ليسه دي زار **الشهادة المتوسطة** **التجربة الثانية لعام 2018 – 2019**

مسابقة في الرياضيات فرنسي	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 1: (3¾pts)

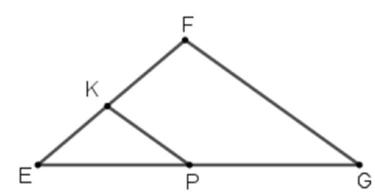
In the following table, **just one** of the proposed answers is correct. Indicate the number of the question and its corresponding answer **and justify.**

$N°$	*Questions*	*Answers* a	b	c
1	If the following table is a **proportionality table** , then $\boldsymbol{a} =$ (¾pt) $\begin{array}{|c|c|}\hline 2^n & 1 \\ \hline 2^n - 2^{n+1} & a \\ \hline\end{array}$	-2^{n+1}	1	-1
2	a and b are two non-zero numbers such that $\boldsymbol{a} \neq \boldsymbol{b}$. If $\boldsymbol{ab} = -\frac{8}{5}$ and $\boldsymbol{a} + \boldsymbol{b} = -\frac{6}{5}$, then $\frac{a^3b - ab^3}{a-b} =$ **(¾pt)**	$\frac{48}{25}$	$-\frac{14}{5}$	$-\frac{2}{5}$
3	Consider the two lines (d): $4y + 2mx = 1$ and (d'): $y = \frac{(n-1)}{2}x + 3$. If (d) and (d') are **parallel**, then $\boldsymbol{n} + \boldsymbol{m} =$ **(¾pt)**	$\frac{1}{2}$	1	-1
4	If $A(r-2; p+1)$ & $B(2p+3; r-3)$ are **symmetric** with respect to **origin** then, **(¾pt)**	$r=-3$ & $p=5$	$r=5$ & $p=-3$	$r=-1$ & $p=3$
5	If $y = 2x + 4s^2 - 49$ is a **linear function** and s is a any real number, then **(¾pt)**	$s = \frac{7}{2}$	$s = -\frac{7}{2}$	$s = \frac{7}{2}$ & $s = -\frac{7}{2}$

Exercise 2: (2¼pts)

(The unit of length is cm.)

In the adjacent figure we have:



- ✓ E, K and F are three collinear points.
- ✓ P is a point on $[EG]$ Such that : $\frac{EP}{EG} = \frac{\sqrt{2}}{3}$.
- ✓ $EF = \dfrac{2-\frac{2}{7}}{\frac{2}{7} - \frac{1}{2-\frac{3}{5}}} \times \left(-\frac{12}{9}\right)^{-1}$ and $EK = \frac{3\sqrt{2}}{\sqrt{2}+1} - \left(2-\sqrt{2}\right)^2$

1) Show that: $EF = 3$ and $EK = \sqrt{2}$. **(1½pts)**
2) Show that (KP) and (FG) are parallel. **(¾pt)**

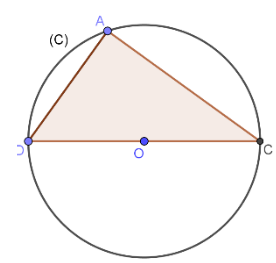
Exercise 3: (8½pts)

In the orthonormal system of axes ($x'Ox , y'Oy$) consider the points : $B(-3\,;0), C(-3\,;\,-4)$, $H(1;\,-2).\,Q(-1;4a^2-12)$ and the straight line $(r): my-2mx=x+m.$

1) Place the points B, C and H then find the slope of (r) in terms of m. $(m\neq 0)$. **(1pt)**
2) a) Show that the equation of (CH) is : $y=\frac{1}{2}x-\frac{5}{2}$. **(½pt)**
   b) Find the value of a if Q belongs to (CH) then specify which quadrant the point Q belongs to? **(1pt)**
   c) Calculate m such that thw two straight lines *(r)* and (d) are parallel. **(½pt)**
3) The straight line (CH) cuts $x'o\,x$ at E.
   a) Calculate the coordinates of E. **(½pt)**
   b) Verify that H is the midpoint of $[CE]$. **(½pt)**
   c) Determine the equation of (CB). **(¾pt)**
   d) Deduce the center and the diameter of (S) the circumscribed circle about the triangle CBE. **(½pt)**
4) Let (d) be the perpendicular bisector of $[CE]$.
   a) Write the equation of (d). **(¾pt)**
   b) Let F be the intersection point of (d) and (BC). Find the coordinates of F. **(¾pt)**
5) Let P be the symmetric of C with respect to O.
   a) ***Without calculating the coordinates of P***, show that (d) and (EP) are parallel. **(½pt)**
   b) Determine the equation of (EP) then deduce the relative position of (EP) with respect to(S). **(1pt)**

Exercise 4: (5½pts)

In the adjacent figure:



- (C) is a circle of center O and diameter $DC=5x-3$.
- A is a point on (C) such that $AD=x+3$.
- (The unit of length is cm and $x>1$)

1) Reproduce the figure. **(¼pt)**
2) a) Place the point B symmetric of D with respect to S the midpoint of $[AC]$. **(¼pt)**
   b) What is the nature of the quadrilateral $ABCD$? Justify. **(½pt)**
3) • $[DB]$ cuts (C) at I.
   • $[AI)$ cuts $[BC]$ and $[DC]$ at N and R respectively.
   a) If $NC=2cm$. Show that $\frac{IN}{IA}=\frac{x+1}{x+3}$. **(¾pt)**
   b) Verify that $x=3$ if $\frac{IB}{ID}=\frac{2}{3}$. **(½pt)**
   c) Calculate AD and CD. **(½pt)**
4) Deduce that $\widehat{ADC}=60°$ then calculate the measure of AC approximated to nearest 10^{-2} by excess. **(1pt)**
5) a) The tangent to (C) at A cuts $[CD)$ at K and the tangent to (C) at C cuts (AK) at F. **(¼pt)**
   b) Show that the three points O; S and F are collinear. **(¾pt)**
   c) Show that the points O; A; F and C belong to the circle whose center and diameter to be determine. **(¾pt)**

Good Work