وزارة التربية والتعليم العالي المديرية العامة للتربية دائرة الامتحانات الرسميّة	امتحانات الشهادة الثانوية العامة فرع: الآداب والانسانيات	دورة العام ٢٠١٦ الاستثنائية السبت ٦ آب ٢٠١٦
عدد المسائل: ثلاث	مسابقة في مادة الرياضيات المدة: ساعة	الاسم: الرقم:

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

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

I- (5 points)

1) Solve the following system : $\begin{cases} 2x + y = 80 \\ 1.7x + 2.7y = 105 \end{cases}$

2) The price of two shirts and one belt is 80 thousands LL.
After a discount of 15% on the price of one shirt and a discount of 10% on the price of a belt, the price of two shirts and three belts becomes 105 thousands LL.

a- Show that this text is modeled by the system given in the 1st question.

b- Find the original price of one shirt and the original price of a belt.

c- Nadim bought four shirts and three belts after the discount.
How much did he pay ?

II- (5 points)

The following table represents the number of boys and girls, in the LH and SE sections in a certain secondary school:

	LH	SE	Total
Boys	x		
Girls		y	26
Total	20		

The number of boys in SE section is twice that of boys in LH.
The number of girls in LH is 4 more than the number of boys in this section.

1) Determine x and y.

In what follows suppose that: x = 8 and y = 14.

2) Copy and complete the table above.

3) One student is randomly selected from these two sections.

a- Calculate the probability that this student is a boy in LH section.

b- Knowing that the student is a boy, calculate the probability that he is in SE section.

c- Calculate the probability that the student is a girl or in LH section.

III- (10 points)

Let f be the function defined on $]-\infty;1[\cup]1;+\infty[$ as $f(x)=-x+2-\dfrac{1}{x-1}$.

(C) is the graph of f in an orthonormal system.

1) Determine $\lim\limits_{\substack{x\to 1\\ x<1}} f(x)$ and $\lim\limits_{\substack{x\to 1\\ x>1}} f(x)$ and deduce an asymptote (Δ) to (C).

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

3) Show that the line (d) with equation y = – x + 2 is an asymptote to (C).

4) Determine the coordinates of point I the intersection of the asymptotes of (C).

5) Show that $f'(x)=\dfrac{x(2-x)}{(x-1)^2}$ and set up the table of variations of f.

6) Draw (Δ), (d) and (C).

7) a- Prove that y = –2x + 3 is an equation of the line passing through I and joining the two vertices of (C).

b- Solve the inequality: f(x) < – 2x + 3.

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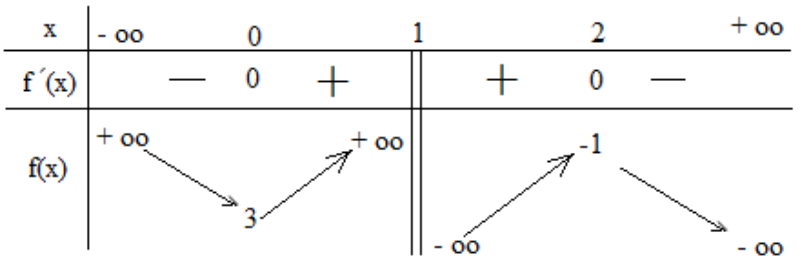
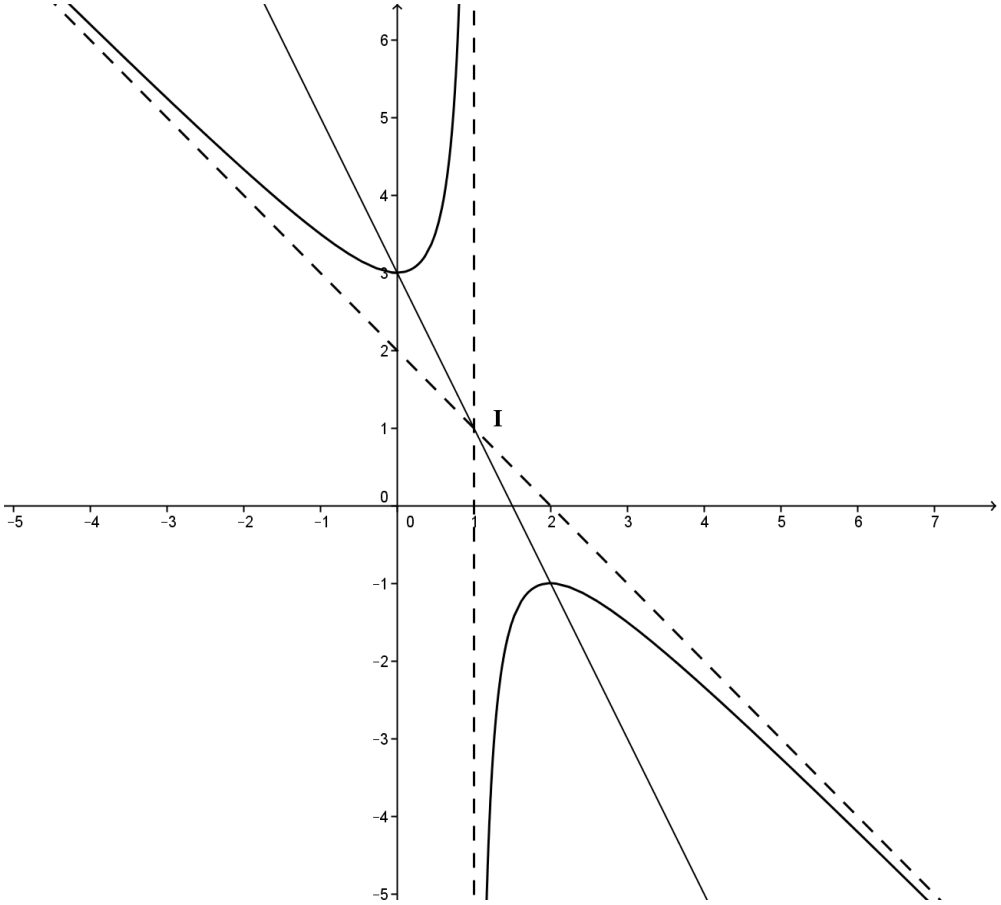
مشروع معيار التصحيح — **مسابقة في مادة الرياضيات**
المدة: ساعة

