Which Polygons Can Be Tiled with Squares?

Richard Kenyon

Dehn (1903) showed that an $a \times b$ rectangle can be tiled with (not necessarily identical) squares if and only if a/b is rational. There are several different proofs of this result, but the more general question of which polygons can be tiled with squares is much more interesting and challenging...and might even be undecidable. We'll show how to answer this question for polygons with up to 10 sides and for some simple surfaces, such as the surface of the regular tetrahedron. Can you tell which of the following polygons are tileable with squares?

Richard Kenyon

Credits

Polygons and author photo are courtesy of the author.

Richard Kenyon is the Erastus L. DeForest Professor of Mathematics at Yale University. His email address is richard.kenyon@yale.edu.

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