وزارة التربية والتعليم العالي	امتحانات الشهادة الثانوية العامة	الدورة العادية للعام ٢٠٠٨
المديرية العامة للتربية	الفرع : آداب و إنسانيات	
دائرة الامتحانات		

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

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

I- (5 points)

A clothing store has a stock of 4400 shirts and 2600 caps.
They are stored in packages of two types A and B.
In each package of type A, there are 110 shirts and 100 caps.
In each package of type B, there are 220 shirts and 100 caps.

1) Calculate the number of packages of type A and the number of packages of type B.

2) A merchant buys all of these packages at the price of 1 100 000 LL for each package of type A,
and 1 300 000 LL for each package of type B.
He decides to sell the cap and the shirt at the price of 5 500 LL each.
Determine the profit to be achieved by the merchant upon selling the whole stock.

3) What is the percentage of the profit relative to the purchase price?

II- (5 points)

The advertising department in a T.V. station produced an advertisement for a new game-show.
The marketing department in this station conducted a survey on a population of 500 persons concerning the efficacy of this advertisement.

1) Copy and complete the following table:

Number of persons who	Watched the show	Did not watch the show	Total
Saw the advertisement	200		
Did not see the advertisement		160	
Total		240	500

We interview a person chosen at random from this population.

2) Consider the following events:
  A: « The interviewed person watched the show ».
  B: « The interviewed person saw the advertisement ».
 a- Determine the probabilities p(A), p(B), p(A ∩ B) and p(A∪B).
 b- Determine p(A/ B), p($\overline{A}$/B) and p($\overline{A}$ /$\overline{B}$).

3) Determine the probability of the event:
  "The interviewed person did not watch the show **or** did not see the advertisement".

III- (10 points)

The curve (C) shown below is the representative curve of a function f defined over $]-\infty \; ; 1 \; [\; \cup \;] \; 1 \; ; + \infty[$ in an orthonormal system.
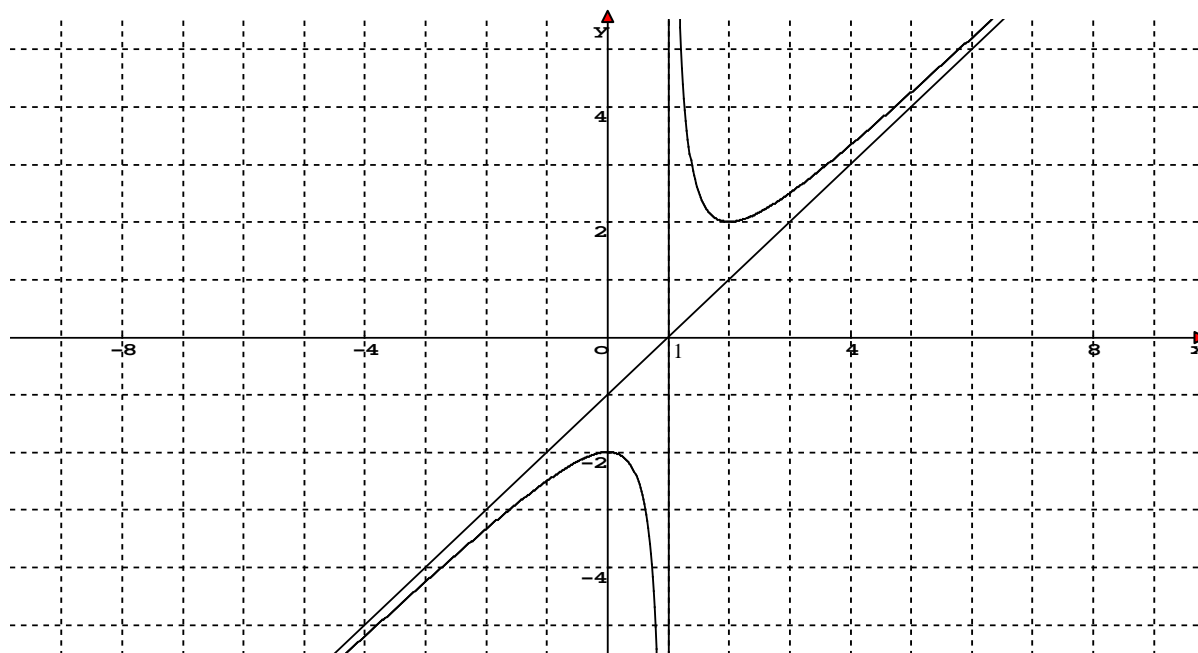
1) Determine f (2) and f (0).

