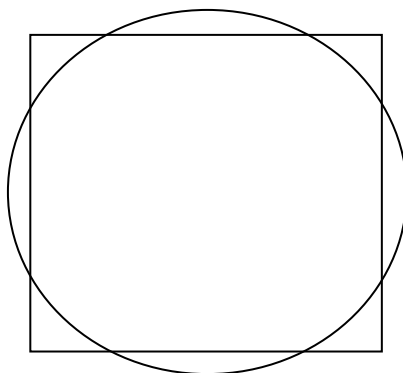


# ROUND #1

*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  $\pi$ .)



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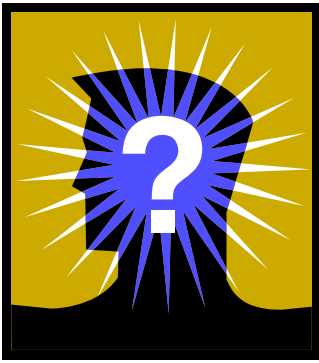


# **ROUND #3**

*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  $a$ .

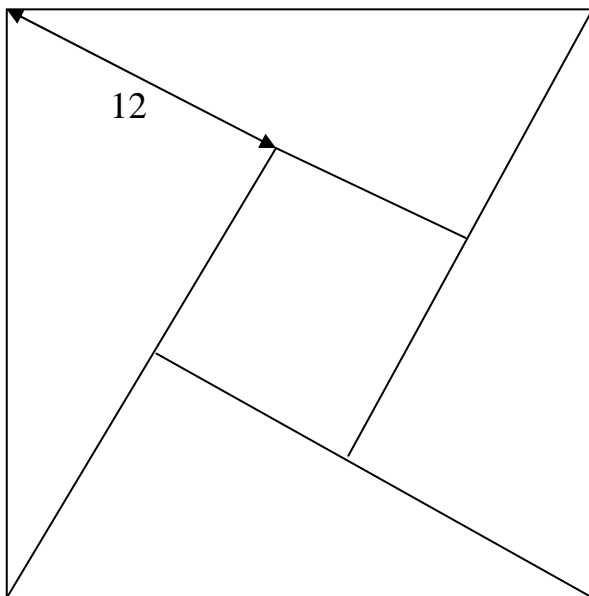
# **ROUND #5**

*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  $16\pi \text{ cm}^2$ . 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.