibility
> with all other axioms and their compatibility with reality.

What does that mean? How do you check compatibility with reality?
Mathematics is not about reality, it is about ideas.

> > > Well f(0) is undefined, why? Because sin(1/0), or sin(oo), is
> > > undefined. But, we know that sin is always between 1 and −1 and
> > > so x sin(1/x) at x=0 is equivalent to 0*(some number between 1
> > > and −1), which is always 0.
> >
> > Except when you go to the complex numbers, where sin(x) can be any value,
> > including values larger than 0... But what you are telling above seems a
> > lot like taking a limit...
>
> It's not dissimilar, but doesn't require the full extent of limits.

You are applying one of the common tests for whether a limit exists.
And indeed, majoring x.sin(x) by x is one of such tests. But it is
a theorem that that test indeed gives the limit. Moreover, you have
a (mathematically) wrong statement: you state that at x = 0 x.sin(1/x)
is equivalent to 0*(some number between 1 and −1). That is false; as
you properly write just a little higher, sin(1/0) is undefined. So
how can you conclude that it is a number between 1 and −1?

> I was playing cards with a buddy, five card draw.

Completely irrelevant.

> > > > To me there is no confusion: f is not defined at x=0. On the other
> > > > hand the limit of f, as x tends to zero, is indeed L = 0 because
> > > > for every _nonzero_ x, |f(x)| <= |x|, which means that the values
> > > > of f can be kept smaller than any pre−assigned epsilon simply by
> > > > keeping x close to (but of course different from) epsilon.
> >
> Somehow, the above looks indented like my statement, but I don't think it is.

It is not. If you look closely you will see it is not indented as your
statement. Count the number of > signs.
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- ***Follow−Ups***:
  - ***Re: abundance of irrationals!)***
    - *From:* Virgil
- ***References***:
  - ***Re: abundance of irrationals!)***
    - *From:* aeo6
  - ***Re: abundance of irrationals!)***
    - *From:* Dik T. Winter
  - ***Re: abundance of irrationals!)***
    - *From:* aeo6
- Prev by Date: ***Meshes***
- Next by Date: ***Re: abundance of irrationals!)***
- Previous by thread: ***Re: abundance of irrationals!)***
- Next by thread: ***Re: abundance of irrationals!)***
- Index(es):
  - ***Date***
  - ***Thread***