وزارة التربية والتعليم العالي **المديرية العامة للتربية** **دائرة الامتحانات**	**الشهادة الثانوية العامة** **فرع: الآداب والانسانيات**	**دورة العام ٢٠١٥ الاستثنائيّة** **الخميس ٢٠ آب ٢٠١٥**
عدد المسائل: ثلاث	**مسابقة في مادة الرياضيات** **المدة: ساعة واحدة**	**الاسم:** **الرقم:**

ارشادات عامة : - 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)

In a certain store, 1 table and 6 chairs cost 2 700 000 LL, while 2 tables and 8 chairs, of the same type, cost 4 600 000 LL.

1) a- Write a system of two equations modeling the above text.

   b- Solve this system, then determine the price of a chair and that of a table.

2) After that, this store offered a 10% discount on the price of a chair and 5% discount on the price of a table. Rami wants to buy 4 chairs and two tables during the discount period.

   Calculate the amount that should be paid by Rami.

II- (5 points)

There are 200 members in a certain sportive club.

These members are interested to practice Football, Basketball, both or none.

A member is selected randomly from this club.

Consider the following events:
F : «the member practices Football »
B : «the member practices Basketball ».

1) Complete the following table.

	F	$\overline{F}$	Total
B		56	140
$\overline{B}$	39		
Total			**200**

2) Calculate the probability P(B) and show that $P(B \cap F) = \frac{21}{50}$.

3) Calculate the probability that the member does not practice football but practices basketball.

4) Knowing that the member does not practice basketball, calculate the probability that he practices football.

III- (10 points)

Consider the function f defined over $]-\infty;-1[\cup]-1;+\infty[$ by $f(x)=x-2+\dfrac{1}{x+1}$,

and denote by (C) its representative curve in an orthonormal system $\left(O;\vec{i},\vec{j}\right)$.

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

b- Deduce an equation of an asymptote (D) to (C).

2) a- Determine $\lim\limits_{x\to -\infty} f(x)$ and $\lim\limits_{x\to +\infty} f(x)$.

b- Prove that the straight line (d) with equation $y = x - 2$ is an oblique asymptote to (C).

3) Prove that the point $I(-1;-3)$ is a center of symmetry of (C).

4) The representative curve (L) of f ', the derivative of f, is shown in the adjacent system.

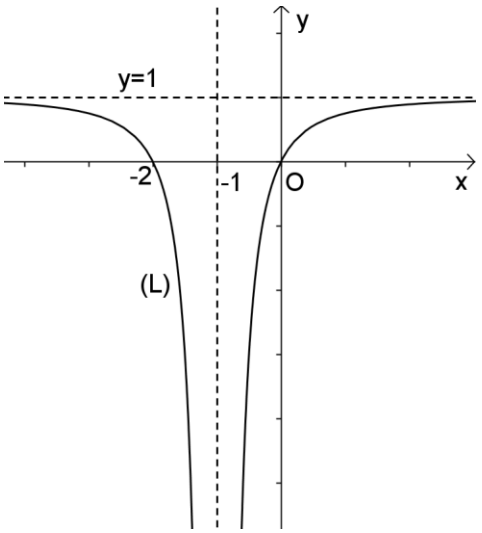
Use this graph to:

a- Determine $f'(-2)$ and $f'(0)$.

b- Solve $f'(x)<0$.

c- Set up the table of variations of f.

d- Write an equation of the tangent to (C) at its point with abscissa -2.



