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

I- (5 points)

PartA.

Solve the system of equations: $\begin{cases} x+y=35\ 000 \\ 27x+16y=670\ 000 \end{cases}$

PartB.

In a bookshop, the sum oforiginal prices of a pen type A and that of a pen type B is 35000LL. The bookshop offers a discount of 10% on pens type A, and 20 % on pens type B.During the sale period, Walid bought 3 pens type A and 2 pens type B for the amount of 67000LL.

1) a- Form a system of equations modeling the situation.
   b- Find the original price of every type of pen.
   c- What is the price of every type after discount?

2) During the sale period, a customer bought a number of pens type A and double this numberof type B forthe amount of 245000LL.

Find the number of pens for every type.

II- (5 points)

For the publicity of a new activity “S” in a club, the direction has distributed brochures for certain members of the club. Some of these members are subscribed in this activity while others are not. The following table represents the results of a survey done on a group of 200 members:

Members	Have received brochure	Have not received brochure
Subscribed in activity “S”	84	42
Not subscribed in activity “S”	56	18

A member of the group is selected at random. Consider the following events:

- A: « the member has received a brochure».
- B: « the member is subscribed in the activity “S”».

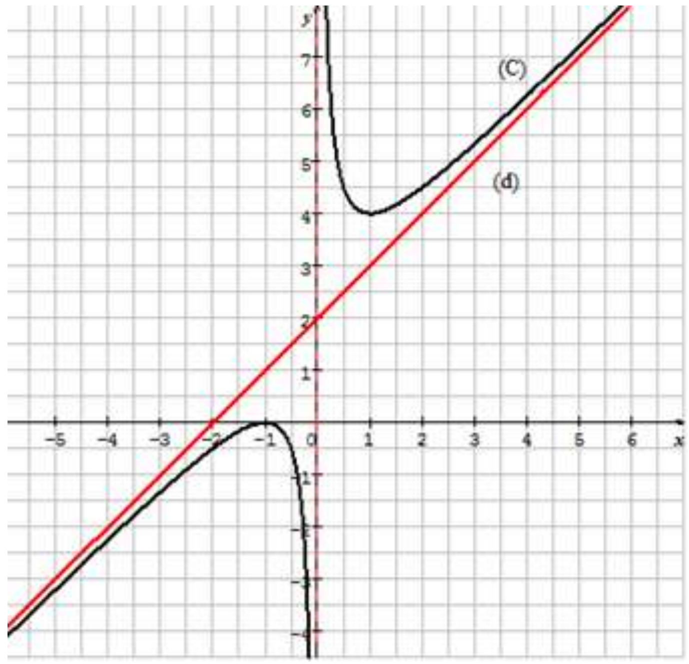
1) Calculate the probability P(A) and show that $P(A \cap B) = \frac{21}{50}$.

2) Calculate the probability that the member selected has not received a brochureand he is subscribed in the activity “S”.

3)Knowing that the member selected is subscribed in the activity “S”, what is the probability that he has received a brochure?

III- (10 points)

Let f be a function defined on $]-\infty;0[\cup]0;+\infty[$. The curve (C)shown below isrepresenting the function f and the line (d) is an asymptote to (C).



A- Using the graph:

1) Determine

a- f (–1) and f(1).

b- $\lim\limits_{\substack{x\to 0\\ x<0}} f(x)$ and $\lim\limits_{\substack{x\to 0\\ x>0}} f(x)$.

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

2) Find an equation of the asymptote (d).

3) Set up the table of variations of f.

4) Compare:

a- $f\left(\frac{1}{2}\right)$ and $f(1)$.

b- $f'(-3)$ and $f'\left(\frac{1}{2}\right)$.

B- In what follows, assume that $f(x) = x + 2 + \frac{1}{x}$.

5) a- Calculate the derivative f´(x).
b- Find an equation of (T), the tangent to (C) at the point A with abscissa x = 2.

6) a- Solve the equation $2x^2 - 5x + 2 = 0$.

b- Find the coordinates of the points ofintersection of (C) and the line (L) with equation $y = \frac{9}{2}$.

c- Solve graphically the inequality $f(x) \le \frac{9}{2}$.

