Promoting the study of Geometry

mouctar.org and institut-delbol.com

March 27, 2017

CHALLENGE

Joining forces with institut-delbol.com, mouctar.org is publishing the first challenge.

This challenge has two sections and points are calculated based on the level of difficulty for each section and question.

Prize is announced in french only for now since the idea is to get the k-12 students involved in the solutions.

Solutions are to be sent to solutions@mouctar.org.

Another way is to use our ¨contact us¨option to attached the file.

All files have to be in pdf format to be considered for the challenge.

If you live in Conakry you can contact Mr. Barry for further details.

Some rules to avoid any conflict:

-If two or more students get the same number of points, the first one that was sent to us will be the winner.

-This is a zero tolerance challenge, meaning you have to get 100

-Closing date will be announced here and at institut-delbol.com,

-Results will be fully explained during video conferencing at a date that will be shown later.
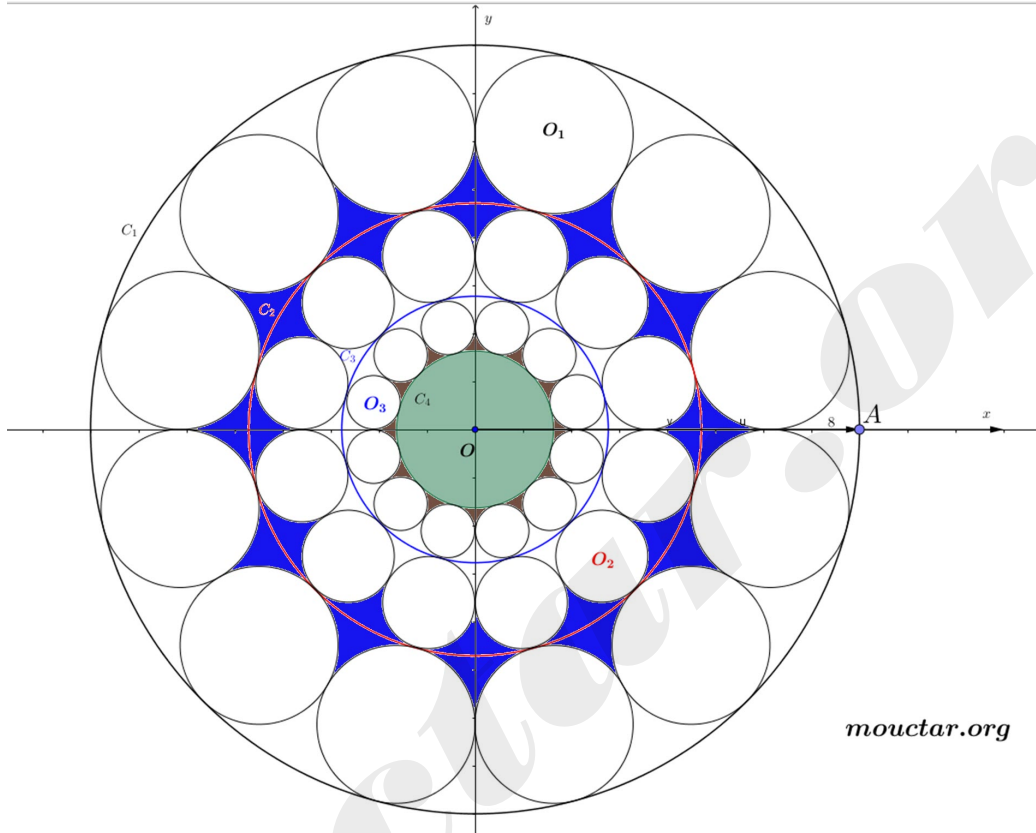
Good luck!

PROBLEM 1: CIRCLES IN ORBITS

Figure 1: Circles Study.

Distance OA is 8 meters. The O is the origin of the x and y axis. The circles are on an orbit. Looking at the figure above, the circle O_1 is on orbit 1, circle O_2 is on orbit 2 and circle O_3 is on orbit 3.

1. Find the radius of circle O_1 and write its equation. *(10 points)*

2. Find the radius of circle O_2 and write its equation. *(2 points)*

3. Find the radius of circle O_3 and write its equation. *(2 points)*

4. Find the radius of circle C_2 and write its equation. *(2 points)*

5. Find the radius of circle C_3 and write its equation. *(2 points)*

6. Find the radius of circle C_4 and write its equation. *(2 points)*

7. From the results above, find a relationship between the radius of a given circle and that circle's orbit number. Write down a function of the radius with the orbit number as a variable. *(20 points)*

8. What is the orbit number after which the radius is less than 0.2 millimeters.*(10 points)*

9. Find the value of the blue shaded area*(40 points)*

10. Find the value of the brown shaded area.*(10 points)*

   PS.All calculations will be done to the hundred thousandth.
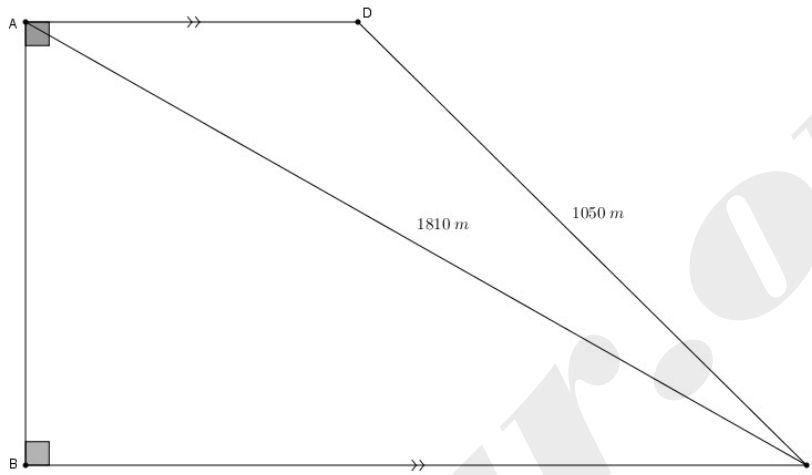
PROBLEM 2: TRAPEZOID

Figure 2: Trapezoid.

An agency is assigning the area bounded by figure $ABCD$ to a city population.

Each member will receive an equal area of a land plot.

Calculations have shown that out of the 5160 members of the population, 2000 will receive their plots from the area covered by triangle ADC The remaining people will be assigned plots from ABC, (See Figure Trapezoid).

DC=1050 m and AC=1810 m

1. Find the area of $ABCD$ *(30 points)*

2. Verify the area of ADC using the Heron's Formula *(10 points)*

3. What is the area, in square meters, assigned to each person? *(10 points)*

PS.All calculations will be done to the hundred thousandth.

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