Gauss Circle Problem Solving and Extending in 3D Shape Using Pick's Theorem

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This study introduces a new solution approach to the Gauss Circle Problem by utilizing Pick's Theorem. Our approach involves examining lattice points within and on the circumference of the circle, constructing the simplest polygon encompassing these lattice points, and applying Pick's Theorem to this polygon for resolution. Introducing lattice triangles within the lattice polygon indicatively reduces errors. We obtained significantly smaller errors compared to traditional number-theoretic interpretations, yielding mathematically meaningful results. Furthermore, we expanded our study from a two-dimensional circle to a three-dimensional sphere. With this expansion, we derived a new solution approach in three-dimensional space by Reeve's Theorem, a extended version of Pick's Theorem. We explore generalizing the current conclusions further by applying grid polytopes and endeavor various three-dimensional rotations.

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