TE 3 (Analyse I) Corrigé

Exercice 1(Dérivées) /8 points

a) $f'(x) = -2x^2 sin(x^2) + cos(x^2)$

b) $g'(x) = \frac{x+1}{x^2+2x+4}$

c) $h'(x) = \frac{-3ln(x^2)+2}{x^4}$

Exercice 2(Étude de Fonction) /12 points

- $D = \mathbb{R}$; $A \simeq [-4.35; \infty[$
- $I_Y\,(0; -4)$; $I_{X_1}(-1; 0)$; $I_{X_2}(2; 0)$
-

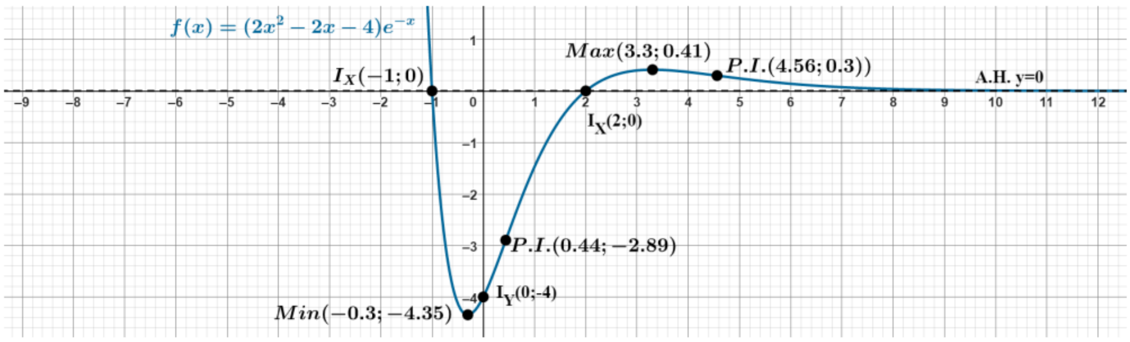
x	...	-1	...	2	...
$f(x)$	$+$	0	-	0	$+$

- $A.H.$ en $y = 0$
- $f'(x) = (-2x^2 + 6x + 2)e^{-x}$
-

x	...	$\frac{3-\sqrt{13}}{2}$	...	$\frac{3+\sqrt{13}}{2}$	...
$f'(x)$	-	0	$+$	0	-
$f(x)$	$\searrow$	Min	$\nearrow$	Max	$\searrow$

- $Min(-0.3; -4.35)$; $Max(3.3; 0.41)$
- $f''(x) = (2x^2 - 10x + 4)e^{-x}$
-

x	...	$\frac{5-\sqrt{17}}{2}$	...	$\frac{5+\sqrt{17}}{2}$	...
$f''(x)$	$+$	0	-	0	$+$
$f(x)$	Conv.	$P.I.$	Conc.	$P.I.$	Conv.

- $P.I.(0.44; -2.89)$; $P.I.(4.56; 0.3)$
- 

- Continue, ni, ni

Exercice 3(Optimisation) /10 points

a) $97'124.22$ CHF

b) $P(h) = 260\pi r^2 + \frac{360'000}{r}$

c) $r = \sqrt[3]{\frac{360'000}{520\pi}} \simeq 6.04$ m et $h = \frac{1000}{\pi r^2} \simeq 8.72$ m. La cuve coûterait $89'401.33$ CHF

d) $r_2 = \sqrt[3]{10}r \simeq 13.01$ m et $h_2 = \sqrt[3]{10}h \simeq 18.79$ m