

ملاحظة: - يسمح باستعمال آلة حاسبة غير قابلة للبرمجة او اختزان المعلومات او رسم البيانات.
- يستطيع المرشح 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:

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

$$P(B \cup M) \quad ; \quad P(\bar{B})$$

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** $\lim_{\substack{x \rightarrow 1 \\ x < 1}} f(x)$

b) **Deduce** an equation of an asymptote (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** $\lim_{x \rightarrow -\infty} f(x)$.

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

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

4) **Copy and complete** the following table of variations of f .

x	$-\infty$	0	1
$f'(x)$	○		
$f(x)$			

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

6) **Draw** (d), (D) and the curve (C).

7) **Solve graphically**: $f(x) \leq -1$.

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