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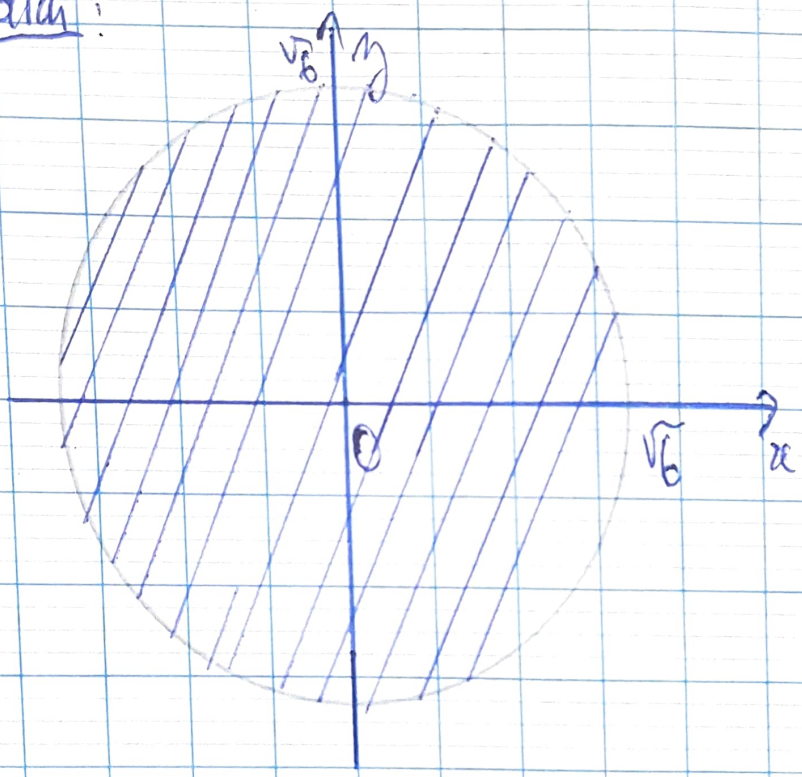
$$\iint_D x \, dA$$

Với $D = \{(x,y) \in \mathbb{R}^2 \mid x^2 + y^2 \leq 6\}$

Giải:



Chuyển sang hệ tọa độ cực

$$\begin{cases} x = r\cos\theta \\ y = r\sin\theta \end{cases}$$

và

$$\begin{cases} 0 \leq \theta \leq 2\pi \\ 0 \leq r \leq \sqrt{6} \end{cases}$$

$$I = \int_0^{2\pi} \int_0^{\sqrt{6}} r\cos\theta \cdot r \, dr \, d\theta$$

$$= \int_0^{2\pi} \int_0^{\sqrt{6}} r^2 \cos\theta \, dr \, d\theta$$

* Lấy trong:

$$\int_0^{\sqrt{6}} r^2 \cos\theta \, dr$$

$$= \frac{r^3}{3} \cdot \cos\theta \Big|_{r=0}^{r=\sqrt{6}}$$

$$= \frac{(\sqrt{6})^3}{3} \cdot \cos\theta$$

* Lấy ngoài:

$$\int_0^{2\pi} \frac{(\sqrt{6})^3}{3} \cos\theta \, d\theta$$

$$= \sin\theta \frac{(\sqrt{6})^3}{3} \Big|_{\theta=0}^{\theta=2\pi}$$

$$= 0$$

Vậy, $I = 0$