ليسه دي زار **الشهادة المتوسطة** **التجربة الأولى لعام 2019 – 2020**

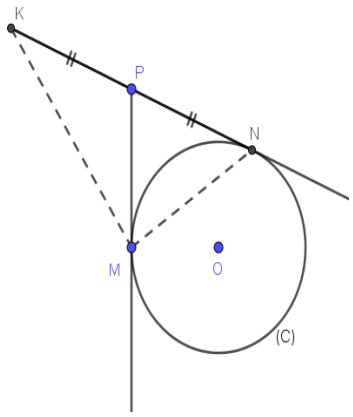
مسابقة في الرياضيات الإنكليزي المدّة : ساعتان الإسم : الرقم :

إرشادات عامة:

- يسمح بإستعمال ألة حاسبة غير قابلة للبرمجة
- يمكن الإجابة على ألمسائل بالترتيب االذي تريد
- يرجى الإجابة بخط واضح ومرتب
- العلامة القصوى من 20

Exercise I: (6½pts)

In the table below, only one among the proposed answers to each question is correct. Write down the number of each question and give, **with justification**, its correct answer.

No.	Questions	Answers		
		a	b	c
1.	(C) is a circle of center O and radius $\mathbf{OA} = \left(\frac{1-\sqrt{5}}{4}\right)^2 + \frac{\sqrt{5}}{8}$. If B is a point such that $\boldsymbol{OB} = \frac{\sqrt{45}-\sqrt{80}+2\sqrt{125}}{\sqrt{7}\times\sqrt{35}-7\sqrt{5}+3} \times \frac{1}{2\sqrt{5}}$, then B is located: **(2pts)**	In the interior part of (C)	On (C)	In the exterior part of (C)
2.	ABC is a triangle **right angled at A** such that: $\sin B\hat{C}A = 2\sin A\hat{B}C$, then: **(1¼pts)**	$BC^2 = 3AC^2$	$BC^2 = 5AC^2$	$BC = 3AC$
3.	In the adjacent figure: ✓ (**C**) is a circle of center **O**. ✓ (**PM**) and (**PN**) are two **tangents** drawn from an external point **P**, where **M** and **N** are points of **tangency**. ✓ **K** is the **symmetric** of **N** with respect to **P**. Then the nature of triangle **MNK** is  **(2pts)**	Right	Right Isosceles	Semi equilateral
4.	In triangle $\boldsymbol{ABC}$, If $\boldsymbol{M}$ & $\boldsymbol{I}$ are the respective **midpoints** of $[\boldsymbol{BC}]$& $[\boldsymbol{AC}]$, then $\overrightarrow{\boldsymbol{AB}} + \overrightarrow{\boldsymbol{AC}} + \overrightarrow{\boldsymbol{MA}} + \overrightarrow{\boldsymbol{MC}} =$ **(1¼pts)**	$2\overrightarrow{AI}$	$\overrightarrow{AB}$	$2\overrightarrow{AC}$

Exercise II:(6pts)

The following parts of the exercise are independent:

Part A:(4pts)

Given:

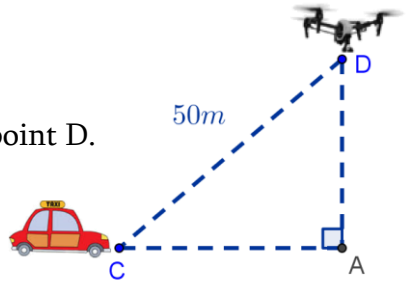
$$A=\left(\frac{1}{3}+\frac{1}{6}\right)^2+\left(\frac{1}{2^3}+\frac{3}{4}\times\frac{5}{2}\right),\quad B=\frac{0.02^2\times 16-4.8\times 10^{-3}}{\sqrt{5^2-3^2}},\quad C=\frac{1+\frac{1}{2}+\frac{1}{4}}{1-\frac{1}{2}-\frac{1}{4}}$$

$$D=2\sqrt{32}+\sqrt{50}-5\sqrt{18}+2\sqrt{8}\ \ \&\ \ E=\left(2\sqrt{3}-2\right)^2+2\left(5\sqrt{3}-8\right)$$

1) Show that $A=\left(\frac{3}{2}\right)^2$. (¾pt)
2) Write B in scientific notation and show that C is positive. (1½pts)
3) Write D in the form $a\sqrt{2}$ where a is an integer to be determine. (½pt)
4) Show that $E=2\sqrt{3}$. (¾pt)
5) Deduce that $D^2+E^2=\left(2\sqrt{5}\right)^2$. (½pt)

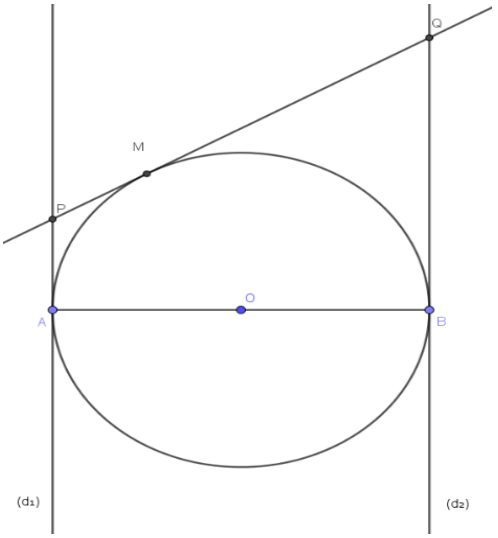
Part B:(2pts)

1) Simplify S= $\sqrt{1.3\overline{4}}\times\sqrt{10}+\frac{15(3-1)}{3}+1$. (1pt)
2) A car located at a point C is controlling a drone 50m away from it at point D. Find the height AD of the drone from ground if $A\widehat{C}D=S$. (1pt)



Exercise3: (7½pts)

In the adjacent figure we have:



- ✓ (C) is a circle of center O, diameter [AB] and radius $R=2cm$.
- ✓ (d_1) and (d_2) are two tangents to (C) respectively at A and B.
- ✓ M is a point of (C) such that $AM=2cm$.
- ✓ The tangent to (C) at M cuts (d_1) and (d_2) at P and Q respectively.

1) Reproduce the figure. (1pt)
2) What does (OP) represent to [MA]? Justify. (½pt)
3) Express PQ as function of PA and QB. (¾pt)
4) [MA] intersects [PO] at R and [MB] intersects [OQ] at S.
   a) Utilize tangent theorem to verify that $\widehat{POQ}$ is right angle and deduce that MROS is a rectangle. (1¼pts)
   b) Show that S is the midpoint of [MB]. (½pt)
5) [MO] intersect [RS] at I. Calculate RI. (½pt)
6) Let G be the centroid of triangle MAB. Prove that $\overrightarrow{MA}+\overrightarrow{MB}=6\overrightarrow{GO}$. (1pt)
7) Let K be the image of S by the translation vector $\overrightarrow{OM}$. Show that the points A, M and K are collinear. (¾pt)
8) a) What is the nature of the triangle MAB. (¾pt)
   b) Utilizing trigonometry in a right triangle to calculate SB. (½pt)