

Matricule	Absent?	Note
252534007201,00	Non	11
242534102310,00	Non	19
242434065517,00	Non	19,5
252534010003,00	Non	10
252534017519,00	Non	13
252534051717,00	Non	7
242434033204,00	Non	12
252534010004,00	Non	19
252534010015,00	Non	14
252534006818,00	Non	11
252534042414,00	Non	13
252534042915,00	Non	13
252534007510,00	Non	14
252534008314,00	Non	7
242534108110,00	Non	19
252534010705,00	Non	19,5
252534008310,00	Non	15
252534042907,00	Non	19,5
252534010101,00	Non	14,5
252534110709,00	Non	7
252534035304,00	Non	15
252534108808,00	Non	10
252534010105,00	Non	17
252534007704,00	Non	17,5
252534071502,00	Non	15,5
252534081916,00	Non	0
252534010103,00	Non	20
252534009912,00	Non	12
252534052409,00	Non	18,5
252534069406,00	Non	13
252534005906,00	Non	10
252534043804,00	Non	15
252534051801,00	Non	15

فوج 1

Matricule	Absent?	Note	Observation
242534110810,00	Non	6	
242434008001,00	Non	9	
242434071807,00	Non	11,5	
232334031113,00	Non	10	
242534111906,00	Non	14	
252534079903,00	Non	16,5	
222234091402,00	Non		
222434105207,00	Non	12	
242434107816,00	Non	19	
232334015904,00	Non		
242434042118,00	Non	8	
242434044510,00	Non	14	
222534098701,00	Non		
212434106116,00	Non		
242434049306,00	Non	11,6	Note acquise N-1
222234031107,00	Non		
242434031619,00	Non	8	
242434049207,00	Non	8	
232334139218,00	Non	10,8	Note acquise N-1
242434070102,00	Non	10,5	
242534111901,00	Non		
242434043817,00	Non	9	
242434010203,00	Non	8	
242434081609,00	Non	17	
242434100919,00	Non	16	
242434065515,00	Non	11,8	Note acquise N-1
242434009716,00	Non	14	

فوج 3

Matricule	Absent?	Note	Observation
252534031502	Non	15,5	
252534052205	Non	10	
222234018714	Non	0	
252534011219	Non	0	
252534034502	Non	11,5	
252534062102	Non	19,5	
252534074407	Non	11	
252534040810	Non	11	
252534062606	Non	10	
252534047405	Non	10	
252534073812	Non	14	
252534043111	Non	20	
252534079908	Non	10,5	
252534017514	Non	0	
252534062604	Non	18	
252534062103	Non	10	
252534010502	Non	2	
252534060406	Non	0	
252534065007	Non	10	
242434042419	Non	0	
252534043004	Non	20	
252534018416	Non	0	
252534064616	Non	14,5	
252534080606	Non	0	
252534034907	Non	14,5	
252534056220	Non	16,5	
252534072409	Non	14	
252534052801	Non	16	
252534023118	Non	10,5	
252534073819	Non	11	
252534043818	Non	10	
252534065316	Non	0	

mathématiques/Semestre 2/Analyse 2/							
Matricule	Note	Absent	Absence Justifiée	Observation	Section	Groupe	
242534110810	0.5					Section/Groupe 1	
252534007201	3.25					Section/Groupe 2	
242434008001	1.5					Section/Groupe 1	
252534031502	5.5					Section/Groupe 3	
252534052205	0.5					Section/Groupe 3	
222234018714						Section/Groupe 3	
242534102310	11.5					Section/Groupe 2	
242434065517	8.0					Section/Groupe 2	
252534011219						Section/Groupe 3	
242434071807	8.5					Section/Groupe 1	
252534010003						Section/Groupe 2	
252534017519	5.5					Section/Groupe 2	
252534051717						Section/Groupe 2	
232334031113	5.25					Section/Groupe 1	
252534034502	1.5					Section/Groupe 3	
252534062102	9.5					Section/Groupe 3	
252534074407	5.5					Section/Groupe 3	
252534040810	3.0					Section/Groupe 3	
252534062606	0.5					Section/Groupe 3	
242534111906	1.0					Section/Groupe 1	
242434033204	3.0					Section/Groupe 2	
252534010004	5.5					Section/Groupe 2	
252534047405	3.0					Section/Groupe 3	
252534010015	3.75					Section/Groupe 2	
252534079903	12.25					Section/Groupe 1	
222234091402						Section/Groupe 1	
252534006818	1.5					Section/Groupe 2	
252534042414	8.0					Section/Groupe 2	
252534073812	3.5					Section/Groupe 3	
252534043111	15.5					Section/Groupe 3	
252534042915	5.5					Section/Groupe 2	

