Olea Tudor - 141

exercitiul 4

$$\iint_D x^2 y^2 \, dx \, dy$$

$$r^2 = \frac{x^2}{a^2} + \frac{y^2}{b^2}$$

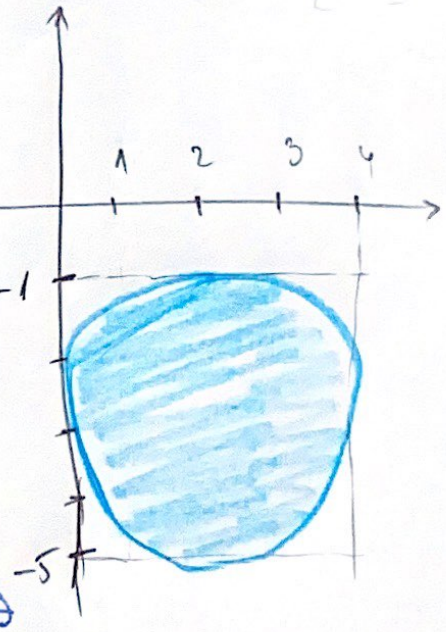
$$D = \{ 4x^2 + y^2 - 4x + 6y \leq -9 \}$$

$$x^2 + y^2 - 4x + 6y \leq -9$$

$$x(x-4) + y(y+6) \leq -9$$

Ne trebuie un B a.i. $\varphi(B) = D$

Stim că $\det(\varphi') = a \cdot b \cdot r \Rightarrow$
$\det(\varphi') = r$



$$r^2 = \frac{x^2}{a^2} + \frac{y^2}{b^2}$$

$a^2 = 4$, $b^2 = 1$

$$r^2 - 4x + 6y \leq -9$$

$$\varphi(r, \theta) = (a \cdot r \cdot \cos\theta, b \cdot r \cdot \sin\theta)$$

$$\iint_D f = \iint_B \varphi(r, \theta) \cdot |\det \varphi'| \, dr \, d\theta$$

Avem $r^2 = x^2 + y^2$

θ va aparține cadranului IV $\left(\frac{3\pi}{2}, 2\pi \right)$

$$\Rightarrow \int_D = \int_1^5 \int_{\frac{3\pi}{2}}^{2\pi} x^2 y^2 \cdot r \, d\theta \, dr$$