Sample Test -2-

I- In the following table, only one of the proposed answers to each question is correct . Write the number of each question & the corresponding answer**& justify.**

N°	*Questions*	*Answers*		
		A	*B*	*C*
1-	$\lim_{x\to 4}\frac{\ln(x-3)}{x-4}=$	0	$+\infty$	1
2-	$\lim_{x\to+\infty} x^2-2x-\ln x=$	0	$+\infty$	$-\infty$
3-	The domain of definition of the function f given by $f(x)=\frac{\ln(x^2-2x)}{x+1}$ is :	$]-1;+\infty[$	$]-\infty;0[\cup]2;+\infty[$	$]-\infty;-1[\cup]-1;0[\cup]2;+\infty[$
4-	The solutions in IR of the Equation $2(\ln(x))^2-3\ln(x)+1=0$ are:	x =1 & $x=\frac{1}{2}$	x = 1 & x =e	$x=e,\ x=\sqrt{e}$
5-	The solution set in IR of the inequation ln(x)+ln(x-2)-ln3<0 is:	$]-1;3[$	$]0;3[$	$]2;3[$

Sample Test -3-

I- In the following table, only one of the proposed answers to each question is correct . Write the number of each question & the corresponding answer**& justify.**

N°	**Questions**	**Answers**		
		a	**b**	**c**
1	$f(x)=\ln\left(\frac{x+1}{x+2}\right)$ The domain of definition of f is:	$]-2;-1[$	$]-1;+\infty[$	$]-\infty;-2[\cup]-1;+\infty[$
2	$\lim_{x\to e} f(x)=\frac{\ln(x)-1}{x-e}$	0	$+\infty$	e^{-1}
3	(C) : $f(x)=\ln(x^3)$ An equation of the tangent at x= 1 to (C) is:	y = 3x – 1	y = 3x – 3	y = - 3x + 3

II-(9Pts)

Part-A-:

Consider a function f defined over $]0;+\infty[$ by: $f(x) = x - 4 - 4\ln\left(\frac{x}{x+2}\right)$

& denote by (C) its representative curve in an orthonormal system **$(O ; \vec{i} ; \vec{j})$.**

1- Calculate: $\lim_{x \to 0^+} f(x)$ & $\lim_{x \to +\infty} f(x)$. Deduce an equation of an asymptote to (C).

2- Show that the line (D) of equation $y = x - 4$ is an oblique asymptote to (C).

3- Show that $f'(x) = \frac{(x-2)(x+4)}{x(x+2)}$ **&** set up the table of variations of f.

4- Trace (C).

Sample Test -4-

I- In the following table, only one of the proposed answers to each question is correct . Write the number of each question & the corresponding answer**& justify.**

N°	*Questions*	*Answers*		
		A	B	C
1	$f(x) = \ln(x^2 + x + 1)$ The domain of definition of f is:	$]0;+\infty[$	IR	$]-\infty;0[$
2	$\lim_{x \to 1} f(x) = \frac{\ln(ex) - 1}{x^2 - 1}$	0	$+\infty$	$\frac{1}{2}$
3	The value of $A = \ln(e^3) - 4\ln(\sqrt{e}) + \ln(e^{-2})$ is:	-1	1	0

Sample Test -7-

I-In the following table, only one of the proposed answers to each question is correct . Write the number of each question & the corresponding answer**& justify.**

No	**Questions**	**Answers**		
		A	**B**	**C**
1-	$\lim_{x \to +\infty} \ln\left(\frac{ex-1}{x+1}\right) =$	0	1	$+\infty$
2-	if $f(x) = (\ln x)^2$ then f '(x)=	$2\ln(x)$	$\ln(2x)$	$\frac{2\ln x}{x}$
3-	The equation in x $\ln(x-2) + \ln(x-4) = 3\ln 2$ has:	One solution	Two solutions	No solutions
4-	The value of $A = \ln(\sqrt{e^2 + 4} - 2) + \ln(\sqrt{e^2 + 4} + 2) + \ln(e^{-2})$ is:	-1	1	0
5-	The domain of definition of f defined by $f(x) = \ln(x^2 - 4x + 3)$ is :	$]1;3[$	IR	$]-\infty;1[\cup]3;+\infty[$

II-

Part-A-:

Consider a function g defined over $]0;+\infty[$ by: $g(x)=\dfrac{\ln x}{x}+e$ & denote by (C_g) its representative curve in an orthonormal system.

