ING01 2025|2026

(3)

① calculer $I = \int_{-1}^{0} \frac{x+3}{x^2+4x+4}\, dx$

② $D = \{ (x,y) \in \mathbb{R}^2 ;\ x \geq 0 ;\ y \geq 0 ;\ x+y \leq 2 \}$

(1) ① tracer D

(1) ② calculer l'aire de (D) (en utilisant les intégrales doubles)

(2.5) ③ calculer $I = \iint_D (x-y)^5\, dx\, dy$

— Bon courage —

Tel

①

$$I = \int_{-1}^{0} \frac{x+3}{x^2+4x+4}\,dx$$

$$\frac{x+3}{x^2+4x+3} = \frac{A}{x+2} + \frac{B}{(x+2)^2}$$

$$= \frac{Ax+2A+B}{x^2+4x+3}$$

$$\begin{cases} A = 1 \\ 2A+B = 3 \end{cases} \Longrightarrow \begin{cases} A = 1 \\ B = 1 \end{cases}$$

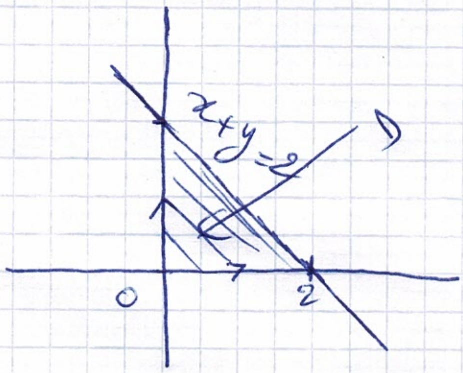
$$I = \int_{-1}^{0} \left(\frac{1}{x+2} + \frac{1}{(x+2)^2} \right) dx$$

$$= \left[\ln(x+2) - \frac{1}{x+2} \right]_{-1}^{0}$$

$$= \frac{2\ln(2) + 1}{2}$$

②

①



② $\text{Aire}(D) = \iint_D dx\,dy$

$$= \int_0^2 \left[\int_0^{2-y} dx \right] dy$$

$$= \int_0^2 (2-y)\,dy$$

①

$$\text{Aire}(D) = \left[2y - \frac{1}{2}y^2\right]_0^2 = 2$$

③ $$I = \iint_D (x-y)^5 \, dx\, dy$$

$$= \int_0^2 \left(\int_0^{2-y} (x-y)^5 \, dx \right) dy$$

$$= \int_0^2 \left[\frac{1}{6}(x-y)^6 \right]_0^{2-y} dy$$

$$= \int_0^2 \left(\frac{1}{6}(2-2y)^6 - \frac{1}{6}y^6 \right) dy$$

$$= \frac{1}{6}\left[-\frac{1}{2} \times \frac{1}{7}(2-2y)^7 - \frac{1}{7}y^7 \right]_0^2$$

$$= -\frac{1}{42}\left[\frac{1}{2}(2-2y)^7 + y^7 \right]_0^2$$

$$= 0$$