

## Re: Trisecting an arbitrary angle

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*Source:* <http://sci.tech-archive.net/Archive/sci.math/2005-07/msg03036.html>

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- *From:* quasi <[quasi@xxxxxxxx](mailto:quasi@xxxxxxxx)>
  - *Date:* Tue, 19 Jul 2005 16:00:33 -0700
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On 19 Jul 2005 12:34:29 -0700, "Proginoskes"  
<[proginoskes@xxxxxxxxxxxxxx](mailto:proginoskes@xxxxxxxxxxxxxx)> wrote:

>  
>quasi wrote:  
>> On Tue, 19 Jul 2005 12:37:14 +0200, "Jutta Gut"  
>> <[gut.jutta.gerhard@xxxxxxxxxx](mailto:gut.jutta.gerhard@xxxxxxxxxx)> wrote:  
>> >  
>> >If I understand correctly, you have shown that in a triangle with  
>> >the sides  $a^3$ ,  $a(b^2 - a^2)$ ,  $b(b^2 - 2a^2)$  one angle is three times  
>> >another one.  
>> >  
>> >The more interesting question would be: given an angle, how to  
>> >construct a triangle with the sides  $a^3$ ,  $a(b^2 - a^2)$ ,  $b(b^2 - 2a^2)$   
>> >and the given angle?  
>> >  
>> >Jutta  
>> >  
>> >Constructing the triangle effectively trisects the given angle which in  
>> >general has been shown to not be possible using straight edge and  
>> >compass. There are only countably many angles for which trisection by  
>> >straight edge and compass is possible.  
>> >  
>> >The OP isn't requiring that an arbitrary angle be trisected.  
>> >  
>> >Maybe, during the construction process, the smaller angle will be  
>> >tripled, which is allowed using straightedge and compass.  
>> >  
>> >--- Christopher Heckman

Tripling an angle is a rather trivial construction (just concatenate 3 copies of the angle).

The formulas discussed parametrize triangles with the property that one angle is a triple of another. They don't really lead to an algorithm for trisecting an arbitrary angle with straight edge and compass, and as we all know, such an algorithm is not possible. Of course, some angles can be constructibly trisected and in fact all such angles can be trisected by standard methods simply constructing

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the length  $\cos(\theta/3)$  and using that to construct  $\theta/3$ . Thus, these parameterization formulas give no new trisectable angles — we have them all already.

Also, there is nothing in the parametrization formulas that even uses an angle as input. Rather it goes the other way — the inputs are parameters, the output is a triangle (with associated lengths and angles).

That doesn't mean the formulas are uninteresting, just that they are not useful as a tool for trisecting angles.

quasi

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### • *References:*

- ◆ ***Trisecting an arbitrary angle***
    - ◇ *From:* bassam king karzeddin
  - ◆ ***Re: Trisecting an arbitrary angle***
    - ◇ *From:* bassam king karzeddin
  - ◆ ***Re: Trisecting an arbitrary angle***
    - ◇ *From:* Jutta Gut
  - ◆ ***Re: Trisecting an arbitrary angle***
    - ◇ *From:* quasi
  - ◆ ***Re: Trisecting an arbitrary angle***
    - ◇ *From:* Proginoskes
- 
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