

Re: History of trigonometry

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- *From:* "Ross A. Finlayson" <raf@xxxxxxxxxxxxxxxx>
 - *Date:* 2 Jan 2007 18:58:41 -0800
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Nick wrote:

"Ken Pledger" <ken.pledger@xxxxxxxxxxxxxxxx> wrote in message
news:ken.pledger-E6DD48.11304703012007@xxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxx

In article
<2386070.1166882761600.JavaMail.jakarta@xxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxx>, zeros <nimzeros@xxxxxxxx> wrote:

....
When did someone define the sine of an angle greater than 90 degrees?

I think this may be happened in 17c. But I can't find any record about my question....

It's an interesting question, which most popular historians of mathematics scarcely mention.

In fact, <http://www-history.mcs.st-andrews.ac.uk/Biographies/Euler.html> says that:

"He made large bounds forward in the study of modern analytic geometry and trigonometry where he was the first to consider sin, cos etc. as functions rather than as chords as Ptolemy had done."

http://www-history.mcs.st-andrews.ac.uk/HistTopics/Trigonometric_functions.html#76 says that:

"The first actual appearance of the sine of an angle appears in the work of the Hindus."

"Chapters of Copernicus's book giving all the trigonometry relevant to astronomy was published in 1542 by Rheticus. Rheticus also produced

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substantial tables of sines and cosines which were published after his death. In 1533 Regiomontanus's work *De triangulis omnimodis* was published. This contained work on planar and spherical trigonometry originally done much earlier in about 1464. The book is particularly strong on the sine and its inverse."

See reference for more.

Nick

Sine, cosine, and tangent may be elementary functions, I am wondering if there are these slightly less elementary functions that are similar to sinecosine and tangent.

Basically I've heard that sine and cosine can be described by the evolving coordinates of an unhinged regular triangle, where it goes from being a triangle to a straight line, and there's a ratio, perhaps unity, between the change of the arc of the angle AB and angle BC, so that it unfolds in this graceful manner and the endpoint happens to go through a path that traces half a period of the sine function, or something along those lines. That does describe a periodic function, with constant period the perimeter. Such a thing obviously exists, questions arise as to the surrounding framework and whether otherwise more complicated expressions could be reduced to these families of periodic functions, with irregular polygons and various arc change ratios. Obviously they could be represented as sums of sine waves.

Where that is so, is there a similar notion to trigonometry for unfolding regular n -gons, n -gonometry? How about a 3-D or n -D analog for pyramidometry and n -hedrometry? I figure these are quite well explained somewhere. Where can I learn more about these things and their directions of development?

Basically my question here is: what's 4-gonometry. Why is trigonometry called trigonometry? I understand it's about the ratio of sides of right triangles.

Ross

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