

PROBLEM OF THE WEEK
Solution of Problem No. 3 (Fall 2000 Series)

Problem: If a given equilateral triangle \triangle of side a can be covered by five equilateral triangles of side b , show that \triangle can be covered by four of side b .

Solution (by Mike Hamburg, Jr. St. Joseph H.S., South Bend)

Suppose \triangle can be covered by 5 equilateral triangles of side b (henceforth “ b -triangles”). Then we assert $a \leq 2b$. For if $a > 2b$, then the vertices and midpoints of the sides of \triangle (6 points at all) are mutually separated by $\frac{1}{2}a > b$. But no 2 points on a b -triangle are separated by a distance greater than b , hence no b -triangle can cover more than one of the 6 points.

But if $a \leq 2b$ then 4 b -triangles can be arranged to form a $2b$ -triangle which covers \triangle .

Also solved by:

Undergraduates: Kevin Darkes (Soph. A&AE), Haldun Kufluoglu (Sr. EE), James Lee (Sr. MA/CS), Stevie Schraudner (Jr. CS)

Graduates: Gajath Gunatillake (MA), Chris Lomont (MA)

Faculty & Staff: Steven Landy (Phys. at IUPUI)

Others: Damir Dzhafarov, Jake Foster (Sr. & Soph., resp., Harrison H.S., WL)

There was one incorrect solution.