E1-29 Some interesting limits for $\cos^{-1}x$, π and $\log_e x$ with its extension to inverse hyperbolic functions

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Here we develop a new mathematical framework following the rich Asian tradition of mathematicians such as Ariyabhatta, Bhaskara and Srinivasa Ramanujan.

A limit for $\cos^{-1}x$ is derived first with some limits for π as its consequences that we call golden limits for π. A limit for $\log_e x$ is derived with its extension to inverse hyperbolic functions as well. Using this limit for $\log_e x$ whole logarithmic table can be reproduced. While deriving the limit for $\cos^{-1}x$ we use a continued root developed by Ramanujan in his second note book. Further we derive the same result using a geometrical method.

This mathematical framework has a considerable practical importance. The inter connection among these results and further results along this direction are discussed.

The new limits for π in this paper can be used by digit hunters of π as a mathematical base in their computer algorithms and further our wish is that these interesting limits may reawaken the interest about π in the world of mathematics.