$$\iint_D xy^2\,dx\,dy =$$

$$D = \{(x,y): x^2+y^2 \le 4\}$$

$$\begin{cases} x = r\cos\varphi \\ y = r\sin\varphi \end{cases} \quad (r \ge 0)$$

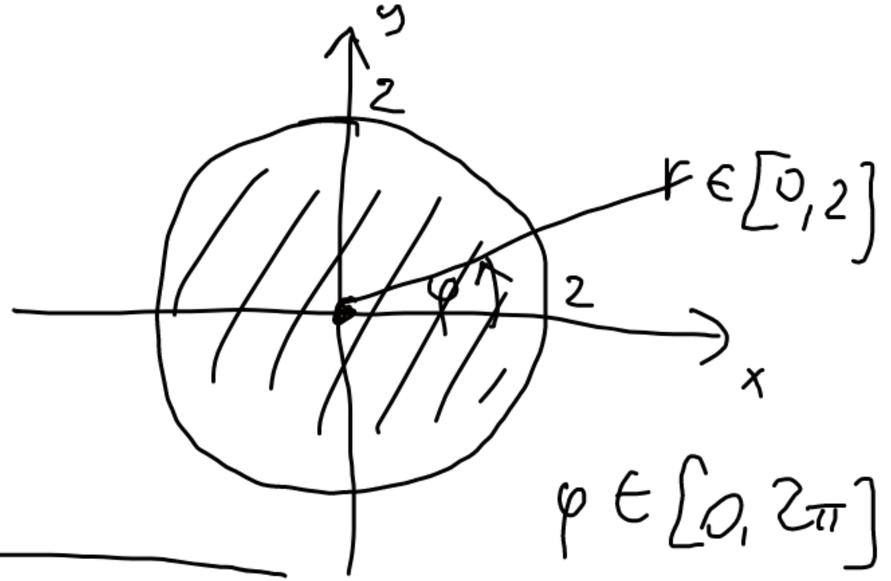
$$dx\,dy = r\,dr\,d\varphi$$

$$= \int_0^{2\pi} d\varphi \int_0^2 r\cos\varphi \cdot (r\sin\varphi)^2 \, r\,dr =$$

$$= \int_0^{2\pi} \cos\varphi \sin^2\varphi \left(\frac{r^5}{5}\right)\Big|_0^2 d\varphi = \begin{cases} t = \sin\varphi \\ dt = \cos\varphi\,d\varphi \end{cases}$$

$$= \frac{32}{5} \cdot \int_0^0 t^2\,dt = 0$$

$$\int \cos\varphi \sin^2\varphi\,d\varphi = \ldots = \frac{\sin^3\varphi}{3} + C$$



$$\varphi \in [0, 2\pi]$$

$$r^2\cos^2\varphi + r^2\sin^2\varphi \le 4$$

$$r^2 \le 4 \rightarrow r \in [0,2]$$