Re: can anyone tell me a little about this puzzle − quartering squares & the pythagorean theorem

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- *From*: michael@xxxxxxxxxxxxxxxxxxxxxxxxxxxx
- *Date*: Fri, 24 Apr 2009 12:35:34 −0700 (PDT)

On Apr 24, 6:08 pm, William Elliot <ma...@xxxxxxxxxxxxxxxx> wrote:

> On Fri, 24 Apr 2009 mich...@xxxxxxxxxxxxxxxxxxxxxxxxxxxx wrote:
>
> > I seem to remember learning a long time ago, that no finite approximation to the diagonal of a square, constructed by dividing the square into equal smaller squares, and then dividing those 4 into 16, etc., "saves" any distance traveling between opposite corners versus traveling along the edges of the original square. Only with an infinite number of divisions is there a path of length equal to the "true" diagonal given by the Pythagorean theorem.
>
> If you take the unit square and zig zag right and up, right and up, ... from (0,0) to (1,1) in steps of 1/n, then n steps right and n steps up, you've traveled a distance of two. You can see that the finer the steps become, that the distance travel is still two. Thus with an infinite number of divisions the distance traveled is still 2.

This was the line of reasoning I was trying to follow, but I guess out of paranoia I wanted also to be sure I could snow that there was no irregular, meandering path that through some mathematical subtlety turned out to be a shorter distance across the original than the approximation to the diagonal going right and up, right and up. But for now the right and up, right and up, conception you just described is a satisfactory way for me to think about the problem.

> Is this really true? When I drew a diagram and started counting edges, the recursive quality of what I was doing suggested that to me that it was true and should be provable by induction, but I have not been able to prove it yet.

> No it is not true. Instead of getting the diagonal, you get a crinkly
> curve that's nowhere differentiable.

Is this because I neglected the difference between countably and uncountably infinite? The dividing of the squares and the zig−zag approximation to the diagonal, is countable, but the points in the diagonal are not?

> > More importantly, does anyone know where I can find some discussion of
> > this puzzle and its physical significance? I did a reasonable amount
> > of Googling before troubling everyone on Usenet with this, but
> > unfortunately I don't know the name of the puzzle, and I just keep
> > getting peripherally related sites about the Pythagorean theorem.
>
> Don't use Google, use Yahoo. Google has a government contract to mine the
> data it gets about you so the government will know if you've been good or
> if you've been bad.

That's disturbing, although my estimation is that people's privacy has already been so pervasively compromised, that the government either already does, or easily could, know everything about anyone, which is super−disturbing. Like that movie "Enemy of the State." However if they know everything about me then they also know I am not malicious, so hopefully I'm fine. I'll give Yahoo a try though, maybe it will get me some results I wouldn't hit otherwise. And I guess all things considered it's better not to be spied on.
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