وزارة التربية والتعليم العالي المديرية العامة للتربية دائرة الامتحانات	امتحانات الشهادة الثانوية العامة فرع الآداب والإنسانيات	دورة سنة ٢٠٠٦ العادية
عدد المسائل : ثلاث	مسابقة في مادة الرياضيات المدة: ساعة واحدة	الاسم: الرقم:

ملاحظة : يسمح باستعمال آلة حاسبة غير قابلة للبرمجة او اختزان المعلومات او رسم البيانات
يستطيع المرشح الاجابة بالترتيب الذي يناسبه (دون الالتزام بترتيب المسائل الوارد في المسابقة)

I– (5 points)

The 100 students of the third secondary classes, in a certain school, are divided into 4 sections as shown in the following table:

	LS	SE	GS	LH
Number of boys	18	18	14	2
Number of girls	22	12	6	8

A student is chosen at random from the students of these third secondary classes.
Consider the following events :

B : « the chosen student is a boy »
G : « the chosen student is a girl »
L : « the chosen student is in LH ».

1) Calculate the probability of each of the following four events:
B, L, (G/L) and $(G \cap L)$.

2) Knowing that the chosen student is a boy, what is the probability that he is a student in the SE section?

3) What is the probability of choosing a boy from the SE section?

II – (4points)

The owner of a restaurant wants to buy 10 tables and 50 chairs having a total price of 1 500 000 LL.
After getting a discount of 30% on the price of a table and 20% on that of a chair, the total price becomes 1 150 000 LL.
What was the initial price, before the discount, of a table and that of a chair ?

III– **(11 points)**

The table below is an incomplete table of variations of the function f that is expressed by $f(x)=\dfrac{x^2-x+b}{x+a}$ (a and b are real numbers).

x	$-\infty$		1		3		5		$+\infty$
f '(x)		+	0	−	‖	−	0	+	
f (x)		↗	1	↘	‖	↘		↗	

Designate by (C) the representative curve of f in an orthonormal system.

1) What is the domain of definition of f ?

2) Verify that a = –3 and b = –2.

In all what follows, take $f(x)=\dfrac{x^2-x-2}{x-3}$.

3) a- Calculate: $\lim\limits_{x\to+\infty} f(x)$ and $\lim\limits_{x\to-\infty} f(x)$.

b- Prove that the line (d) of equation y = x+2 is an asymptote of the curve (C).

c- Verify that the line (D) of equation x = 3 is an asymptote of the curve (C).

4) a- Set up the table of variations of f.

b- Determine the abscissas of the points of intersection of (C) with the axis of abscissas.

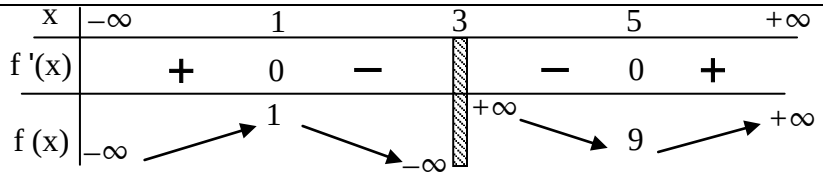
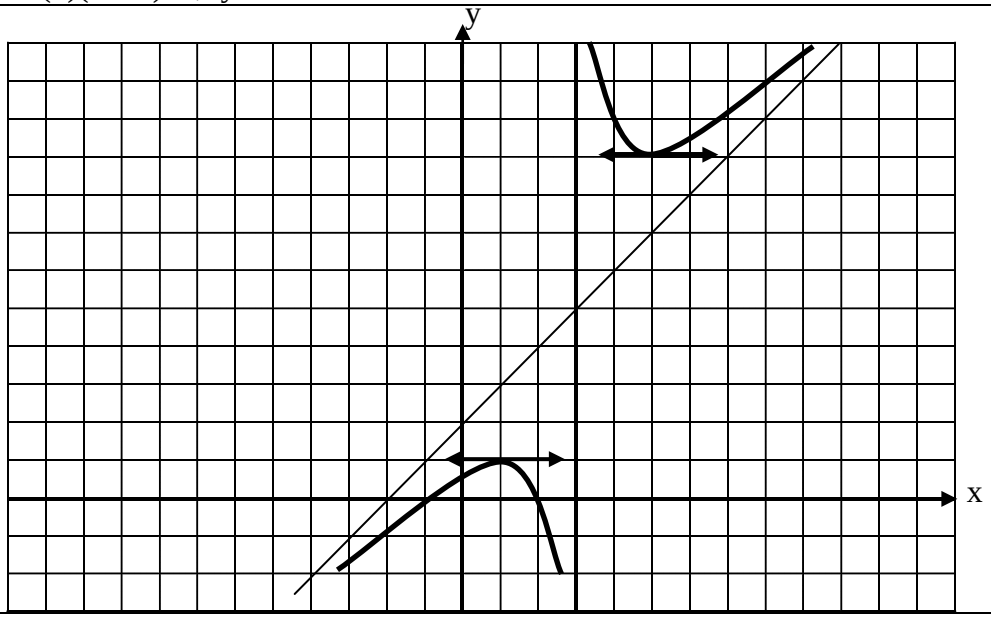
5) a- Show that $f'(x)=\dfrac{(x-1)(x-5)}{(x-3)^2}$.

