Re: Transcendental Dimensions

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- *From*: "Michel Hack" <hack@xxxxxxxxxxxxx>
- *Date*: 21 Jul 2005 11:27:37 −0700

Timothy Murphy wrote:
> Timothy Little wrote:
>
> > Dimensions of fractals often have the form (log p / log q) for some
> > integers p and q. If the ratio isn't "obviously" a rational then it's
> > irrational and hence transcendental. If log p / log q is a rational
> > then p^n = q^m with m > 1, which tends to be pretty obvious. That's a
> > fairly uncommon relationship, requiring that p and q be different
> > powers of a common base.
>
> Irrational is not the same as transcendental.
> (A number can be irrational without being transcendental.)

Yes −− but this is not a general case. Look up Gelfond−Schneider Theorem.
If p and q are integers (and greater than 1), then log(p)/log(q) is either
an integer or it is transcendental. Alternatively, if log(p)/log(q) is algebraic, then it must be an integer. Since all integers are rational,
if log(p)/log(q) is not rational (i.e. if it is irrational), then it must
indeed be transcendental.

Michel.

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- ***Follow−Ups***:
  - ***Re: Transcendental Dimensions***
    - ◊ *From:* Timothy Murphy

- ***References***:
  - ***Transcendental Dimensions***
    - ◊ *From:* gsax

- ***Re: Transcendental Dimensions***
  - ◊ *From:* W. Dale Hall
- ***Re: Transcendental Dimensions***
  - ◊ *From:* gsax
- ***Re: Transcendental Dimensions***
  - ◊ *From:* Timothy Little
- ***Re: Transcendental Dimensions***
  - ◊ *From:* Timothy Murphy

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