1-

(b) $xy \tan x$ ①

2-

(d) -3 ①

3-

$\because \frac{dv}{dt} = K(4\pi r^2)$ (1) $\frac{1}{2}$; K est Constant

$\because v = \frac{4}{3}\pi r^3$ $\frac{1}{2}$

$\therefore \frac{dv}{dt} = 4\pi r^2 \frac{dr}{dt}$ (2) 1

de (1) et (2) $\therefore \frac{dr}{dt} = K$ 1

c.a.d le rayon diminue en taux Constant

③

4-

$$\because y = \frac{10 - \cos x}{x}$$

$$\therefore xy = 10 - \cos x \quad \boxed{\tfrac{1}{2}}$$

on dérive

$$\therefore x\frac{dy}{dx} + y = \sin x \quad \boxed{\tfrac{1}{2}}$$

on dérive

$$\therefore x\frac{d^2y}{dx^2} + \frac{dy}{dx} + \frac{dy}{dx} = \cos x \quad \boxed{\tfrac{1}{2}}$$

$$\therefore x\frac{d^2y}{dx^2} + 2\frac{dy}{dx} = \cos x \quad \boxed{\tfrac{1}{2}}$$

②

(تراعى الحلول الأخرى)

5-

(c) $2 \ln a$ ①

6-

(a) $e^{-x}\left(\frac{1}{x} - \ln x\right)$ ①

7-

$\because y = 3x^2 - \ln x$

$\therefore \frac{dy}{dx} = 6x - \frac{1}{x}$ $\triangle 1$

en $x = 1 \Rightarrow \frac{dy}{dx} = 6(1) - 1 = 5$ $\triangle \frac{1}{2}$

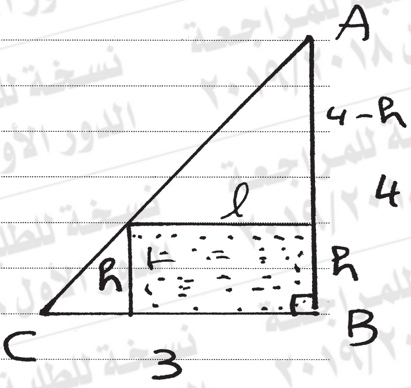
$\therefore$ Équation de la tangente est

$y - 3 = 5(x-1)$ $\triangle \frac{1}{2}$

$\therefore 5x - y - 2 = 0$

②

8-



$\because \frac{l}{3} = \frac{4-h}{4}$

$\therefore l = \frac{12-3h}{4}$ (1) $\frac{1}{2}$

L'aire $A = h l$

$= \frac{h(12-3h)}{4}$

$\therefore A = \frac{1}{4}(12h - 3h^2)$ $\frac{1}{2}$

$\therefore \frac{dA}{dh} = \frac{1}{4}(12 - 6h)$ $\frac{1}{2}$

$\frac{dA}{dh} = 0 \Rightarrow h = 2$ $A' \longleftarrow + + \overset{\max}{\underset{2}{|}} - - \longrightarrow$ ↗ ↘ $\frac{1}{2}$

$h = 2$ qui rend l'aire maximale $\frac{1}{2}$

de (1) $\therefore l = \frac{3}{2}$ cm $\frac{1}{2}$

③

(تراعى الحلول الأخرى)

9-

(a) $3x + C$ ①

10-

(d) $]-\infty ; -1[$ et $]0 ; 1[$ ①

11-

$\because \frac{dy}{dx} = a \operatorname{Cosec}^2 x$

$\therefore y = \int a \operatorname{Cosec}^2 x \, dx$ $\frac{1}{2}$

$\therefore y = -a \operatorname{Cotg} x + C$ $\frac{1}{2}$

$\because (\frac{\pi}{4} ; 5) \in$ de la Courbe $\therefore a + C = 5$ (1)

, $\because (\frac{3\pi}{4} ; 1) \in$ de la Courbe $\therefore a + C = 1$ (2) $\frac{1}{2}$

de (1) et (2) $\therefore 2C = 6 \Rightarrow C = 3$ $\frac{1}{2}$

; $a = -2$ $\frac{1}{2}$

$\therefore y = 2 \operatorname{Cotg} x + 3$ $\frac{1}{2}$ ③

12-

$$\because |x-4| = \begin{cases} x-4 \ ; & x \geq 4 \\ 4-x \ ; & x < 4 \end{cases}$$ Continue en $x=4$

$$\therefore \int_0^6 |x-4|\,dx = \int_0^4 (4-x)\,dx + \int_4^6 (x-4)\,dx \quad \frac{1}{2}$$

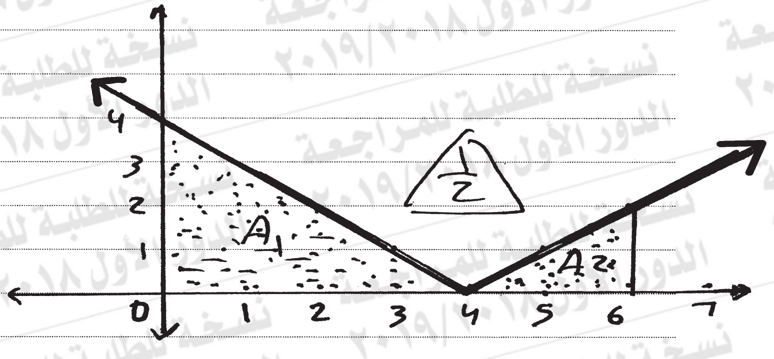
$$= \left[4x - \frac{x^2}{2}\right]_0^4 + \left[\frac{x^2}{2} - 4x\right]_4^6 \quad 1$$

$$= 16 - 8 + (18 - 24) - (8 - 16)$$

$$= 10 \quad \frac{1}{2}$$

②

autre Solution :



$$\int_0^6 |x-4|\,dx = A_1 + A_2$$

$$= \frac{1}{2} \times 4 \times 4 + \frac{1}{2} \times 2 \times 2 \quad 1$$

$$= 10 \quad \frac{1}{2}$$

②

(تراعى الحلول الأخرى)

13-

(d) deux valeurs minimales relatives et une valeur maximale relative.