252534079908	3.5				Section/Groupe 3
222434105207	3.75				Section/Groupe 1
242434107816	17.0				Section/Groupe 1
252534017514					Section/Groupe 3
252534007510	0.5				Section/Groupe 2
252534062604	1.5				Section/Groupe 3
252534062103	4.5				Section/Groupe 3
252534008314					Section/Groupe 2
242534108110	8.5				Section/Groupe 2
252534010502	1.0				Section/Groupe 3
252534010705	11.0				Section/Groupe 2
252534008310					Section/Groupe 2
252534060406					Section/Groupe 3
252534042907	13.0				Section/Groupe 2
232334015904					Section/Groupe 1
242434042118	0.5				Section/Groupe 1
252534010101	2.0				Section/Groupe 2
242434044510	4.25				Section/Groupe 1
252534110709	0.5				Section/Groupe 2
252534065007	1.0				Section/Groupe 3
222534098701					Section/Groupe 1
252534035304	6.5				Section/Groupe 2
212434106116					Section/Groupe 1
252534108808	1.5				Section/Groupe 2
242434049306	11.6	Note acquise N-1	Note Acquise N-1		Section/Groupe 1
242434042419					Section/Groupe 3
252534043004	10.5				Section/Groupe 3
222234031107					Section/Groupe 1
252534010105	10.75				Section/Groupe 2
242434031619	2.0				Section/Groupe 1
252534018416					Section/Groupe 3
252534064616	6.5				Section/Groupe 3
242434049207	6.25				Section/Groupe 1

232334139218	10.8		Note acquise N-1	Note Acquise N-1		Section/Groupe 1
252534007704	6.5					Section/Groupe 2
252534080606						Section/Groupe 3
252534071502	7.0					Section/Groupe 2
252534034907	8.0					Section/Groupe 3
242434070102	1.25					Section/Groupe 1
252534081916						Section/Groupe 2
242534111901						Section/Groupe 1
252534010103	17.5					Section/Groupe 2
252534056220	3.75					Section/Groupe 3
252534072409	4.0					Section/Groupe 3
252534052801	3.5					Section/Groupe 3
252534023118	2.75					Section/Groupe 3
242434043817	4.0					Section/Groupe 1
252534073819	1.0					Section/Groupe 3
252534043818	1.0					Section/Groupe 3
242434010203	1.0					Section/Groupe 1
242434081609	7.0					Section/Groupe 1
252534009912	0.5					Section/Groupe 2
252534065316						Section/Groupe 3
252534052409	9.0					Section/Groupe 2
252534069406	5.5					Section/Groupe 2
242434100919	2.25					Section/Groupe 1
252534005906	0.0					Section/Groupe 2
252534043804	8.5					Section/Groupe 2
252534051801	5.0					Section/Groupe 2
242434065515	11.8		Note acquise N-1	Note Acquise N-1		Section/Groupe 1
242434009716	4.0					Section/Groupe 1

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Exo 1 (7 pts):

I1 = ∫ 1 / ((1+lnx)(x+x(lnx))) dx (2,5 pts)

I1 = ∫ 1/x / ((1+lnx)(1+(lnx)^2)) dx ; we put : lnx = t => dt/dx = 1/x (0,25)

I1 = ∫ dt / ((1+t)(1+t^2)) So: dt = 1/x dx. (0,25)

I1 = ∫ a / (1+t) dt + ∫ (bt+c) / (1+t^2) dt (0,25)

a / (1+t) + (bt+c) / (1+t^2) = 1 / ((1+t)(1+t^2)) (0,25)

a(1+t^2) + (1+t)(bt+c) = 1 / ((1+t)(1+t^2)) => (a+c) + (b+c)t + (a+b)t^2 = 1 (0,5)

So: { a+c=1 (1) ; b+c=0 (2) ; a+b=0 (3) } 2-3 => c-a=0 => c=1/2 and a=1/2 ; b=-1/2. and: a+c=1.

