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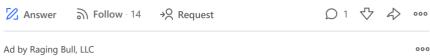
Cosine (math function)   Sine (math function)   Tangent   Trigonometric Functions

Trigonometry (mathematics)   +2   ✎

How were sine, cosine, and tangent derived?

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4 Answers

🌌 **Emad Noujeim**, Knowledge & science,reader,former teacher,multiple interests   👤
Answered March 10, 2016

Adding some brief remarks to the answers already given , ancient cultures knew about some properties of the sides of a triangle , and early trigonometric knowledge was used for practical purposes and in astronomical calculations . Then around the beginning of the Common Era astronomers started developing the concept of Chord (geometry) ↗ (which is related to the Sine ↗ function) . Ancient scholars and astronomers such as Hipparchus ↗ and Ptolemy ↗ provided tables of chords .

The concept of Sine was progressively elaborated , and here is an explanation of the etymology of the words *sine* , *tangent* and *co* … (more)

⌃ 3   🔁   💬   ⌄   ↱   ⋯

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🦊 **Elijah Stroud**, I am a student who loves knowledge.   👤
Answered March 10, 2016

As to the discovery of the trigonometric identities, I cannot say much, but as to how they can be calculated without a calculator is a whole 'nother matter.

Sine and cosine can be defined by a Taylor series ↗ we can derive from L'Hospital's rule ↗.

$$sin(x) = \sum_{n=0}^{\infty} \frac{(-1)^n (x)^{2n+1}}{n!}$$

$$cos(x) = \sum_{n=0}^{\infty} \frac{(-1)^n (x)^{2n}}{n!}$$

Basically, this means that sine cosine and tangent (sin/sos) can all be defined using only the four basic arithmetic functions! Using these definitions, and the Taylor series for e^x also derived using L'Hospital's rule, we get Euler's formula.

$$e^{ix} = cos(x) + isin(x)$$

and in a special case:

$$e^{i\pi} = -1$$

$$sin(x) = \frac{\ \ \ }{2i}$$

$$cos(x) = \frac{e^{ix} + e^{-ix}}{2i}$$

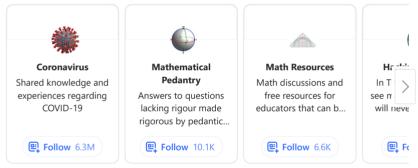And when we remove the imaginary units we get

$$sinh(x) = \frac{e^x - e^{-x}}{2}$$

$$cosh(x) = \frac{e^x + e^{-x}}{2}$$

the hyperbolic identities ⬀! The hyperbolic identities are used in many advanced areas of math. I apologize for going a little overboard, but I couldn't help myself. I hope you find this answer interesting.

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Bhava Nath Dahal, Breaking Classical Rules in Trigonometry- 5 new methods & higher-degree equation
Answered September 16, 2016

Precise-Rewritten method

We can use new method named as "Precise-Rewritten method" for determination of exact values of trigonometric functions. This method requires few new conceptual preparation of Centrals and Nested radicals. Let us take an example of Sin 20 degree describing Precise-Rewritten method.

Concept of Centrals. For Precise-Rewritten method, we just need simple understanding of 'Centrals'. Starting from 90 degrees, it's half is 45- first central. Half of 45 is 22.5 - second central, 11.25 is third central and so on. In the example of Sin 20, following picture may describe the Preci ... (more)

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What actually are sine, cosine and tangent?

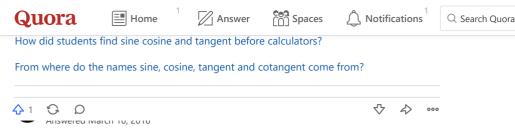How did students find sine cosine and tangent before calculators?

From where do the names sine, cosine, tangent and cotangent come from?

What are the actual calculations behind sin, cos, and tan?

What is sine, cosine and tangent and how they came into being and what are their uses?

What are the uses of sine, cosine, and tangent in real life?

Ask Question

How did students find sine cosine and tangent before calculators?

From where do the names sine, cosine, tangent and cotangent come from?

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Answered March 10, 2016

They are based upon relationship between the angles of a right triangle and the ratios of the length of the sides of the triangle. So, theoretically, if you could draw a triangle that has the exact angle that you are trying to take the trig function of, and you can measure the length of the appropriate sides to an arbitrary degree of accuracy, then you can use the ratio of those sides to find the value of that trig function to an arbitrary degree of accuracy. However, I would offer this possibility to you. Let us say that we are concerned with the ratio of the side opposite the angle and the h ... **(more)**

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4 Answers Collapsed (Why?)

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How was the math function sine discovered? By whom?

Why do they say THE calculus?

In mathematics, what exactly is sine, cos and tangent?

How do they know if they have to take the sine or cosine or tangent for relate they to a formulae in physics?

Why are cosine, sine, tangent, and cotangent so important? Why should I be graphing them, using them in calculus, etc.?

Why are sine, cosine and tangent called circular functions?

Why are sine and cosine so often used in physics?

What is the practical meaning and use of a cosine, sine, and tangent in mathematics?

How should I prepare before I start my college calculus 2 class?