The Third Annual

Utah Math Olympiad

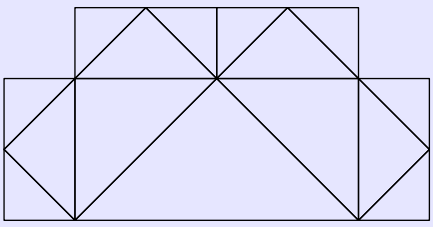
Saturday, March 21, 2015
2:00 - 5:00 pm

Participation is free.
Register at www.utmath.org by March 14.
Prize money will be distributed to the top scorers.

Please contact us at contact@utmath.org,
or refer to our website for more information.

Sample Problem

A fractal figure is formed as follows. First, draw a 45-45-90 right triangle with a hypotenuse of length 1. Then draw two new 45-45-90 triangles whose hypotenuses are the first right triangle's legs, and whose legs lie outside the first triangle. Then, for each of the two new triangles, do the same thing, so that there are two new right triangles for each right triangle in the previous iteration. Repeat this process to infinity. The diagram below shows the figure after three iterations of the process.



(a) Prove that the resulting figure has finite area. (If triangles overlap, their common area is only counted once.)

(b) Find this area.

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