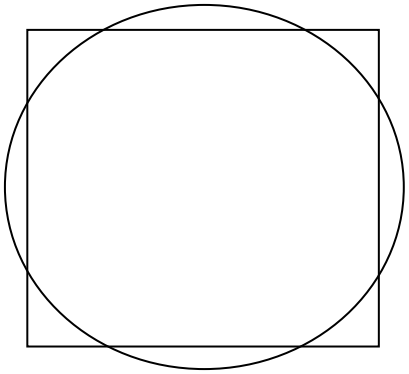
ROUND #1

University of North Georgia
Nineteenth Annual Sophomore Level Mathematics Tournament
April 6, 2013

A square and a circle intersect so that each side of the square contains a chord of the circle which equals the circle's radius. What is the ratio of the area of the square to the area of the circle? (Leave answer in terms of π.)



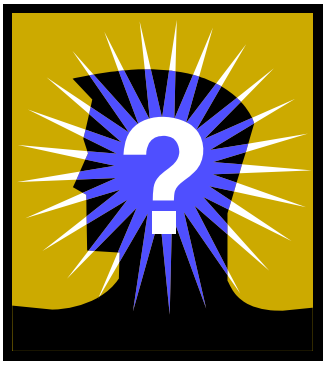
If you need this document in another format, please email minsu.kim@ung.edu or call 678 - 717 - 3546.

ROUND #3

University of North Georgia

ROUND #4

University of North Georgia
Sophomore Level Mathematics Tournament
April 6, 2013



Suppose the coefficients of x^3 and x^4 of a polynomial $(x+a)^5$ are the same and suppose $a>0$.

Find the value of a.

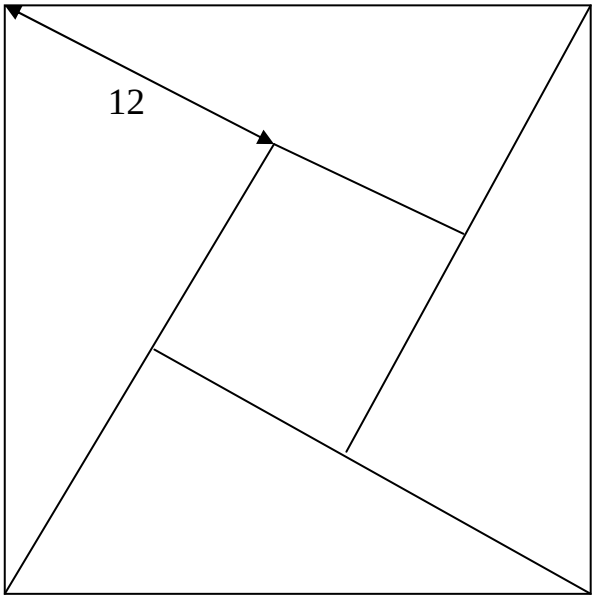
ROUND #5

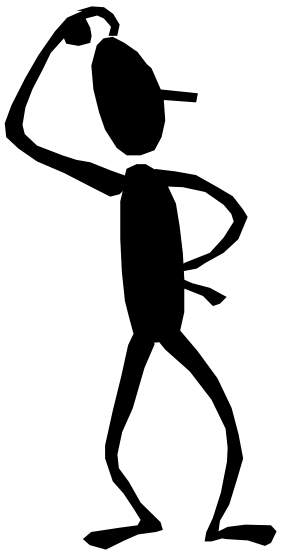
University of North Georgia
Sophomore Level Mathematics Tournament
April 6, 2013

ROUND #6

University of North Georgia
Sophomore Level Mathematics Tournament
April 6, 2013

Two squares are nestled as shown and form 4 congruent triangles. The large square's area is 400 square units. What is the small square's area?





ROUND #8

University of North Georgia
Sophomore Level Mathematics Tournament
April 6, 2013

A regular pentagon is inscribed in a circle of area $16\pi\, cm^2$. Find the perimeter of the pentagon approximated to the nearest tenth of a *cm*.

ROUND #9

ROUND #10

University of North Georgia
Sophomore Level Mathematics Tournament
April 6, 2013

A cyclist travels downhill at a speed of 12 *mph*, on the level part of the road at 8 *mph*, and uphill at 6 *mph*. She takes 4 hours to travel from town M to town N. The return trip takes 4.5 hours. Find the distance between the two towns.