المركز التربوي للبحوث والإنماء	الهيئة الأكاديميّة المشتركة قسم : الرياضيات	المادة: الرياضيات الشهادة: الثانوية العامة الفرع: الآداب والإنسانيات نموذج رقم -١- المدّة : ساعة واحدة

نموذج مسابقة (يراعي تعليق الدروس والتوصيف المعدّل للعام الدراسي ٢٠١٦-٢٠١٧ وحتى صدور المناهج المطوّرة)

ارشادات عامة : - يسمح باستعمال آلة حاسبة غير قابلة للبرمجة او اختزان المعلومات او رسم البيانات.
- يستطيع المرشح الإجابة بالترتيب الذي يناسبه دون الالتزام بترتيب المسائل الوارد في المسابقة.

I- (5 points)

A Shop sells phone books. At the beginning of the season, the prices of a phone and an IPAD together is 1 800 000 LL. At the end of the season, after a 30% decrease in the price of the phone and 25% increase in the price of the IPAD, the prices together become 1 920 000 LL.

1) Find the price of the phone and the price of the IPAD at the beginning of the season.

2) Find the price of the phone and the price of the IPAD at the end of the season.

3) Samir wants to buy 5 phones and 2 IPADs. Is it profitable for him to buy them at the beginning or at the end of the season? Justify your answer.

II- (5 points)

An auto company has 400 vehicles in its stores. These vehicles could be cars or jeeps. For each kind of vehicles, there are American and German.

A statistical study showed that:

- 40% of the vehicles are jeeps
- 30% of the cars are American
- 65% of the jeeps are German

1) Copy and complete the following table.

	Car	**Jeep**	**Total**
American			
German			
Total			400

2) A customer comes and chooses at random one vehicle from the company.

a- Calculate the probability of choosing a car.

b- Calculate the probability of choosing a German jeep.

c- Calculate the probability of choosing a jeep knowing that it is American.

d- Calculate the probability of choosing a car or a jeep.

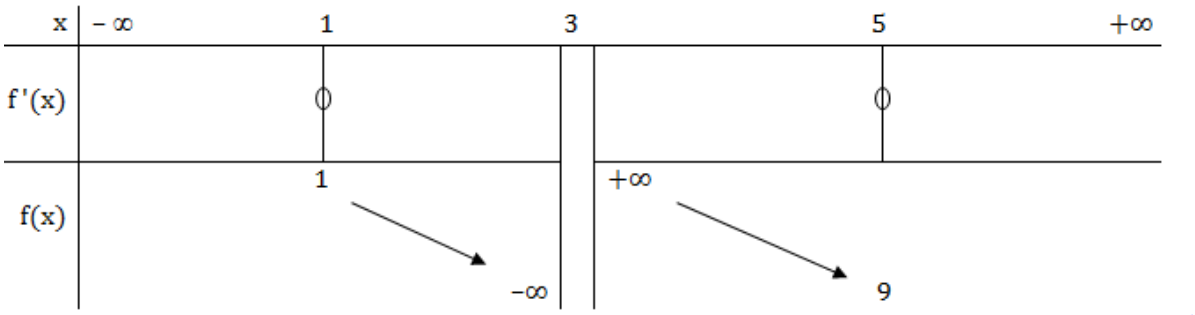
3) Two customers come and choose two vehicles from the company, one after another.

a- Calculate the probability of choosing two jeeps.

b- Calculate the probability of choosing two cars given that they are German.

III- (10 points)

The table below is the table of variations of a function f defined by $f(x) = x + a + \frac{b}{x-c}$, where a, b, and c are three real numbers. Designate by (C) its representative curve in an orthonormal system $(O, \vec{i}, \vec{j})$.



1) Determine the domain of definition of f.

2) Calculate c, then a and b.

3) Write an equation of the tangent to (C) at the point of abscissa 5.

In what follows, suppose that $a = 2, b = 4,$ and $c = 3$.

4)

a- Find the limits of f at $-\infty$ and at $+\infty$.

b- Show that the straight line (d) of equation $y = x + 2$ is an asymptote to (C).

5) Verify that $f'(x) = \frac{(x-5)(x-1)}{(x-3)^2}$, then copy and complete the above table of variations.

6) Draw (C) and its asymptotes.

