LSU Math Circle Research Proposal

Points with Rational Distances

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Category: Geometry (Calculus not required)

Abstract: A well-known open problem in mathematics is whether you can find a point in the unit square such that the distance from that point to each corner of the square is a rational number. While this remains unsolved, a similar result is known about the triangle.

For a triangle which has one side of rational length and the remaining side length whose squares are rational, there exists infinitely many points such that that distance from that point to each of the vertices is rational, according to [1].

I am proposing we study a similar problem on general quadrilaterals (kites, rhombuses, and/or isosceles trapezoids). We will answer what restrictions on the side lengths and/or angles of a quadrilateral guarantee there will be a point in the quadrilateral that is a rational distance away from all four corners?

Possible Extension
If we are able to find a good result for quadrilaterals, we may look at a similar problem on the pentagon.

☑ This research proposal has the potential for continued research after the program.

REFERENCES