

Cal Poly Department of Mathematics

Puzzle of the Week

Nov 19 - Dec 2, 2015

Consider the following construction: Begin with a unit circle and its circumscribed equilateral triangle; then circumscribe about the triangle a new circle, and circumscribe about it a square; continue in this way, so that after constructing a regular n -gon you circumscribe it with a circle and circumscribe the new circle with a regular $n + 1$ -gon. If $r_3 = 1$ denotes the radius of the first circle, and in general we let r_n denote the radius of the circle which circumscribed the regular $n - 1$ -gon, then what is a formula for r_n ? Correct to four decimal places, what is r_{1000} ? Do you think r_n tends to a finite value, or infinity, as $n \rightarrow \infty$? (No proof required)

Solutions should be submitted to Morgan Sherman:

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before the due date above. Those with correct and complete solutions will have their names listed on the puzzle's web site (see below) as well as in the next email announcement. Anybody associated to Cal Poly is welcome to make a submission.

<http://www.calpoly.edu/~sherman1/puzzleoftheweek>