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

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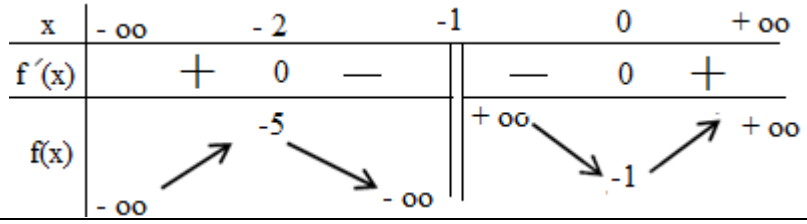
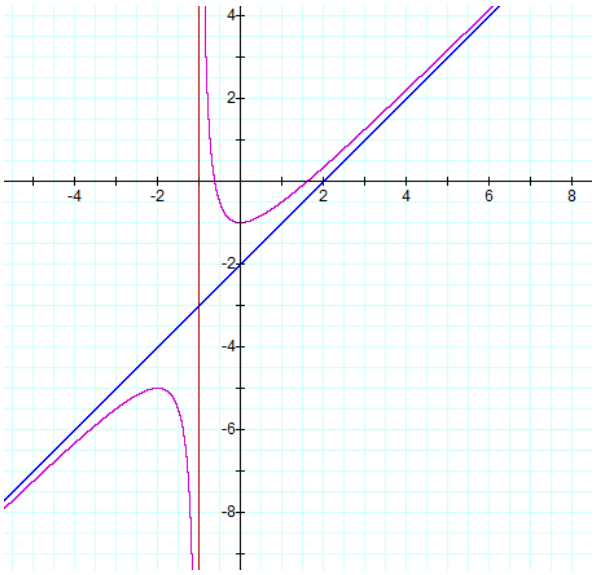
QI	Answers	M
1	Let x be the price of a table and y that of a chair. The system is : $\begin{cases} x+6y=2\ 700\ 000 \\ 2x+8y=4\ 600\ 000 \end{cases}$.	1.5
1	$x=1500000;\ y=200000$ price of table is 1 500 000 LL and that of a chair is 200 000 LL.	1.5
2	After discount: The price of a table becomes 0.95×1 500 000 = 1 425 000 LL The price of a chair becomes 0.90×200 000 = 180 000 LL Thus Rami will pay : (4×180 000) + (2×1 425 000) = 3 570 000 LL.	2

QII	Answers	M
1		1
2	$P(B)=\frac{140}{200}=\frac{7}{10}=0.7$; $P(B\cap F)=\frac{84}{200}=\frac{21}{50}$.	1.5
3	$P(\overline{F}\cap B)=\frac{56}{200}=\frac{7}{25}=0.28$	1
4	$P\left(F/\overline{B}\right)=\frac{P(F\cap\overline{B})}{P(\overline{B})}=\frac{39}{60}=\frac{13}{20}=0.65$	1.5

	F	$\overline{F}$	Total
B	**84**	56	140
$\overline{B}$	39	**21**	**60**
Total	**123**	**77**	**200**

QIII	Answers	M
1a	$\lim\limits_{x\to -1^-} f(x) = -\infty$; and $\lim\limits_{x\to -1^+} f(x) = +\infty$.	1
1b	The line with equation x = –1 is an asymptote to (C).	0.5
2a	$\lim\limits_{x\to -\infty} f(x) = -\infty$; $\lim\limits_{x\to +\infty} f(x) = +\infty$.	1
2b	$\lim\limits_{x\to -\infty}\left[f(x)-(x-2)\right] = \lim\limits_{x\to -\infty} \dfrac{1}{x+2} = 0$ and $\lim\limits_{x\to +\infty}\left[f(x)-(x-2)\right] = \lim\limits_{x\to +\infty} \dfrac{1}{x+2} = 0$. The line with equation y = x–2 is an asymptote to (C) at $+\infty$ and $-\infty$.	1
3	$f(2a-x)+f(x) = f(2\times(-1)-x)+f(x) = -6 = 2\times(-3) = 2b$	1
4a	$f'(-2) = 0$ and $f'(0) = 0$	1
4b	$f'(x) < 0$ for $x \in]-2;-1[\cup]-1;0[$	1
4c		1
4d	y = –5 is an equation of the tangent to (C) at its point with abscissa -2.	1
5		1.5