وزارة التربية والتعليم العالي
المديرية العامة للتربية
دائرة الامتحانات

امتحانات الشهادة الثانوية العامة
فرع الآداب والإنسانيات

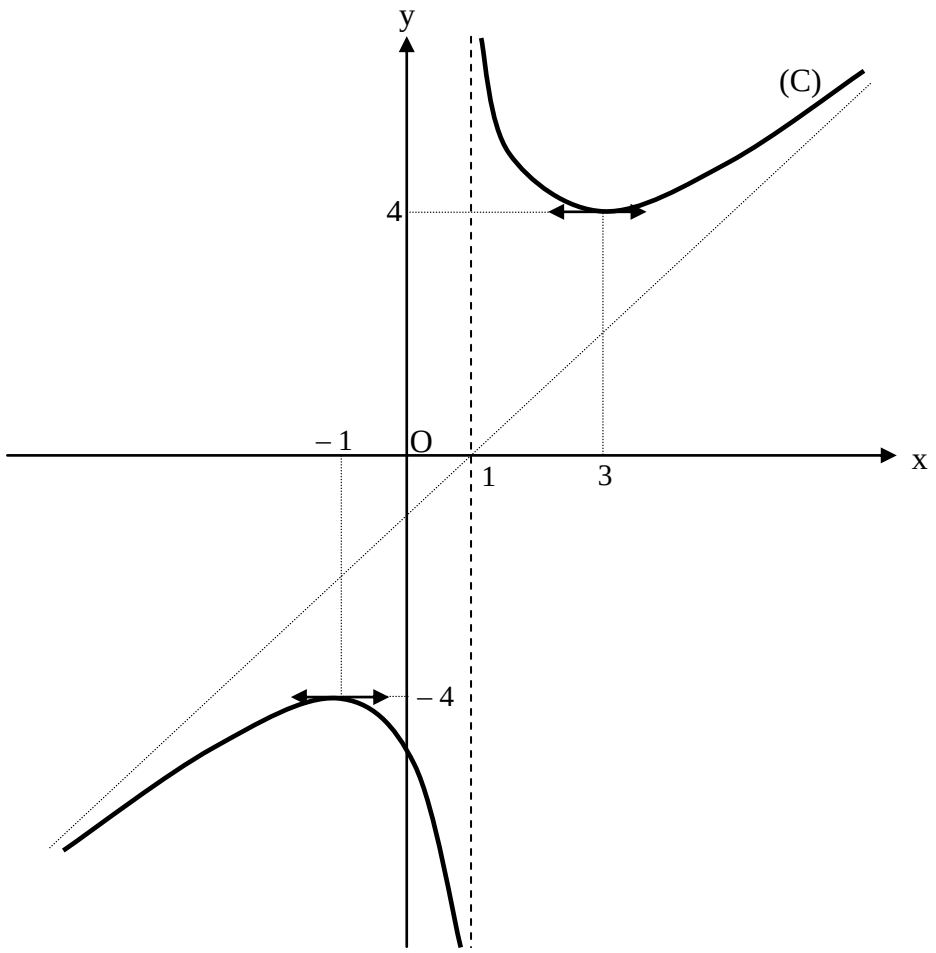
دورة سنة ٢٠٠٤ الاستثنائية

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

ملاحظة: يسمح باستعمال آلة حاسبة غير قابلة للبرمجة أو اختزان المعلومات أو رسم البيانات.
يستطيع المرشح الإجابة بالترتيب الذي يناسبه (دون الإلتزام بترتيب المسائل الواردة في المسابقة).

I-(10 points)

The curve (C), drawn in the orthonormal system below, is the representative curve of a function f .



1) Determine $\lim\limits_{\substack{x\to 1\\ x<1}} f(x)$, $\lim\limits_{\substack{x\to 1\\ x>1}} f(x)$, $\lim\limits_{x\to -\infty} f(x)$ and $\lim\limits_{x\to +\infty} f(x)$.

2) Set up the table of variations of f.

3) What is the number of solutions of the equation f(x) = – 5? Justify your answer.

4) Solve the inequality f(x) > 0 .