Q	Réponses	N
1	a- $\lim\limits_{\substack{x\to 0\\ x<0}} f(x) = -\infty$; $\lim\limits_{\substack{x\to 0\\ x>0}} f(x) = +\infty$. b- $\lim\limits_{x\to+\infty} f(x) = +\infty$; $\lim\limits_{x\to-\infty} f(x) = -\infty$. c- f(–1) = 0 ; f(1) = 4.	2
2	L'asymptote oblique passe par les points de coordonnées (–2 ; 0) et (0 ; 2) et vérifient l'équation y = a x + b. On a donc : $\begin{cases} 0 = -2a + b \\ 2 = 0a + b \end{cases}$, qui donne a = 1 et b = 2, alors (d) : y = x + 2.	1
3	Les coordonnées de l'un des sommets sont x = –1 et y = 0. Elles vérifient l'équation de la courbe (C), alors : $f(x) = x + 2 + \frac{c}{x} \Rightarrow 0 = -1 + 2 + \frac{c}{-1} \Leftrightarrow c = 1$, et $f(x) = x + 2 + \frac{1}{x}$.	1
4	a-Sur]0 ; 1] la fonctionf est strictement décroissante alors $f\left(\frac{1}{2}\right) > f(1)$. b-Sur $]-\infty;-1]$ la fonction fest strictement croissante alors $f'(-3) > 0$. Tandis que sur $]0,+1]$ la fonction fest strictement décroissante alors $f'\left(\frac{1}{2}\right) < 0$, donc $f'(-3) > f'\left(\frac{1}{2}\right)$..	1
5a	$f(x) = x + 2 + \frac{1}{x}$; alors $f'(x) = 1 - \frac{1}{x^2} = \frac{x^2 - 1}{x^2} = 0$ pour $x = -1$ ou $x = 1$. $\begin{array}{c\|ccccccccc} x & -\infty & & -1 & & 0 & & +1 & & +\infty \\ \hline f'(x) & & + & 0 & - & \|\| & - & 0 & + & \\ \hline f(x) & -\infty & \nearrow & 0 & \searrow & -\infty \; \|\| \; +\infty & \searrow & 4 & \nearrow & +\infty \end{array}$	2
5b	$f(2) = \frac{9}{2}$; $f'(2) = \frac{3}{4}$ et $y - \frac{9}{2} = \frac{3}{4}(x-2) \Leftrightarrow y = \frac{3}{4}x + 3$.	1
6a	$2x^2 - 5x + 2 = 0$ pour $x = \frac{1}{2}$ ou $x = 2$. $f(x) = \frac{9}{2} \Leftrightarrow 2x^2 + 4x + 2 = 9x \Leftrightarrow 2x^2 - 5x + 2 = 0$ donc les points d'intersection sont $\left(\frac{1}{2};\frac{9}{2}\right)$ et $\left(2;\frac{9}{2}\right)$.	1,5
6b	$x + \frac{1}{x} \le \frac{5}{2} \Leftrightarrow x + \frac{1}{x} + 2 \le \frac{9}{2} \Leftrightarrow f(x) \le \frac{9}{2} \Leftrightarrow x < 0$ ou $\frac{1}{2} \le x \le 2$.	0,5

Q	Réponses	N
1	$V_{act} = 600000 \times \dfrac{1-\left(1+\dfrac{0,06}{12}\right)^{-36}}{0,005} \approx 19723000LL.$ le prix de cette voiture est 29723000 LL.	2
2	Intérêtspayés par Walid = $600\,000 \times 36 - 19723000 = 1874000LL.$	1
3	$C_{12} = 30000000 \times \left(1+\dfrac{0,04}{4}\right)^{12} = 33804750LL.$ Intérêts payés à Walid : 3 804 750LL.	2

Q	Réponses	N
1	P (B) = 0, 7. $P(B \cap A) = P(S/A) \times P(B) = 0,6 \times 0,7 = 0,42 = \dfrac{21}{50}.$	1
2	$P(A \cap \overline{B}) = 0,65 \times 0,3 = 0,195.$	1
3	$P(A) = P(A \cap B) + P(A \cap \overline{B}) = \dfrac{21}{50} + 0,195 = 0,615.$	1,5
4	$P(\overline{B}/A) = \dfrac{p(\overline{B} \cap A)}{p(A)} = \dfrac{0,195}{0,615} = \dfrac{13}{41}.$	1,5