

THEORETICAL PART: 4 points

PRACTICAL PART: 6 points

To pass the exam you must obtain, at least, 50% of points in each part.

THEORETICAL PART

- (0.5 points)** Justify if it is possible to build a concave polygon with 17 sides and, at least, 7 concave angles. If it is possible, draw an example.
 - (0.5 points)** Justify if it is possible to build a prism with 27 edges. If it is possible, draw an example.
- (1 point)** Give precise definitions and draw an example of: trapezoid, regular polyhedron, arc segment, angle, and altitude of an obtuse triangle.
- (1 point)** Design a didactical situation to carry out in a classroom of 3rd course of a Primary School to introduce the concept of diagonal of a polygon. What is the student's previous knowledge required to deal with this concept?
- (1 point)** Prove that when dividing a parallelogram by a diagonal, two equal triangles are obtained.

PRACTICAL PART

- (0.4 points)** Analyze the coherence of the data of the label of the container in the figure.
 - (0.6 points)** A cross motorbike spends 0.2 l of fuel each kilometer driving in a city, 0.15 l of fuel each kilometer when driving in a highway and 0.0028hl of fuel each kilometer when driving in a motocross track. Compute the total quantity of liters that are consumed on a tour of 10km driving on a city, 30km driving in a highway and 15km in a motorcross track.

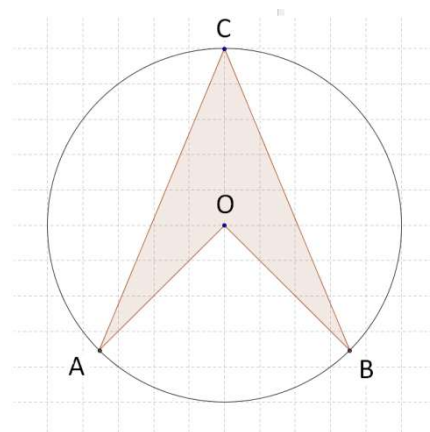


- (1 point)** Build a regular hexagon from an equilateral triangle using isometries (at least one symmetry, one rotation and one translation), you can use the original triangle and triangles obtained by isometries. Explain all the steps you follow to obtain the regular hexagon and show all the elements that define each isometry used.
- (1 point)** A scooter has the front wheel of 16 inches radius and the back wheel has a radius of 12 inches (remember that 1 inch = 2.54 cm). Compute the number of laps of the front wheel in a path of 1km long. Then, from this solution compute the number of laps of the back wheel in the path of 1km long.

- (1.5 points)** This solid is found in a park. The side of the regular hexagon measures 130cm, and the distance from the middle point of each side of the regular hexagon to the circumference is 20 cm. The width of the solid is 80 cm. Compute the area of metal sheet needed to build it and its interior volume.



- (1.5 points)** In the figure, the point O is the center of the circle, the angle $\widehat{AOB}$ is a right angle, and the segments $\overline{AC}$ and $\overline{CB}$ are equal. Compute the measure of the interior angles of the quadrilateral that appears in the figure. In addition, knowing that the radius of the circle is 5 cm and each arc segment has an area of 20.61 cm^2 , compute the area of the quadrilateral.



JUSTIFY YOUR ANSWERS IN ALL QUESTIONS.