Lycée Des Arts

Nom / Name: ……

Classe / Class: **Grade 8** *Section:*…… *Date:* ……

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

Exercise 1: (11 pts)

Answer by true or false and **justify**:

1) If A = $\frac{2\frac{3}{4}+\frac{1}{5}}{\frac{3}{4}-\frac{1}{2}+\frac{7}{5}}$ and B = $\frac{1}{7}+2\times\frac{2}{5}+\frac{26}{35}$, then A>B . (2 pts)

2) If E = $\frac{125^3+75^2}{125\times15^2}$ then E is not a decimal number. (1 ½ pts)

3) ABC is a triangle such that : AB = 6cm , B$\hat{A}$C = 65°, and A$\hat{B}$C = 45° .

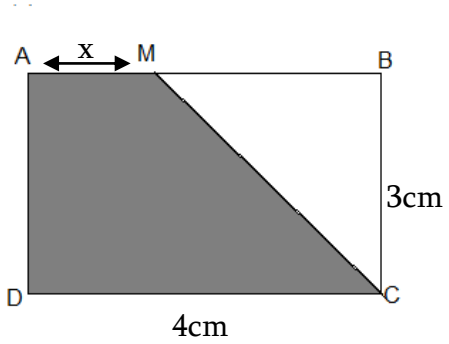
If M is a point of [BC] such that C$\hat{A}$M=20°, and I is the midpoint of [AB], then IA = IB = IM . (1 ½ pts)

4) If in a triangle, the centroid and the orthocenter are confounded, then this triangle is equilateral . (1pt)

5) If A= $\left(\frac{5}{3}\right)^x\times\left(\frac{3}{5}\right)^{x+1}$ where x is a natural number,

then A= 6×10^{-1}. (1 ½ pts)

6) ABCD is a rectangle with BC = 3cm, AB = 4cm and
M is a variable point of [AB] such that AM = x (0 < x < 4) .
The area of the shaded region AMCD is (12 - 3x) cm². (2 ½ pts)



7) (C) is a circle of center M and diameter [BC].
A is a point belonging to (C), then ABC is a right triangle at A . (1pt)

Exercise 2: (14 pts)

Consider the two polynomials :

f(x)=x(x-3)+2(3-x)

g(x)=x²-9+(2x-6)(x+2)-(x-3)²

Part A:

1) Develop, reduce and order g(x) ,then deduce its degree. (2 pts)

2) Solve the equation g(x)=2 x²+2. (1pt)

3) Verify that f(x)=(x-3)(x-2). (1pt)

4) a) Write g(x) in the form of a product of 3 factors. (1 ½ pts)

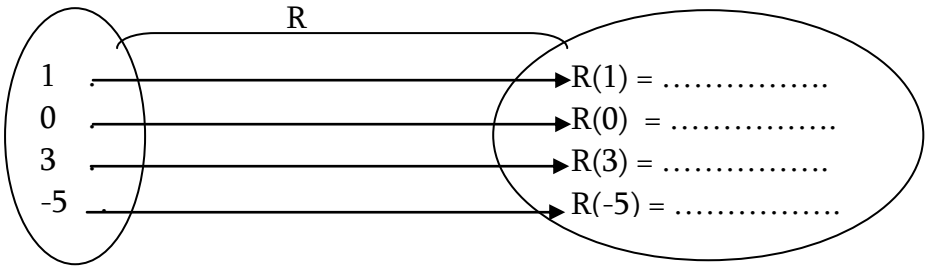
b) Explain the meaning of a root of a polynomial then deduce the roots of g(x) . (1 ½ pts)

Part B:

Let R(x) = $\frac{2f(x)}{g(x)}$

1) What does R(x) represent? Explain. (1 pt)

2) a) Complete the diagram below in order to make a hypothesis. (2½ pts)



b) Deduce the domain of definition of R(x). (1pt)

c) Use words or numbers from your own to write a complete statement containing: R(x), integers, defined, except. (1pt)

3) a) Simplify R(x). (½ pt)

b) Solve the equation R(x)=3 . (1pt)

Exercise 3: (15 pts)

Consider the triangle ABC such that: BC = 3cm, $AB = \frac{8^2 \times 40^{-1}}{2 \times 6^{-1}} + \frac{1}{5}$, and $AC = \frac{1}{5} + \frac{2^{42} + 5 \times 8^{14}}{10 \times 2^{39}}$

1) Show that triangle ABC is isosceles at A. (2½ pts)
2) -Knowing that AB = AC = 5 cm so the triangle ABC is isosceles at A.
   -Let (xy) be a straight line passing through A and parallel to (BC). Let E & F be the feet of the perpendiculars drawn from points B and C to straight line (xy) respectively.
   Draw a clear and coded figure at the center of your answer sheet. (1 ½ pts)
3) a) Determine the nature of quadrilateral BCFE.(1 ½ pts)
   b) Show that CAF and EBA are congruent triangles. (1 ½ pts)
   c) Deduce relative position of point A with respect to [EF]. (1pt)
4) Draw through point C a straight line parallel to (AB) that cuts (xy) at J, and from B, draw a straight line parallel to (AC) that cuts (xy) at H.
   a) Determine the nature of quadrilateral ABCJ. (1pt)
   b) If (CJ) & (BH) intersect at K, then show that BKCA is a rhombus. (1 ½ pts)
   c) Deduce that (AK) is perpendicular to (BC). (1 pt)
5) Let [BJ] & [HC] intersect at G and let N & R be respective centers of the parallelograms ACBH & ABCJ.
   a) Prove that G is the centroid of triangle ABC. (1½ pts)
   b) Calculate the length of [EN]. (1pt)
   c) Deduce that EN = FR. (1pt)

Good Work