b- Write an equation of the tangent to (C) at the point of abscissa 0.

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

7) Solve graphically the inequality f(x) > 2.

MATHEMATIQUES LH — FIRST SESSION 2006

☞I	Answers	N
1	P(B) = 52 /100 = 0.52 P(L) = 10/100 = 0.1 P(G/L) = 8 /10 = 0.8 P(G ∩ L) = 8/100 = 0.08	2 ½
2	P(ES/B) = 18 / 52 = 0.346	1 ½
3	P(B ∩ ES) = 18/100 = 0.18	1
☞II		
	Let x be the price of a table and let y be that of a chair before the sold. After the sold : the price a table becomes $x - 0.3x = 0.7x$ the price a chair becomes $y - 0.2y = 0.8\,y$ We get the system : $\begin{cases} 10x + 50y = 1500000 \\ 10(0{,}7x) + 50(0{,}8y) = 1150000 \end{cases}$; x = 50 000 and y = 20 000 Before the sold the price of a table was 50 000LL and that of a chair was 20 000LL.	4
☞III		
1	Regarding the table of variations $D_f =]-\infty ; 3[\cup] 3 ; +\infty [$.	½
2	f ids not defined for x = 3 then x + a = 0(for x =3), hence a = – 3. f(1) = 1 so b/(–2) = 1 and b = – 2.	1
3.a	$\lim\limits_{x\to-\infty} f(x) = \lim\limits_{x\to-\infty} \frac{x^2}{x} = \lim\limits_{x\to-\infty} x = -\infty$ and $\lim\limits_{x\to+\infty} f(x) = \lim\limits_{x\to+\infty} \frac{x^2}{x} = \lim\limits_{x\to+\infty} x = +\infty$	1
3.b	$\lim\limits_{x\to+\infty} [f(x)-(x+2)] = \lim\limits_{x\to+\infty} \frac{4}{x-3} = 0$ et $\lim\limits_{x\to-\infty} [f(x)-(x+2)] = \lim\limits_{x\to-\infty} \frac{4}{x-3} = 0$ The line of equation y = x + 2 is an asymptote to (C).	1
3.c	$\lim\limits_{\substack{x\to3\\x>3}} f(x) = \frac{4}{0^+} = +\infty$ and $\lim\limits_{\substack{x\to3\\x<3}} f(x) = \frac{4}{0^-} = -\infty$.	1
4.a		1
4.b	f(x) = 0 for $x^2 - x - 2 = 0$, so x = – 1 or x = – 2.	1
5.a	$f'(x) = [(2x-1)(x-3) - (x^2 - x + 2)]/(x-3)^2$ $= (x^2-6x+5)/(x-3)^2 = (x-1)(x+5)/(x-3)^2$	1
5.b	y – f(0) = f'(0)(x – 0) ; y = 5/9 x + 2/3 .	1
6		1 ½
7	f(x) > 2 , (C) is above the line of equation y = 2 , then x > 3.	1