عدد المسائل: ثلاث	مسابقة في مادة الرياضيات المدة: ساعة	الاسم: الرقم:

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).

I- (5 points)

Rami and Bassem are two clients of the same store.

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

While 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) During a sale period, the store offers a 20% discount on the price of each shirt.
   a) What is the price of one shirt after this discount?
   b) Rami went to the store during the sale period and bought 5 shirts and n ties. Calculate n knowing that he paid 200 000 LL.

II- (5 points)

A survey is done on a population formed of 40 men and 60 women about their usage of three kinds of soaps A, B and C. The results are shown in the following table:

	Soap A	**Soap B**	**Soap C**
Men	20	5	15
Women	15	20	25

A person is randomly selected from this population and interviewed :

Consider the following events :

A : « The interviewed person uses soap A »

B : « The interviewed person uses soap B »

M : « The interviewed person is a man ».

1) Calculate the following probabilities:

   $P(M)$; $P(A \cap M)$; $P(A / M)$; $P(B \cup M)$ and $P(\overline{B})$.

2) The interviewed 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 $\left(O;\vec{i},\vec{j}\right)$.

1) Determine $\lim\limits_{\substack{x\to 1\\ x<1}} f(x)$ and deduce an equation of an asymptote (d) to (C).

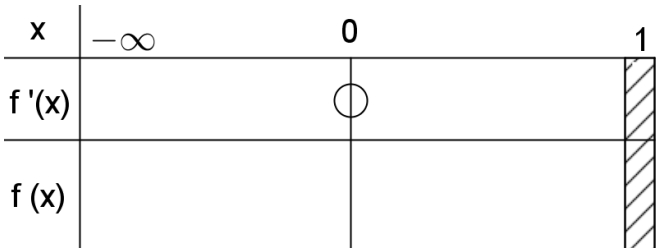
2) a) f(x) can be written in the form $f(x)=4x+3+\frac{m}{x-1}$. Calculate the real number m.

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

   c) Show that the line (D): y = 4x + 3 is an 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.



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

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

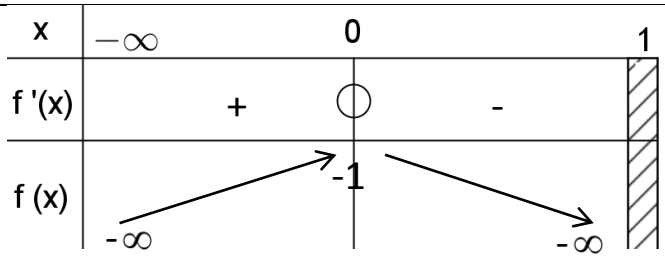
7) Solve graphically: $f(x)\leq -1$.

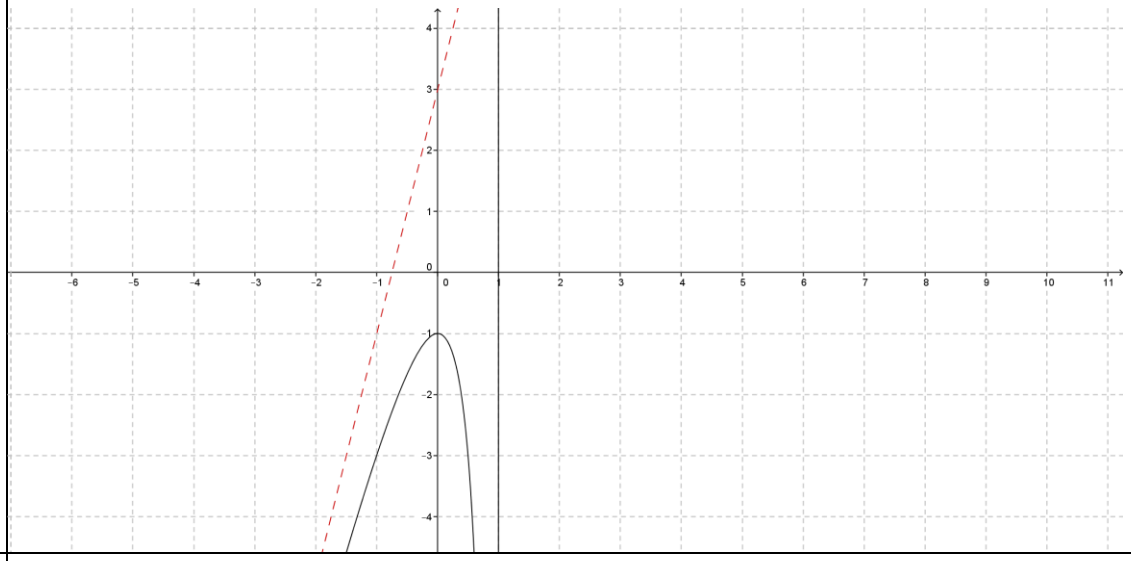
8) Solve the equation: f(x) = 4x.

عدد المسائل: ثلاث **أسس التصحيح مادة الرياضيات(English)**

QI	Answer Key	Note
1	the price of a shirt is x = 30000 L.L the price of a tie y = 20000 L.L	**2**
2a	The price of a shirt after the sold is 3000(1- 0.2) = 24000 L.L	$\mathbf{1\frac{1}{2}}$
2b	5(24000) + 20000 n = 20000 then n = 4	$\mathbf{1\frac{1}{2}}$

QII	Answer Key	Note
1	$P(H) = \frac{40}{100} = 0.4$; $P(A \cap H) = 0.2$; $P(A/H) = \frac{20}{40} = 0.5$ $P(B \cup H) = \frac{15+20+25+5}{100} = 0.65$ and $P(\bar{B}) = 0.75$	**4**
2	$P(H/\bar{A}) = \frac{20}{65}$	**1**

QIII	Answer Key	Note
1a	$\lim\limits_{\substack{x\to 1\\ x<1}} f(x) = -\infty$ (d) : x = 1	**1**
2a	$f(x) = 4x + 3 + \frac{m}{x-1} = \frac{4x^2 - x + 1}{x-1}$ then -3+ m = 1 therefore m = 4	**1**
2b	$\lim\limits_{x\to-\infty} f(x) = -\infty$	$\mathbf{1/2}$
2c	$\lim\limits_{x\to-\infty} [f(x) - y_d] = 0$	$\mathbf{1/2}$
3	$f'(x) = \frac{4x(x-2)}{(x-1)^2}$	**1**
4		**1 ½**
5	f(-1) = -3 and f'(-1) = 3 the equation of the tangent (T) : y = 3x	**1**

6		$1\frac{1}{2}$
7	$x \in]-\infty\ ;1[$	**1**
8	$f(x)=4x=\dfrac{4x^2-x+1}{x-1}$ $x=-\dfrac{1}{3}$	**1**