QI	Answers	M
1	x = 30 and y = 20	**1.5**
2a	Let x be the price of a shirt and y the price of a belt. x and y verify the system	**1.5**
2b	The price of a shirt is 30 000 LL and the price of a belt is 20 000 LL	**1**
2c	$4(30\,000 \times 0.85) + 3(20\,000 \times 0.9) = 156\,000$ Nadim should pay 156 000 LL	**1**

QII	Answers	M
1	x + x + 4 = 20 and x + 4 + y = 26 ; Hence x = 8 and y = 14.	**1**
2	<table><tr><td></td><td>Hum</td><td>Eco</td><td>Total</td></tr><tr><td>Boys</td><td>8</td><td>16</td><td>24</td></tr><tr><td>Girls</td><td>12</td><td>14</td><td>26</td></tr><tr><td>Total</td><td>20</td><td>30</td><td>50</td></tr></table>	**1**
3a	$P(B \cap H) = \frac{8}{50} = \frac{4}{25}$.	**1**
3b	$P(E/B) = \frac{16}{24} = \frac{2}{3}$.	**1**
3c	$P(G \cup H) = P(G) + P(H) - P(G \cap H) = \frac{26}{50} + \frac{20}{50} - \frac{12}{50} = \frac{17}{25}$.	**1**

QIII	Answers	M
1	$\lim\limits_{\substack{x\to 1\\ x<1}} f(x) = +\infty$ and $\lim\limits_{\substack{x\to 1\\ x>1}} f(x) = -\infty$. The line with equation x = 1 is an asymptote to (C).	**1.5**
2	$\lim\limits_{x\to-\infty} f(x) = +\infty$ and $\lim\limits_{x\to+\infty} f(x) = -\infty$.	**1**
3	$\lim\limits_{x\to-\infty} \big(f(x) - (-x+2)\big) = \lim\limits_{x\to-\infty} \frac{-1}{x-1} = 0$ and $\lim\limits_{x\to+\infty} \big(f(x) - (-x+2)\big) = 0$. The line with equation y = –x + 2 is an asymptote to (C).	**1**
4	For x = 1, y = 1; then I(1 ; 1).	**1**
5	$f'(x) = -1 + \frac{1}{(x-1)^2} = \frac{-x^2+2x-1+1}{(x-1)^2} = \frac{x(2-x)}{(x-1)^2}$.  	**1.5**

6			**2**
7	a	The points with coordinates (1 ; 1) , (0 ; 3) and (2 ; –1) belong to line $y = -2x + 3$.	**1**
	b	$f(x) < -2x+ 3$; that is (C) is below line $y = -2x + 3$: so $x \in]-\infty; 0[\cup]1, 2[$	**1**