C. Kimberling

Dept. of Mathematics, University of Evansville, 1800 Lincoln Avenue, Evansville, IN 47722, U.S.A.
`ck6@evansville.edu`

Two Kinds of Golden Triangles, Generalized to Match Continued Fractions

Two kinds of partitioning of a triangle ABC are considered: side-partitioning and angle-partitioning. Let $a = |BC|$ and $b = |AC|$, and assume that $0 < b \leq a$. Side-partitioning occurs in stages. At each stage, a certain maximal number q_n of subtriangles of ABC are removed. The sequence (q_n) is the continued fraction of a/b, and if $q_n = 1$ for all n, then ABC is called a side-golden triangle. In a similar way, angle-partitioning matches the continued fraction of the ratio C/B of angles, and if $q_n = 1$ for all n, then ABC is called a angle-golden triangle. It is proved that there is a unique triangle that is both side-golden and angle-golden.

Keywords: Golden triangle, golden ratio, continued fraction.

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