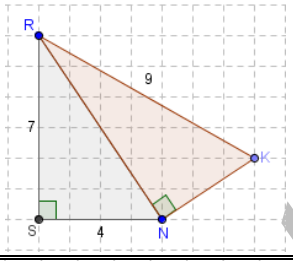
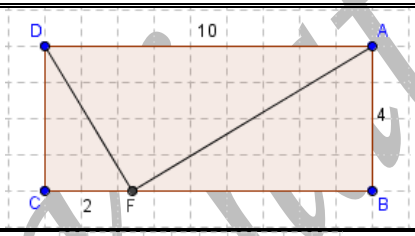
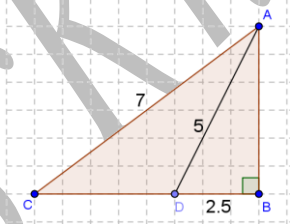
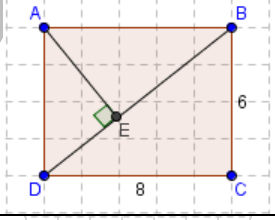
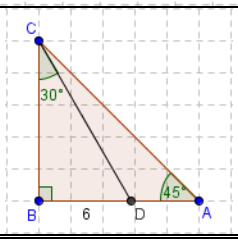
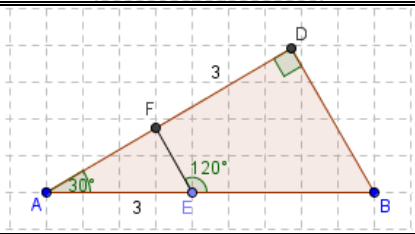
1- Work out the following problems, the unit of length is centimeter:

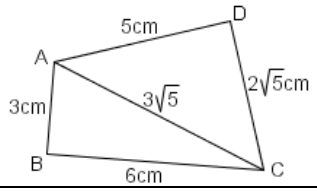
A- Compute the exact measure of *NK*, such that triangles *RNK* and *RSN* are right at *S* and *N* respectively.	
B- Prove that triangle *AFD* is right knowing that *ABCD* is a rectangle.	
C- 1) Find the length of side *CD*. 2) Deduce the area of ΔADC .	
D- 1) Determine length of side *DB*. 2) Find area of ΔABD. 3) Deduce the length of *AE*.	
E- Find the perimeter and area of: *i)* ΔBCD. *ii)* ΔABC. *iii)* ΔACD.	
F- Find the perimeter and the area of the trapezoid *BEFD*.	

2- Given the triangle ABC such that: $AB = \sqrt{7} + \sqrt{6}$ $BC = \sqrt{14} + 2\sqrt{3}$ *and* $AC = \dfrac{1}{\sqrt{7} - \sqrt{6}}$.

i. Rationalize the measure of side AC .

ii. Calculate: AB^2, BC^2 & AC^2. Deduce the nature of triangle ABC ?

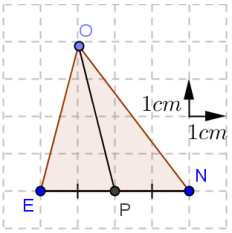
3- Indicate with justification the only correct answer that corresponds for each question.

No.	Problem	Expected answer		
		A	B	C
1.	In the coded figure below ,*ABCD* 	is a Parallelogram	is a Right trapezoid	The four points *A*, *B*, *C* and *D* belong to the same circle of diameter [*AC*].
2.	Sides $AB=2+\sqrt{3}$, $BC=\dfrac{1}{2-\sqrt{3}}$ & $AC=\left(1+\sqrt{3}\right)^2-\left(2+\sqrt{3}\right)$ form	A scalene triangle	An isosceles triangle of vertex *B*	An equilateral triangle.

4- Consider a circle (C) of center O and radius r = 4cm. A line (d) is drawn through O that intersect (C) at points A & B. Plot M the symmetric of O with respect to A, then trace (MT) the tangent to (C) at T.

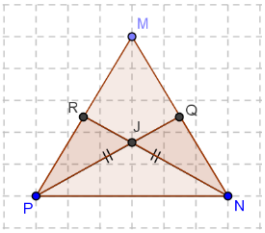
- ***a.*** Find the value of TA.
- ***b.*** What is the nature of triangle ATO?
- ***c.*** Deduce the measure of angle $T\hat{M}O=30^\circ$.
- ***d.*** What is the nature of triangle *MTO*?

5- Consider the adjacent figure.



- ***a.*** Device a method to find the exact measures of $[OP]$&$[OE]$.
- ***b.*** Recopy the figure to a ***real scale***. Compare $[OP]$&$[EN]$.
- ***c.*** Let *J* be the centroid of triangle *ONE* . Prove that *EJN* is right at *J*.

6- Consider in the adjacent figure the congruent medians $[PQ]$& $[NR]$.



- ***a.*** Reconstruct the figure.
- ***b.*** Prove that triangles *RJP* & *NJQ* are congruent.
- ***c.*** Deduce that triangle *MNP* is isosceles of vertex *M*.

7- Draw a parallelogram *ABCD*, so that $D\hat{A}B=120^\circ$.

- ***a.*** Trace $[DI)$ the internal bisector of $A\hat{D}C$.
- ***b.*** What is the nature of triangle *DAI*? Deduce that *AB=2AD*.
- ***c.*** Show that $D\hat{A}C=90^\circ$.

8- *ABC* is any triangle whose medians $[AM]$&$[BN]$ intersect at point *G*.

- ***a.*** Draw figure, produce points *D* & *E* such that *MD=MG* and *NE = GN*.
- ***b.*** Prove that quadrilaterals *BGCD* and *CGAE* are parallelograms.
- ***c.*** Show that *G* is the midpoint of both sides $[AD]$&$[BE]$.

9- The altitudes $[AH]$ and $[BK]$ of triangle *ABC* intersect at *O*.

- ***a.*** Plot *D* & *E* the respective midpoints of segments $[OA]$&$[OB]$.
- ***b.*** Prove that triangles *DKO* & *EHO* are isosceles, then deduce that both triangles are equal.

10- Consider a circle C (O; r) of two perpendicular diameters [AB] & [CD]. Let M be a point taken on the arc AC. The line (MB) cuts [CD] at I.

a. Show that quadrilateral $OIMA$ is inscribed in a circle C' of center O' to be determined.

b. Determine the radius of (C') if the measure of arc $AM = 60^o$.

11- Consider a circle (C_1) of center O, and diameter [AB], such that AB=12cm. let E be a point of the segment [OB] such that OE=2cm. (C_2) is the circle of diameter [EB] and center I. locate point M on (C_2) such that BM=2cm.

a. Draw a figure.

b. What is the relative position of circles (C_1) and (C_2)? Justify.

c. Show that EMB is a semi-equilateral triangle. Deduce the length of segment [EM].

d. The straight line (BM) intersects (C_1) at P.

i. Prove that (ME)is parallel to (AP).

ii. Compute BP

12- The dimensions of a rectangle are: $r = 7 + 2\sqrt{5}$ *and* $n = 3 + \sqrt{5}$.

a. Compute the expression: $r - n$.

b. Deduce which of the dimensions r *or* n represents the width of the rectangle.

c. Find the length of the rectangle's diagonal.

d. Calculate the area and the perimeter of the given rectangle.

Mastering problems		
Chapter	*Exercises*	*Pages*
CH-: Right Triangles	Ex:$1\left(1 \longrightarrow 4\right)$	239
	$3 \rightarrow 7$	240 & 241