

# TILING THE PLANE WITH IDENTICAL CONVEX POLYGONS

Sava Grozdev

**Abstract.** *The present paper is dedicated to tilings of the plane with identical convex hexagons and pentagons, i.e. monohedral tilings. The numerous cases are reduced to 3 types of convex hexagons with which tilings are possible. This result is due to K. Reinhardt [2]. The paper includes a proof that monohedral tilings of the plane with convex  $n$ -gons are possible only in the case  $n \leq 6$ . Of interest are concrete tilings and some of them seeming to be new are presented in the paper.*

**Key words:** Plane, Tiling, Polygon, Convex Polygon, Tessellation

## References

- [1] S. Grozdev, *For High Achievements in Mathematics. The Bulgarian Experience (Theory and Practice)*, Sofia: Association for the development of education, 2007, ISBN: 978-954-92139-1-1
- [2] K. Reinhardt, *Über die Zerlegung der Ebene in Polygone*, Dissertation der Naturwiss, Main, Borna: Fakultat, Universitat Frankfurt, 1918
- [3] B. Bollobas, Filling the plane with congruent convex hexagons without overlapping, *Annals Universitatis Scientiarum Budepestinensis, Eötvös Sect. Math.*, 1963, 6, 117–123
- [4] R. Kershner, On paving the plane, *American Mathematical Monthly*, 1968, 75 (8), 839–844, doi:10.2307/2314332, ISSN: 0002-9890, JSTOR 2314332, MR 0236822
- [5] M. Gardner, Tilings with Convex Polygons, *Ch. 13 in Time Travel and Other Mathematical Bewilderments*, New York: W. H. Freeman, 1988, pp. 162–176
- [6] C. Zong, Can You Pave the Plane Nicely with Identical Tiles, *arXiv:1803.06610v3 [math.MG]*, 26 Mar 2018

Sava Grozdev

University of Insurance and Finance

1 Gusla Str., 1618 Sofia, Bulgaria

Corresponding author: sava.grozdev@gmail.com