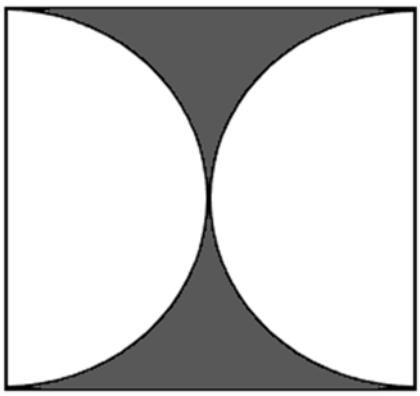
ROUND #1

University of North Georgia
Mathematics Tournament
April 6, 2019

The area of the black region is $(9 - 2.25\pi)$ square meters. A square circumscribes the two congruent semi-circles. What is the perimeter of the square?

Give an exact answer.

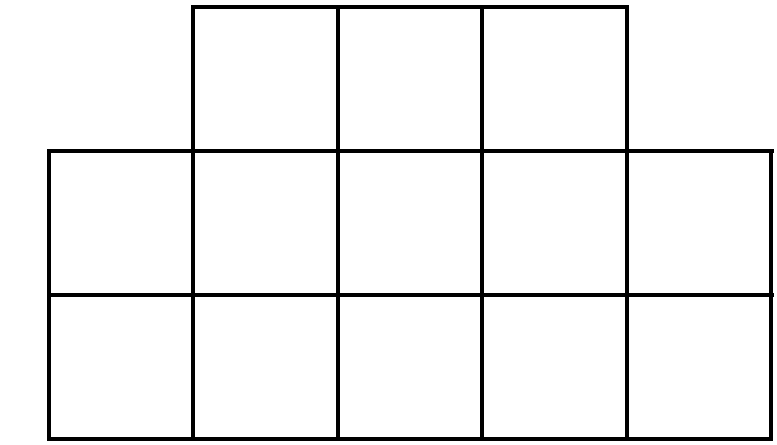


If you need this document in another format, please email minsu.kim@ung.edu or call 678-717- 3546.

ROUND #2

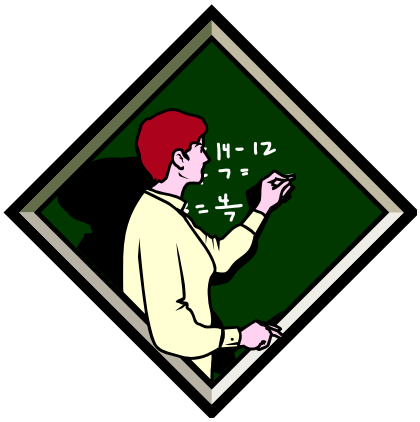
University of North Georgia
Mathematics Tournament
April 6, 2019

Farmer John purchased a plot of land surrounded by a fence. The former owner marked off 13 squares of equal size (100 ft. x 100 ft.) to subdivide the land, as shown below. John wants to divide the land into two plots of equal area. To divide the property, he wishes to build a single straight fence beginning at the far left corner (Point A on the diagram). What is the length of fence required to accomplish this? Give an approximate answer to one decimal place.



ROUND #3

University of North Georgia
Mathematics Tournament
April 6, 2019



The median of a set of 2020 consecutive even integers is 2021. What is the sum of these integers?

ROUND #4

University of North Georgia
Mathematics Tournament
April 6, 2019

Find the sum of all integer solutions to the inequality

$$\log_{10}(x+4)+\log_{10}(x-4) \le 2 .$$

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

ROUND #5

University of North Georgia
Mathematics Tournament
April 6, 2019

Bobby's pizza claims that it stocks enough topping ingredients so that you can order a pizza with a different combination of up to 3 ingredients every night for 5 consecutive years. What is the least number of topping ingredients that must be available to make this claim true?

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

ROUND #6

University of North Georgia
Mathematics Tournament
April 6, 2019

Of 200 families surveyed, each family owned either a car, a motorcycle, or both. Half of the 150 families who owned a car also owned a motorcycle. How many of the people surveyed owned a motorcycle?

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

ROUND #7

University of North Georgia
Mathematics Tournament
April 6, 2019

If $\left(\sqrt{7+4\sqrt{3}}\right)^{\cos x} + \left(\sqrt{7-4\sqrt{3}}\right)^{\cos x} = 4$, find all possible values of x.

Give your answer in radians.

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

ROUND #8

University of North Georgia
Mathematics Tournament
April 6, 2019

Zach eats ice cream in a right circular cone with an opening of radius 5 and a height of 10. If Zach's ice cream scoops are always perfectly spherical, find the radius of the largest scoop he can get such that at least half of the scoop is contained within the cone. Give an exact answer.

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

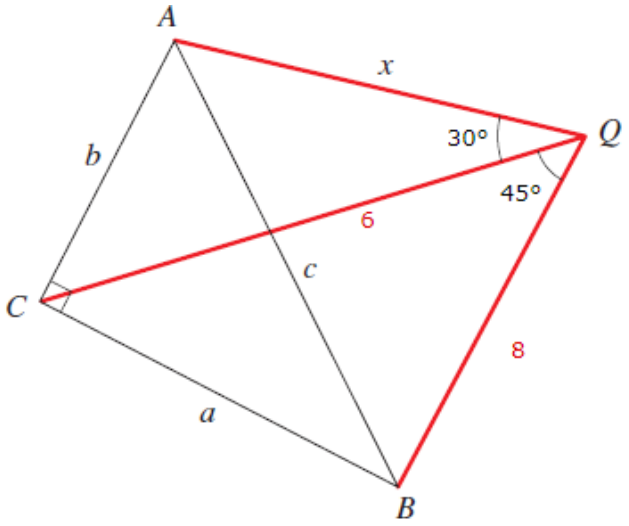
ROUND #9

University of North Georgia
Mathematics Tournament
April 6, 2019

In the figure, triangle ABC is a right triangle, $CQ = 6$, and $BQ = 8$.

Also, $\angle AQC = 30°$ and $\angle CQB = 45°$.

Find the length of AQ to the nearest hundredth.



ROUND #10

University of North Georgia
Mathematics Tournament
April 6, 2019

Suppose $1+\frac{1}{x}+\frac{1}{x^2}+\frac{1}{x^3}+\ldots=2019$ and $\frac{1}{y}+\frac{1}{y^2}+\frac{1}{y^3}+\ldots=2017$.

Then what is the ratio $\frac{y}{x}$? Leave your answer as a fraction.