1

14-

(a) e

1

15-

(A) $\because y = x^3 + ax^2 + bx$ (1)

$\therefore y' = 3x^2 + 2ax + b$ } $\frac{1}{2}$

, $y'' = 6x + 2a$

$\because y''(3) = 0 \Rightarrow 18 + 2a = 0$

$\therefore a = -9$ $\frac{1}{2}$

$\because$ $(3; -9) \in$ de la Courbe

$\therefore -9 = 27 - 9 \times 9 + 3b$

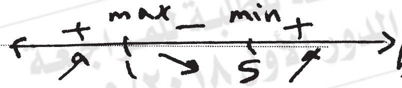
$\therefore b = 15$ $\frac{1}{2}$

$\therefore y' = 3x^2 - 18x + 15$

$y' = 0 \Rightarrow x^2 - 6x + 5 = 0$

$\therefore (x-1)(x-5) = 0$

$\therefore x = 1$ ou $x = 5$



$\frac{1}{2}$

$\because y = x^3 - 9x^2 + 15x$

$\therefore y(1) = 7$ est une valeur maximale relative $\frac{1}{2}$

$\therefore y(5) = -25$ est une valeur minimale relative $\frac{1}{2}$

3

(B) $\because F(x) = 2x^2 e^x$ (1)

$\therefore F'(x) = 2x^2 e^x + 4x e^x$ $\frac{1}{2}$

$\therefore F'(x) = 2x e^x (x+2)$

$F' = 0 \Rightarrow x+2 = 0$ ou $x = 0$

$\therefore x = -2 \in [-3;1]$ ou $x = 0 \in [-3;1]$ $\Big\}$ $\frac{1}{2}$

$\therefore f(-3) = \frac{18}{e^3} \simeq 0,9$

$f(-2) = \frac{8}{e^2} \simeq 1,08$ $\Big\}$ $\frac{1}{2}$

$f(1) = 2e \simeq 5,44$

$f(0) = 0$ $\Big\}$ $\frac{1}{2}$

$\therefore$ la valeur absolue maximale est $2e$ $\frac{1}{2}$

, et la valeur absolue minimale est 0 $\frac{1}{2}$

3

(تراعى الحلول الأخرى)

16-

(c) $\pi \int_0^4 (64x^2 - 4x^4)\, dx$ ①

17-

(b) 4 ①

18-

(A) $\int x^3 \sqrt{4-x^2}\, dx$

Soit $u = x^2 \Rightarrow du = 2x\, dx$ $\frac{1}{2}$

$, dv = x\sqrt{4-x^2} \Rightarrow v = \int x\sqrt{4-x^2}\, dx$

$= -\frac{1}{2} \int (-2x)(4-x^2)^{\frac{1}{2}} dx$

$= -\frac{1}{2} \cdot \frac{2}{3} (4-x^2)^{\frac{3}{2}} = -\frac{1}{3}(4-x^2)^{\frac{3}{2}}$ $\frac{1}{2}$

$\therefore \int x^3 \sqrt{4-x^2}\, dx$

$= -\frac{1}{3} x^2 (4-x^2)^{\frac{3}{2}} - \int -\frac{1}{3}(4-x^2)^{\frac{3}{2}} \cdot 2x\, dx$ $\frac{1}{2}$

$= -\frac{1}{3} x^2 (4-x^2)^{\frac{3}{2}} - \frac{1}{3} \times \frac{2}{5} (4-x^2)^{\frac{5}{2}} + c$

$= -\frac{1}{3} x^2 (4-x^2)^{\frac{3}{2}} - \frac{2}{15} (4-x^2)^{\frac{5}{2}} + C$ $\frac{1}{2}$

②

(B) $\int \sin^3 x \, dx$

$I = \int \sin x \, (1-\cos^2 x)\, dx$ △ $\frac{1}{2}$

Soit $u = \cos x \Rightarrow du = -\sin x \, dx$

$\therefore dx = -\frac{du}{\sin x}$

$\therefore I = \int (1-u^2) \cdot \sin x \left(\frac{-du}{\sin x}\right)$ △ $\frac{1}{2}$

$= -\int (1-u^2)\, du$

$= \int (u^2-1)\, du$

$= \frac{1}{3} u^3 - u + C$ △ $\frac{1}{2}$

$= \frac{1}{3} \cos^3 x - \cos x + C$ △ $\frac{1}{2}$

autre Solution

$I = \int (\sin x - \cos^2 x \cdot \sin x)\, dx$ △ 1

$= -\cos x + \frac{1}{3} \cos^3 x + C$ △ 1

②

(تراعى الحلول الأخرى)

(انتهت الإجابة وتراعى الحلول الأخرى)