الشهادة المتوسطة التجربة الثالثة لعام 2006 - 2007

مسابقة في الرياضيات الانكليزية المدّة : ساعتين الإسم : الرقم :

1st exercise: (2 ½ pts)

1. Consider the following polynomials:

   $A(x) = (2x - 1)^2 - (3x + 4)(6x - 3) + 20x^2 - 5$

   $B(x) = 144x^2 + 120x + 25$

   a. Factorize A(x)

   b. Solve the equation B(x) = 24A(x)

2. Given $F(x) = (3x + 2)^2 - (3x - 2)^2$

   a. Expand F(x)

   b. Deduce the value of $(30002)^2 - (29998)^2$ show all work (without the use of the calculator)

2nd exercise: (2pts)

Given :

$$A = \sqrt{\frac{5+2\sqrt{5}}{5-2\sqrt{5}}} \quad ; \quad B = \sqrt{6}\sqrt{1-\frac{\sqrt{5}}{3}} \quad ; \quad C = \left(\sqrt{5}-1\right)^2$$

a. Verify that $B^2 = C$

b. Expand $\left(2+\sqrt{5}\right)^2$

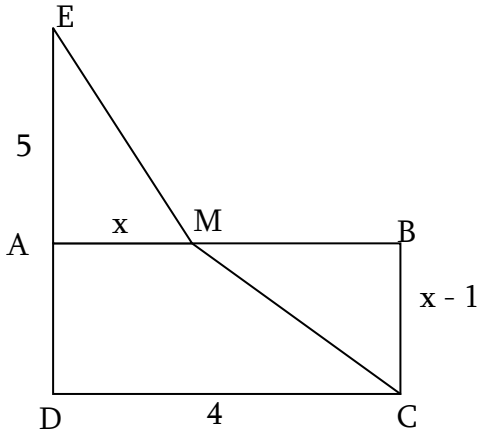
c. Write A in a form which contain one radical

d. Use the preceding result to prove that A – B is a natural number

3rd exercise: (2 ½ pts)

ABCD is a rectangle, M is a point on [AB] such that AM = x. where x is a real number such that $0 < x < 4$.

E is a point on (AD) such that AE = 5cm.



1. Calculate the area of triangle BMC interns of x.
2. Calculate the area of the trapezoid AMCD interns of x.
3. Calculate x if the area of the trapezoid exceeds the area of the triangle by $x^2 - 2x - 9$
4. In this part suppose that BC = 3 and AM = x.
   Find the value of x for E, M and C are collinear.

4th exercise: (3pts)

1. Solve the following system : $\begin{cases} x + y = 50 & (1) \\ 16x + 19y = 905 & (2) \end{cases}$
2. To buy a book and a CD. We need 50$, The shop make a discount 20% on the CD and 5% on the book, their price would be 45,25$.

   Calculate the price of the CD and the book before discount.
3. The shop sold 32 CD and book for 639$ after discount, calculate the number of CDs and the number of books that were sold.

5th exercise: (5pts)

A. Consider a circle C(0;6), [AB] is a diameter of (C). Let P be a point on the circle such that BP = 9,6cm, and N be a point on [OB] such that BN = 4cm, Let M be the feet of the perpendicular drawn form N to (BP).

1. Draw the figure
2. Calculate AP, MP and MN
3. Let E be the mid point of [BN]. Prove that (ME) is parallel to (PO)

B. (PO) cut (C) in K and (PN) cut (BK) in I.

a. Find the ratio $\frac{BN}{BO}$ then deduce that what does N represent with respect to triangle PBK.

b. Prove that I is the midpoint of [BK].

c. Suppose in this part P varies on the circle while N is fixed. Find the locus of M.

6th exercise: (5pts)

1. In an orthonormal system of axis x'oy and y'oy, plot the points A(2;1); B(-1;4) and C(4;3)
2. Find the equation of (AB) and (AC). Then deduce that triangle ABC is right at A.
3. Find the equation of (u) perpendicular (AC) and passing through I the midpoint of [AC]
4. Verify by calculation that (u) cuts [BC] in its midpoint E.
5. Let (D) : y = x + 2,

   Show that E belong (D)

   Plot (D) and deduce that (D) parallel (AC)
6. Prove geometrically that: $\frac{BF}{BA} = \frac{CI}{CA}$