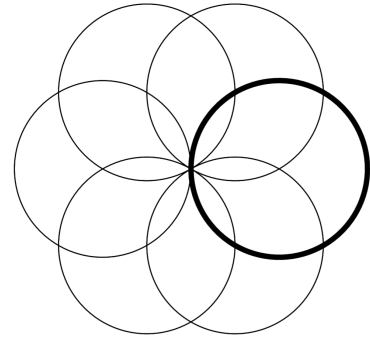


Problem Proposal.

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PROBLEM:

For $N > 2$ a fixed positive integer, we imagine taking a circle of radius 1 and rotating it N times around a point on its boundary, with each rotation angle being $2\pi/N$. Shown here is an example with $N = 6$ rotations of a circle of radius 1 (drawn here in bold), rotated about the boundary point on the far left of the bold circle.



So, here's the problem.

- First, without using calculus, find the area of the N -petal star in the center, as shown here in black for $N = 6$.
- Then, using calculus as needed, analyze the behavior of the ratio of the areas of the $(N+1)$ -petal star and the N -petal star as $N \rightarrow \infty$.

