

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

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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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| "A mathematician is a device for turning coffee into |
| theorems." --Alfred Renyi |

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