عدد المسائل: ثلاث

ملاحظة: - يسمح باستعمال آلة حاسبة غير قابلة للبرمجة او اختزان المعلومات او رسم البيانات.
- يستطيع المرشّح الإجابة بالترتيب الذي يناسبه (دون الالتزام بترتيب المسائل الواردة في المسابقة).

مسابقة في مادة الرياضيات

المدة: ساعة

(باللغة الانكليزية)

الاسم: .....

الرقم: .....

I- (5 points)

Rami bought 3 shirts and 2 ties and paid 130 000 LL.

Bassem bought 2 shirts and 3 ties and paid 120 000 LL.

1) **Calculate** the price of one shirt and the price of one tie.
2) A store offers a 20% discount on the price of each shirt.
   a) **Calculate** the new price of one shirt after this discount?
   b) Rami bought 5 shirts and n ties. **Calculate n** knowing that he paid 200 000 LL.

II- (5 points)

A survey is done on 100 persons (40 men and 60 women) about their usage of three kinds of soaps. Soap A, Soap B and Soap C. The results are shown in the following table:

	Soap A	**Soap B**	**Soap C**	**Total**
Men	20	5	15	**40**
Women	15	20	25	**60**
Total	**35**	**25**	**40**	**100**

One person is randomly selected from this population:

Consider the following events :

A : « The person uses **soap A** »

B : « The person uses **soap B** »

M : « The person is a **man** ».

1) **Calculate** the following probabilities:

   $P(M)$; $P(A \cap M)$; $P(A / M)$

   $P(B \cup M)$; $P(\overline{B})$

2) **Knowing that** the person **doesn't use soap A**. **Calculate** the probability that this person **is a man**.

III- (10 points)

Consider the function f defined over $]-\infty;1[$ as:

$$f(x)=\frac{4x^2-x+1}{x-1}$$

Denote by (C) the representative curve of f in an orthonormal system $(O;\vec{i},\vec{j})$.

1) a) **Determine** $\lim\limits_{\substack{x\to 1\\ x<1}} f(x)$

   b) **Deduce** an <u>equation of an asymptote</u> (d) to (C).

2) a) f(x) can be written in the form $f(x)=4x+3+\frac{m}{x-1}$.

   Calculate the real number m.

   b) **Determine** $\lim\limits_{x\to-\infty} f(x)$.

   c) **Show that** the line (D): y = 4x + 3 is an <u>oblique asymptote</u> to (C).

3) **Prove that**, for all x in $]-\infty;1[$: $f'(x)=\frac{4x(x-2)}{(x-1)^2}$.

4) **Show that f** is <u>increasing</u> **over** $]-\infty;0[$ and it's decreasing over $]0;+\infty[$

5) **Write** an <u>equation of the tangent (T)</u> to (C) at the point with <u>abscissa -1</u>.

6) **Solve** the equation: f(x) = 4x.