I1 = 1/2 ∫ 1/(1+t) dt + 1/2 ∫ (t-1)/(1+t^2) dt = 1/2 ln|1+t| - 1/4 ln(1+t^2) + 1/2 arct(t) + C (0,25)

I1 = 1/2 ln(1+lnx) - 1/4 ln(1+(lnx)^2) + 1/2 arct(lnx) + C (0,25)

2pts I2 = ∫ 1/x^2 ln(x^2+1) dx / using integration by parts: u = ln(x^2+1) => u' = 2x / (x^2+1) (1)

I2 = -ln(x^2+1)/x + ∫ 2 / (x^2+1) dx ; v' = 1/x^2 => v = -1/x. I2 = ln(x^2+1)/x + 2 arctan(x) + C (0,5)

$$\int \frac{x-2}{x^2-x+1} dx = \frac{1}{2} \int \frac{2(x-2) - 1 + 1}{x^2-x+1} dx \quad (0,25)$$

$$I_3 = \frac{1}{2} \int \frac{2x-1-3}{x^2-x+1} dx = \frac{1}{2} \int \frac{2x-1}{x^2-x+1} dx - \frac{3}{2} \int \frac{1}{x^2-x+1} dx$$

$$I_3 = \frac{1}{2} \ln(x^2-x+1) - \frac{3}{2} J$$

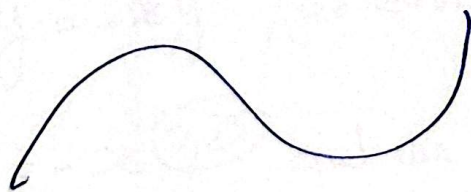
$$J = \int \frac{1}{x^2-x+1} dx = \int \frac{1}{x^2-x+(\frac{1}{2})^2+(\frac{1}{2})+1} dx = \int \frac{1}{(x-\frac{1}{2})^2+\frac{3}{4}} dx \quad (0,25)$$

$$J = \int \frac{1}{\frac{3}{4} \left[(x-\frac{1}{2})^2 + 1 \right]} dx \quad J = \int \frac{1}{\frac{3}{4} \left(\frac{4}{3} (x-\frac{1}{2})^2 + 1 \right)} dx = \frac{4}{3} \int \frac{1}{\left(\frac{2}{\sqrt{3}} (x-\frac{1}{2}) \right)^2 + 1} dx \quad (0,25)$$

$$J = \frac{4}{3} \int \frac{1}{t^2+1} \cdot \frac{\sqrt{3}}{2} dt \quad \left(\frac{2}{\sqrt{3}} (x-\frac{1}{2}) = t \Rightarrow \frac{dt}{dx} = \frac{2}{\sqrt{3}} \Rightarrow dx = \frac{\sqrt{3}}{2} dt \right)$$

$$J = \frac{2\sqrt{3}}{3} \arctan \left(\frac{2}{\sqrt{3}} (x-\frac{1}{2}) \right) \quad (0,25)$$

$$I_3 = \frac{1}{2} \ln(x^2-x+1) - \frac{3}{2} \cdot \frac{2\sqrt{3}}{3} \arctan \left(\frac{2}{\sqrt{3}} (x-\frac{1}{2}) \right) + C \quad (0,25)$$



Ex 2: 6 pts (4+2).

(3)

$$y' - 6xy = 3x$$

$0,25 \times 5 = 1,25$

We solve: $y' - 6xy = 0$; $y' - 6xy = 0 \Rightarrow y' = 6xy$.

$$\Rightarrow \frac{y'}{y} = 6x \Rightarrow \int \frac{1}{y} dy = \int 3x^2 dx + c \Rightarrow y = c e^{3x^2}$$

$$y_G = c e^{3x^2} \Rightarrow y_H = c(x) e^{3x^2} \Rightarrow y'_H = c'(x) e^{3x^2} + 6x \cdot c(x) e^{3x^2}$$

$$\text{we have: } y'_H - 6xy_H = 3x \Rightarrow c'(x) e^{3x^2} + 6x c(x) e^{3x^2} - 6x c(x) e^{3x^2} = 3x$$

$$\Rightarrow c'(x) = 3x e^{-3x^2} \Rightarrow c(x) = \int 3x e^{-3x^2} dx = \frac{3}{6} \int -6x e^{-3x^2} dx$$

$$c(x) = -\frac{1}{2} e^{-3x^2} \Rightarrow y_H = -\frac{1}{2} e^{-3x^2} \cdot e^{3x^2} = -\frac{1}{2}$$

$0,25 \times 9 = 2,25$

$$\text{So: } y = y_G + y_H = c e^{3x^2} - \frac{1}{2}$$

$y = c e^{3x^2} - \frac{1}{2}$ (0,5)

