- A square and an equilateral triangle have the same perimeter. Let A be the area of the circle circumscribed about the square and B be the area of the circle circumscribed about the triangle. Find A/B.

(A) $\frac{9}{16}$ **(B)** $\frac{3}{4}$ **(C)** $\frac{27}{32}$ **(D)** $\frac{3\sqrt{6}}{8}$ **(E)** 1

2003 AMC 12 A, Number #11— "Draw the figure, find the radius"

- **Solution (C)** Let the common perimeter be 1. Then the side length of the square is $1/4$, and the side length of the triangle is $1/3$. The radius of the circle cicumscribed about the square is half the diagonal length or $\sqrt{2}/8$. The area $A = \pi(\sqrt{2}/8)^2 = \pi/32$. The radius of the circle circumscribed about the triangle is $(2/3)(\sqrt{3}/6) = \sqrt{3}/9$. The area $B = \pi(\sqrt{3}/9)^2 = \pi/27$. Then the ratio $A/B = 27/32$.

Difficulty: Medium

NCTM Standard: Geometry Standard for Grades 9–12: Analyze characteristics and properties of two- and three-dimensional geometric shapes and develop mathematical arguments about geometric relationships.

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Geometry > Plane Geometry > Triangles > General Triangles > Triangle Circumscribing