Lycée Des Arts

Name / Nom: ……

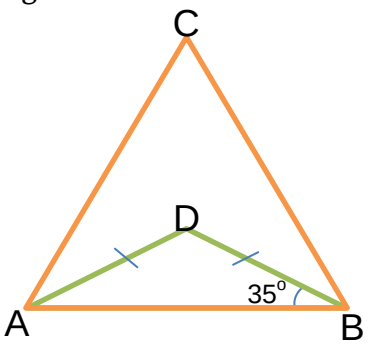
Class / Classe: *Gr8* Section: ……. Date: ……

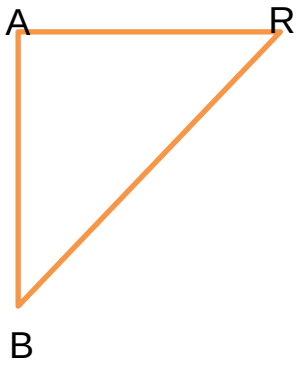
Exam in / Examen de: *Math* *Midterm*

يمنع استعمال الآلة الحاسبة

Exercise I : (14 pts)

In the table below, **One** of the proposed answers to each question is correct. Indicate it with **justification.**

№	Questions	Answers		
		A	B	C
1.	The equation : $x(x-5)=(x-5)^2$ is verified for : (1½pts)	A unique value of x	All values of x	No values of x
2.	If $A=\dfrac{2\frac{3}{4}+\frac{1}{5}}{\frac{3}{4}-\frac{1}{2}+\frac{7}{5}}$ and $B=\dfrac{1}{7}+2\times\dfrac{2}{5}+\dfrac{26}{35}$ then…… (3pts)	A < B	A > B	A = B
3.	In the adjacent figure we have : - $A\hat{B}D=35^o$ - D is the center of the inscribed circle about the triangle ABC. So $A\hat{C}B=$ (2½pts) 	40°	110°	55°
4.	ABC is a triangle such that : $BC=\dfrac{75^2+125^2}{85\times 25}cm$ N is the midpoint of [AB]. The parallel (d) to [BC] passing through N cuts $[AC]$ at D . so ND= ……... (2½pts)	10 cm	5 cm	3.5 cm

5.	-ABR is a triangle right at A. -T is a point on the semi-straight line [BR) (not on the segment [BR]). -(**d**) is the perpendicular to (BR) through T. (BA) and (AR) cut (**d**) at S and K respectively. So the straight lines (SR) and (BK) are…… (2pts) 	Intersecting	Parallel	Perpendicular
6.	If $A = \left(\frac{-2}{3}\right)^{-2} - \frac{1-\frac{1}{2^2}}{2+\frac{1}{2^2}}$ and $B = \frac{0.24\times1.8^2}{0.48\times0.36}$ So the scientific notation of $\frac{A}{B}\times 54$ is…… (2½pts)	2.3×10^{-1}	2.3×10	0.23×10^{2}

Exercise II : (13 pts)

Consider the expression: $P(x) = x^2 - m + 3\,(x-1)(x-2)$

1- What does $P(x)$ represent and for what values of x is it defined? **Justify**. (1- pt)

2- Determine the values of m for which $x=2$ is a root of $P(x)$. (1- pt)

3- From this part on, let $m=4$

a. Prove that $P(x)$ can be written in the form ax^2+bx+c, where a, b & c are integers to be determined. (1- pt)

b. Solve: $P(x)=2$. (¾pt)

c. Express $P(x)$ in form of product of 1st degree binomials. (1- pt)

4- Let $Q(x)=(3x+5)^2-(x-6)^2$

a. Prove that $Q(x)=(2x+11)(4x-1)$. (1- pt)

b. Deduce the roots of $Q(x)$. (¾pt)

5- Let $F(x)=\frac{P(x)}{Q(x)}$

a. What does $F(x)$ represent? Justify. (½pt)

b. Prove that $F(x)$ is defined for all natural numbers x (1 pt)

c. Simplify (F). (½pt)

d. Show that $F(x) = 1 - \frac{x+13}{2x+11}$.(1pt)

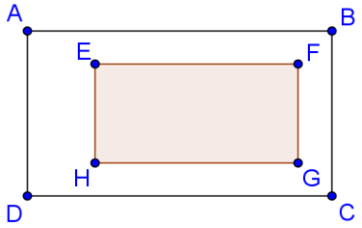
e. Show that $F\left(\frac{1}{2}\right)$ is the inverse of a number to be determined. (1pt)

f. Solve $F(x) = \frac{1}{4}$. (1pt)

6- Let *ABCD* & *EFGH* be two rectangles of respective areas $Q(x)$& $P(x)$.

a. Determine the area of the shaded part in product form . (¾pts)

b. Calculate its numerical value if $x = 0$. What can you deduce? (¾pt)



Exercice III : (13 pts)

Let (C) be a circle of center O, radius 4 cm and diameter [AB]. The perpendicular bisector of [OA] cuts (C)at M and N and cuts (AB)at E.

1) Draw a clear figure. (½pts)
2) i) Show that **OA=AM**. (¾pt)
   ii) Deduce the nature of triangle **AMO**. (¾pt)
3) i- Find a relation between the segments **MO** and **AB**. (½pt)
   ii- Deduce that the triangle **MAB** is a semi-equilateral triangle. (¾pt)
4) Determine the nature of quadrilateral **AMON**. . (¾pt)
5) Let I be the midpoint of [**BM**]
   a- Show that (**OI**) is parallel to (**MA**) . (¾pt)
   b- Deduce the exact measure of the segment **OI**. (¾pt)
6) Show that the points **N, O** and **I** are collinear. . (¾pt)
7) a - Show that the two triangles **OIB** and **MEO** are congruent. (1½ pt)
   b- Deduce that **BI=EN** (½ pt)
8) What does the point **O** represent for triangle **MBN**? (1 pt)
9) Deduce that (**MO**) cuts (**NB**) at its midpoint. (¾ pt)
10) Let K be the symmetric of **A** with respect to **N**, and **S** the orthogonal projection of **K** on (**AM**). (¼ pt)
    a. What is the nature of the quadrilateral *NOBK*? **justify** (1 pt)
    b. Deduce that the quadrilateral *MBKS* is a rectangle. (1 pt)
    c. Calculate the measure of [**MB**] so that the perimeter of *MBKS* is **15** *cm.* (¾ pt)

Good Work