1- Calculate: $\lim\limits_{x\to 0^+} g(x)$ & $\lim\limits_{x\to +\infty} g(x)$. Deduce the equations of asymptotes to (C_g).

2- a- Calculate g '(x) & set up the table of variations of g .

b- Solve the equation: g(x) = e .

3- Calculate $g(\frac{1}{e})$. Deduce the sign of g (x) in terms of x .

4- Trace (C_g).

Part-B-:

Consider a function f defined over $]0;+\infty[$ by: $f(x)=\frac{1}{2}(\ln x)^2+ex-e$ & denote by (C_f) its representative curve in an orthonormal system (Scale: 4 cm on x'ox & 2 cm on y'oy).

1. Calculate $\lim\limits_{x\to 0^+} f(x)$ & $\lim\limits_{x\to +\infty} f(x)$. Deduce the equation of an asymptote to (C_f).
2. Verify that f '(x) = g (x).
3. Set up the table of variations of f.
4. Write the equation of the tangent (T) to (C_f) at the point of abscissa x = 1.
5. Study the position between (C) & (T).
6. Tracer (C) et (T).

III-

Consider a function f defined by: $f(x)=ax+b+\dfrac{cx}{\ln x}$ whose table of variations is on the right:

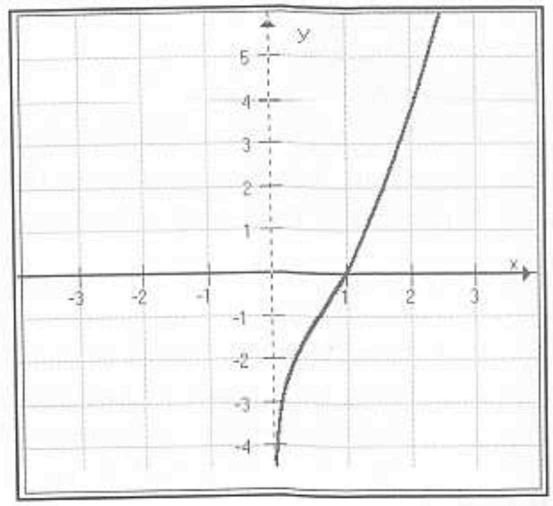
x	0		e^{-1}		1		$\sqrt{e}$		$+\infty$
f '(x)		+	0	-	‖	-	0	+	
f(x)	0	↗	e^{-1}	↘	$-\infty$ ‖ $+\infty$	↘	$4\sqrt{e}$	↗	$+\infty$

1-Calculate f '(x) in terms of a , c & x .

2- use the information in the table calculate a , b & c .

Part-A-:

The curve(C) below is the graphical representation of a function g defined over $]0;+\infty[$ by : $g(x)=x^2+a\ln x+b$.
(T) is the tangent at A(1;0) to (C) of equation y=3x-3.



1- Use (C) & (T) to prove that : $a=1$ & $b=-1$.

2- Solve graphically :
$g(x)=0$; $g(x)>0$; $g(x)<0$.

Part – B- :

Consider a function f defined over $]0;+\infty[$ by: $f(x)=x-\dfrac{\ln x}{x}$

Designate by (C ') its representative curve in an orthonormal system .

1- Calculate: $\lim\limits_{x\to 0} f(x)$ & $\lim\limits_{x\to +\infty} f(x)$.

2- a) Show that the line (D) of equation $y=x$ is an asymptote to (C') at $+\infty$.
 b) Study the position between (C') & (D).

3- a-Show that $f'(x)=\dfrac{g(x)}{x^2}$.
 b-Set up the table of variations of f .(use part A-2).

4- Trace (C').