

Re: Sin Cos Tan, why not Sin Sec Tan?

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From: Cassandra Thompson (*cass.harley_at_bigpond.com*)

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Jake Wildstrom wrote:

> *The Prophet Cassandra Thompson known to the wise as cass.harley@bigpond.com, opened the Book of Words, and read unto the people:*

>

>> *Why is it important that the hypotonuse be the denomitator? Because the*

>> *answer will always be ≤ 1 . Because as far as I can tell that is the only*

>> *reason for choosing the sin/cos pair over the sec/csc pair.*

>>

>> *I am guessing that there is a very good answer why this is better then*

>> *the result being > 1 , however I cannot yet see why.*

>

>

> *Well, bounded functions are frequently nicer. In calculus and*

> *analysis, you'll find there are many things which sin and cos*

> *"naturally" fall out of (for instance, there's a grand cosmic*

> *relationship between the exponential function e^x and the sin and cos*

> *functions; also, the sin and cos functions, unlike the sec and csc*

> *functions, have good approximating sequences and behave generally*

> *nicely in ways which sec and csc fail to do. One last, simpler,*

> *example: sin and cos are defined everywhere; sec and csc have*

> *discontinuities when they jump to infinity, which is really unpleasant*

> *(tan has this problem too, but with the tan/cot pair, this is*

> *unavoidable; the distinction of one of tan/cot as 'customary' is*

> *moderately arbitrary, but the distinction of sin/cos as customary and*

> *sec/csc as exotic is in fact a nonarbitrary decision).*

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> | *D. Jacob Wildstrom -- Math monkey and freelance thinker |*

> | *Graduate Student, University of California at San Diego |*

> | *"A mathematician is a device for turning coffee into |*

> | *theorems." --Alfred Renyi |*

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> *The opinions expressed herein are not necessarily endorsed by the*

> *University of California or math department thereof.*

Thank you (and everybody else who has responded). You have really clarified what I was trying to understand, and I feel like I have a much

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stronger knowledge about it.

Thanks again.

Cassandra Thompson.