2/3 pts $y' + 2xy = -xy^4$ (we divide by y^4):

$$y' y^{-4} + 2x y^{-3} = -x \quad (0,25) \text{ and we put } y^{-3} = t; \text{ so: } dt = -3y^{-4} dy$$

$$-\frac{1}{3} t' + 2x t = -x \Rightarrow -3 \left(-\frac{1}{3} t' + 2x t \right) = -3(-x) \quad (0,25)$$

$$\Rightarrow t' - 6x t = 3x \Rightarrow t = c e^{3x^2} - \frac{1}{2} \text{ and } y^{-3} = t \quad (0,25)$$

$$\text{So: } y = \frac{1}{(t)^{1/3}} = \frac{1}{(c e^{3x^2} - \frac{1}{2})^{1/3}} \quad (0,5)$$

(0,25) $y = (c e^{3x^2} - \frac{1}{2})^{-1/3}$

Exo 3 :

(4)

$$f(x) = \sqrt{4x^2 + x + 1} \cos\left(\frac{x}{x^2 + 1}\right); \quad n = 3; \quad x_0 = 0.$$

$$\frac{x}{x^2 + 1} = x - x^3 + o(x^3) \quad [\text{Euclidean division}]. \quad (0,15)$$

$$\cos(x - x^3) = 1 - \frac{1}{2}(x - x^3)^2 + o(x^3) = 1 - \frac{1}{2}x^2 + o(x^3) \quad (0,25)$$

$$\sqrt{1 + x + 4x^2} = 1 + \frac{1}{2}(x + 4x^2) - \frac{1}{8}(x + 4x^2)^2 + \frac{1}{16}(x + 4x^2)^3 + o(x^3) \quad (0,25)$$

$$\sqrt{1 + x + 4x^2} = 1 + \frac{1}{2}x + 2x^2 - \frac{1}{8}x^2 - \frac{1}{8}(8x^3) + \frac{1}{16}x^3 + o(x^3) \quad (0,25)$$

$$\sqrt{1 + x + 4x^2} = 1 + \frac{1}{2}x + \frac{15}{8}x^2 - \frac{15}{8}x^3 + o(x^3). \quad (0,25)$$

$$f(x) = \left(1 - \frac{1}{2}x^2\right) \left(1 + \frac{1}{2}x + \frac{15}{8}x^2 - \frac{15}{8}x^3\right) + o(x^3). \quad (0,25)$$

$$f(x) = 1 + \frac{1}{2}x + \frac{15}{8}x^2 - \frac{15}{8}x^3 - \frac{1}{2}x^2 - \frac{1}{4}x^3 + o(x^3). \quad (0,25)$$

$$f(x) = 1 + \frac{1}{2}x + \frac{11}{8}x^2 - \frac{17}{8}x^3 + o(x^3). \quad (0,15)$$

$$f'(0) = 2! \times \frac{11}{8} = \frac{11}{4}. \quad (0,15) \quad (0,75)$$

3,5 pts

$$g(x) = e^{\frac{1}{2x}} \sqrt{x^2 + 2x}; \quad \text{we put } x = \frac{1}{h} \quad \left(\begin{array}{l} x \rightarrow \infty \\ h \rightarrow 0 \end{array} \right) \quad (0,25)$$

$$g\left(\frac{1}{h}\right) = e^h \sqrt{\frac{1}{h^2} + \frac{2}{h}} = e^h \sqrt{\frac{1+2h}{h^2}} = \frac{1}{h} e^h (1+2h)^{\frac{1}{2}} \quad (0,25)$$

$$e^h = \left(1 + h + \frac{1}{2}h^2\right) + o(h^2) \quad (0,25)$$

$$(1+2h)^{\frac{1}{2}} = 1 + \frac{1}{2}(2h) - \frac{1}{8}(2h)^2 + o((2h)^2) \quad (0,25)$$

$$= 1 + h - \frac{1}{2}h^2 + o(h^2) \quad (0,25)$$

$$e^h \cdot (1+2h)^{\frac{1}{2}} = \left(1 + h - \frac{1}{2}h^2\right) + \left(h + h^2\right) + \frac{1}{2}h^2 + o(h^2)$$

$$= 1 + 2h + h^2 + o(h^2) \quad (0,25)$$

$$\frac{1}{h} e^h (1+2h)^{\frac{1}{2}} = \frac{1}{h} + 2 + h + o(h) \quad (0,25)$$

$$g(x) = x + 2 + \frac{1}{x} + o\left(\frac{1}{x}\right) \quad (0,5)$$

The asymptote (Δ): $y = x + 2$. (0,5)

we have: $\frac{1}{x} < 0$ when $x \rightarrow -\infty$; $x(\Delta)$ is below (Δ) . (0,25)

$\frac{1}{x} > 0$ when $x \rightarrow +\infty$; $x(\Delta)$ is upper (Δ) . (0,25)

(3,5 pts)