وزارة التربية والتعليم العالي	امتحانات الشهادة الثانوية العامة	دورة العـام ٢٠١٦ العاديّة
المديرية العامة للتربية	فرع: الآداب والإنسانيات	الاثنين ١٣ حزيران ٢٠١٦
دائرة الامتحانات الرسمية		

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

ملاحظة: ـ يسمح باستعمال آلة حاسبة غير قابلة للبرمجة او اختزان المعلومات او رسم البيانات.

ـ يستطيع المرشّح الإجابة بالترتيب الذي يناسبه (دون الالتزام بترتيب المسائل الواردة في المسابقة).

I- (5 points)

1) Solve the following system: $\begin{cases} x + y = 20 \\ 30x + 25y = 560 \end{cases}$

2) Fadi bought a box of 20 bottles of juice.

   The price of this box is 56 000 LL. The box contains pineapple bottles for

   3 000 LL each and orange bottles for 2 500 LL each.

   a- How many bottles of each type did Fadi buy ? Justify.

   b- If the price of each bottle of pineapple juice is subject to 20% discount, and

   that of the orange bottle remains the same. What is then the price of one box?

II- (5 points)

The following table represents the distribution of 80 employees of a certain

factory according to their service years.

	Less than 10 years in service	Between 10 and 20 years in service	More than 20 years in service
Women	10	8	12
Men	14	16	20

1) One employee of this factory is randomly interviewed.

   Consider the following events :

   S: « The interviewed employee has less than 10 years in service ».
   M: « The interviewed employee is a man ».

   a- Calculate the following probabilities: P (S), P (M), P (M∩S) and P (M/$\bar{S}$).

   b- The interviewed employee is a man. What is the probability that he has less than

   10 years in service?

2) Two employees are interviewed one after another.

   Consider the event :

   A: « the two interviewed employees have more than 20 years in service ».

Show that P(A) = $\dfrac{62}{395}$.

III- (10 points)

The following table is the table of variations of a function f defined over $\mathbb{R}-\{1\}$.

Denote by (C) the representative curve of f in an orthonormal system $(O\,;\vec{i}\,,\vec{j}\,)$.

x	$-\infty$		0		1		2		$+\infty$
f '(x)		$+$	0	$-$	$\|\|$	$-$	0	$+$	
f (x)	$-\infty$	$\nearrow$	0	$\searrow$ $-\infty$ $\|\|$ $+\infty$		$\searrow$	4	$\nearrow$	$+\infty$

A– For each of the following statements, answer True or False and justify.

1) If $x<0$, then $f(x)>0$.

2) $f\left(\dfrac{1}{2}\right)<f\left(\dfrac{3}{4}\right)$.

3) $f\,'(-0.5)>f\,'(0.5)$.

4) The x-axis is tangent to the curve (C) at the origin O.

B- In what follows, let $f(x)=x+1+\dfrac{1}{x-1}$

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

2) Write an equation of (T), the tangent to the curve (C) at its point A with abscissa $x=-2$.

3) Verify that the line (d) with equation $y=x+1$ is an asymptote to (C).

4) Draw (d) and (C) .

5) Show that the equation $f(x)=-2$ has two distinct solutions.

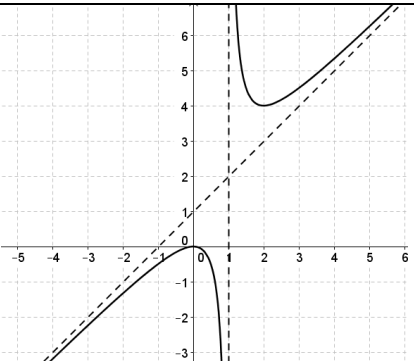| مشروع معيار التصحيح	مسابقة في مادة الرياضيات المدة: ساعة	

I- (5 points)

Q	Correction	Grade
1	$x = 12$; $y = 8$	1.5
2-a	let x be the number of pineapple bottles and y the number of orange bottles : $\begin{cases} x + y = 20 \\ 3000x + 2500y = 56000 \end{cases}$ $\quad x = 12$; $y = 8$ 12 pineapple bottles and 8 orange bottles .	2
2-b	the price of one pineapple bottle is : $3000 - 3000 \times \dfrac{20}{100} = 2400$ LL the price of one orange bottle is : 2500 LL the price of one box is : $12 \times 2400 + 8 \times 2500 = 48800$ LL	1.5

II- (5 points)

Q	Correction	Grade
1-a	$P(M) = \dfrac{24}{80} = \dfrac{3}{10}$; $P(H) = \dfrac{50}{80} = \dfrac{5}{8}$; $P(H \cap M) = \dfrac{14}{80} = \dfrac{7}{40}$; $P(H / \overline{M}) = \dfrac{36}{56} = \dfrac{9}{14}$	2
1-b	$P(M / H) = \dfrac{14}{50} = \dfrac{7}{25}$	1.5
2	$P(A) = \dfrac{32}{80} \times \dfrac{31}{79} = \dfrac{62}{395}$	1.5

III- (10 points)

Q	Correction	Grade
A-1	False because if $x < 0$, then $f(x) \in]-\infty; 0[$	1
A-2	False because on $[0;1[$ f is strictly decreasing $f\left(\dfrac{1}{2}\right) > f\left(\dfrac{3}{4}\right)$	1
A-3	True because for $x < 0$ we have $f'(x) > 0$ and for $x > 0$ we have $f'(x) < 0$	1
A-4	True because $f(0) = 0$ and $f'(0) = 0$	1
B-1	$f'(x) = \dfrac{x^2 - 2x}{(x-1)^2}$	1
B-2	$y = f'(-2)(x+2) + f(-2) = \dfrac{8}{9}x + \dfrac{4}{9}$	1
B-3	$\lim\limits_{x \to +\infty} [f(x) - (x+1)] = \lim\limits_{x \to +\infty} \dfrac{1}{x-1} = 0$ similarly for $x \to -\infty$.	1
B-4		1.5
B-5	the line of equation y = - 2 intersect the curve (c) in two distinct points or by calculation.	1.5