2) Set up the table of variations of f.

3) Compare, with justification, f(3) and f(5).

4) For which values of x is $f(x) > 0$?

5) What is the sign of $f'(-1)$?

6) What are the equations of the asymptotes of (C)?

7) Suppose that $f(x) = ax + b + \dfrac{c}{x-1}$. Calculate a, b and c.

8) Solve the equation $f(x) = 2x - 2$.

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QI	Answer	Mark
1	Let x be the number of type A packages and y be the number of type B packages**.** $$\begin{cases} 110x + 220y = 4400 \\ 100x + 100y = 2600 \end{cases}.$$ $x = 12$; $y = 14.$	2
2	·The purchase price of all the packages is: $(12 \times 1\ 100\ 000) + (14 \times 1\ 300\ 000) = 31\ 400\ 000\text{LL}.$ ·The selling price of all the packages is : $7\ 000 \times 5\ 500 = 38\ 500\ 000\text{LL}.$ · The profit achieved is: $38\ 500\ 000 - 31\ 400\ 000 = 7\ 100\ 000\text{LL}.$	2
3	$\dfrac{7\ 100\ 000}{31\ 400\ 000} \times 100 = 22.6\%$	1

QII	Answer	Mark
1	<table><tr><th>Number of persons who</th><th>Watched the show</th><th>Didn't watch the show</th><th>Total</th></tr><tr><td>Saw the advertisement</td><td>200</td><td>80</td><td>280</td></tr><tr><td>Didn't see the advertisement</td><td>60</td><td>160</td><td>220</td></tr><tr><td>Total</td><td>260</td><td>240</td><td>500</td></tr></table>	1
2a	· $p(A) = \dfrac{260}{500} = \dfrac{13}{25}$ · $p(B) = \dfrac{280}{500} = \dfrac{14}{25}$ · $p(A \cap B) = \dfrac{200}{500} = \dfrac{2}{5}$ · $p(A \cup B) = p(A) + p(B) - p(A \cap B) = \dfrac{13}{25} + \dfrac{14}{25} - \dfrac{2}{5} = \dfrac{17}{25}$	2
2b	· $p(A/B) = \dfrac{200}{280} = \dfrac{5}{7}$ · $p(\overline{A}/B) = \dfrac{80}{280} = \dfrac{2}{7}$ · $p(\overline{A}/\overline{B}) = \dfrac{160}{220} = \dfrac{8}{11}$	1
3	$p(\overline{A} \cap \overline{B}) = \dfrac{160}{500} = \dfrac{8}{25}$; $p(\overline{A}) = 1 - \dfrac{13}{25} = \dfrac{12}{25}$; $p(\overline{B}) = 1 - \dfrac{14}{25} = \dfrac{11}{25}$ $p(\overline{A} \cup \overline{B}) = p(\overline{A}) + p(\overline{B}) - p(\overline{A} \cap \overline{B}) = \dfrac{12}{25} + \dfrac{11}{25} - \dfrac{8}{25} = \dfrac{3}{5}$ OR: $p\left(\overline{A} \cup \overline{B}\right) = p\left(\overline{A \cap B}\right) = 1 - \dfrac{2}{5} = \dfrac{3}{5}.$	1

Q III	Answer	Mark
1	f (2) = 2 ; f (0) = -2.	0.5
2	The table of variations is: 	1.5
3	3 and 5 are in] –1 ; + ∞[where the function f is strictly increasing, so f(3) < f(5).	1
4	f(x) > 0 for x > 1 since the branch corresponding to (C) is above x'Ox.	1
5	f '(–1) > 0. (f is strictly increasing on] – ∞ ; 0[ ).	1
6	- An equation of the vertical asymptote is : x = 1. - An equation of the oblique asymptote is : y = a x + b ; This asymptote passes through the point A(1 ; 0) so 0=a+b and it passes through the point B(0 ;-1) so -1 = b, consequently a=1. Hence, an equation of this asymptote is : y = x -1.	1.5
7	$f(x) = ax + b + \dfrac{c}{x-1}$. Since y = x – 1 is an asymptote to (C) then $f(x) = x - 1 + \dfrac{c}{x-1}$. (C) passes through the point (0 ; – 2) so $- 2 = -1 - c$ therefore c = 1 . Thus a =1, b = –1 and c = 1.	2
8	f(x) = 2x – 2 has two solutions x = 0 or x = 2 (Could be solved graphically or algebraically).	1.5