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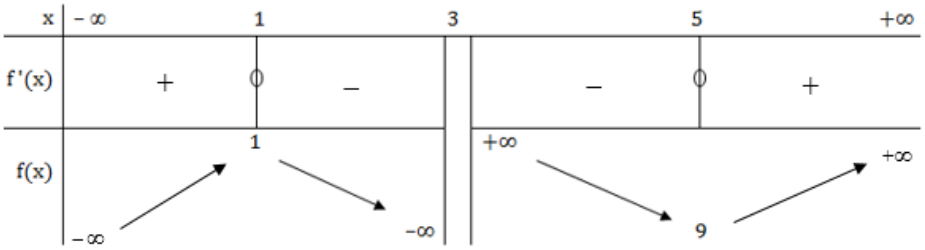
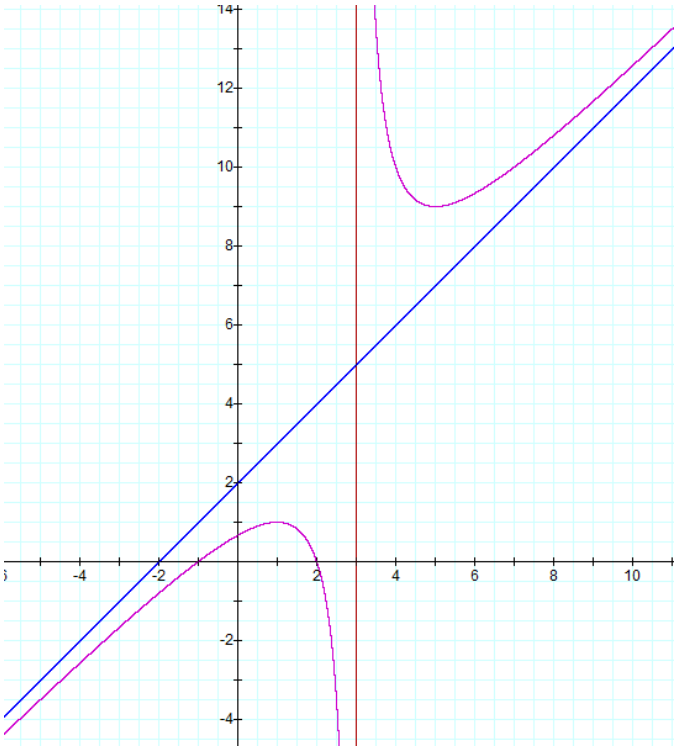
أسس التصحيح (تراعي تعليق الدروس والتوصيف المعدّل للعام الدراسي ٢٠١٦-٢٠١٧ وحتى صدور المناهج المطوّرة)

Answer Key

Question I		Mark
1)	<table><tr><th>Gender/Section</th><th>[14,16[</th><th>[16,18[</th><th>[18,20]</th><th>Total</th></tr><tr><td>Boys</td><td>15</td><td>8</td><td>2</td><td>25</td></tr><tr><td>Girls</td><td>3</td><td>10</td><td>12</td><td>25</td></tr><tr><td>Total</td><td>18</td><td>18</td><td>14</td><td>50</td></tr></table>	1
2)	a. $\frac{3}{50}$ b. $P(G \text{ or } age \geq 18) = \frac{25}{50} + \frac{14}{50} - \frac{12}{50} = \frac{27}{50}$ c. $P(B / Age \geq 18) = \frac{2}{14} = \frac{1}{7}$	1 1 1
3)	$P(BG \text{ or } GB) = \frac{25}{50} \bullet \frac{25}{49} + \frac{25}{50} \bullet \frac{25}{49} = \frac{25}{49}$	1

Question II		Mark
1)	x : original price of a pen y : original price of a copybook	1
2)	From the given we get the following system $\begin{cases} x + y = 4(0.8x) \\ 0.8x + 0.8y = 16000 \end{cases}$ $x = 6250 LBP$ $y = 13750 LBP$ $0.8x = 5000$ LBP $0.8y = 11000$ LBP	2
3)	Rima should pay a sum equals to: $2 \times 5000 + 3 \times 11000 = 43000 LBP$	1

Question III		Mark
1)	$]-\infty , 3[\cup]3 , +\infty[$	**0.5**
2)	c = 3; a = 2; b = 4	**1.5**
3)	y = 9	**1**
4)	**a-** $-\infty; +\infty$	**1**
	b- limit is 0	**1**
5)	$f'(x) = \frac{x^2-6x+5}{(x-3)^2} = \frac{(x-5)(x-1)}{(x-3)^2}$	**1**
		**2.5**
6)		**2.5**