5) Copy and fill in the blanks using either one of the following symbols: = ; < ; > .
f '(-2) …….0 .
f '(-1) ……0 .
f '(0) ……..0 .
f '(3)…….. 0 .

6) **In this part,** let $f(x) = x - 1 + \frac{4}{x-1}$.

a- Prove that the line (d) of equation $y = x - 1$ is an asymptote of the curve (C).

b- Write an equation of the line that is tangent to (C) at the point E of abscissa 2.

II-(5 points)

Consider the following propositions:

p : Beirut is a capital.

q : Beirut is overpopulated.

1) Write each of the following propositions in a symbolic language:

a : Beirut is overpopulated and is not a capital.

b : Beirut is not a capital and is not overpopulated.

c : It is not true that Beirut is an overpopulated capital.

d : If Beirut is a capital then it is overpopulated .

e : If Beirut is not overpopulated then it is not a capital.

2) Among the 5 propositions mentioned in the first part, indicate two propositions that are equivalent.

III-(5 points)

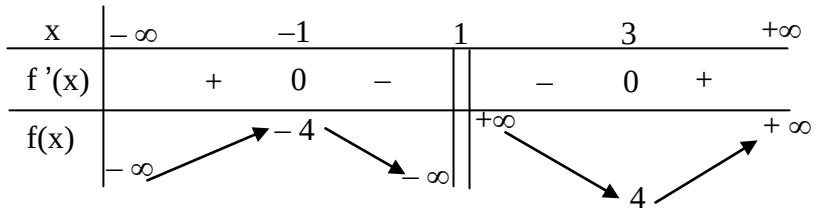
Jamil has a capital of 20 000 000 LL. He deposits **half** of his capital in bank A at an **annual interest rate** of 8% compounded **quarterly**, and **the other half** in bank B at an **annual interest rate** of 7.5% compounded **monthly**.

1) Determine the amount compounded in Jamil's account in bank A after 5 years.

2) Determine the amount compounded in Jamil's account in bank B after 5 years.

3) What is the amount of interests gained by his capital during these five years?

LH session 2004			MATH	2nd
Questions			Answers	M
I	1	plic	$\lim_{\substack{x\to 1\\ x<1}} f(x) = -\infty$; $\lim_{\substack{x\to 1\\ x>1}} f(x) = +\infty$; $\lim_{x\to -\infty} f(x) = -\infty$ and $\lim_{x\to +\infty} f(x) = +\infty$	2

	2			1 ½
	3		The line of equation y = - 5 cuts (C) at two points , then f(x) = - 5 has two solutions.	1
	4		f(x) > 0 corresponds to the part of (C) that is above the axis of abscissas, then x> 1	1
	5		From the table of variations(or graphically) , f '(–2)>0 , f '(–1) = 0 , f '(0) < 0 and f '(3) = 0.	2
	6-a-		$\lim_{x\to-\infty}[f(x)-(x-1)]=\lim_{x\to-\infty}\frac{4}{x-1}=0$ and $\lim_{x\to+\infty}[f(x)-(x-1)]=\lim_{x\to+\infty}\frac{4}{x-1}=0$ Hence (d) is asymptote of (C).	1
	6-b-		$f'(x)=1-\frac{4}{(x-1)^2}$, f(2) = 5 , f '(2) = – 3 Equation of the tangent : y = (x –2)f '(2) + f(2) = –3x + 11	1 ½
II	1		a : $q\wedge(\neg p)$ b : $(\neg p)\wedge(\neg q)$ [**OR** : $\neg(p\vee q)$] c : $\neg(p\wedge q)$ [**OR** : $(\neg p)\vee(\neg q)$] d : $p\Rightarrow q$ e : $(\neg q)\Rightarrow(\neg p)$.	4
	2		The propositions d and e are equivalent.	1
III	1		$C_A = 10\,000\,000(1+\frac{0.08}{4})^{20} = 14{,}859{,}474$ LL	2
	2		$C_B = 10\,000\,000(1+\frac{0.075}{12})^{60} = 14{,}532{,}944$ LL	2
	3		$I = I_A + I_B = C_A + C_B - 20\,000\,000 = 9{,}392{,}418$ LL	1