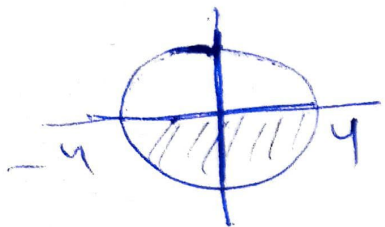


$$\iint_D \sqrt{1+4(x^2+y^2)} \, dx \, dy \rightarrow \text{convert to polar}$$



$$= \int_{\theta=0}^{\pi} \int_{r=0}^4 \sqrt{1+4r^2} \times r \, dr \, d\theta$$

$$\Rightarrow -\pi \times \int_{r=0}^4 \sqrt{t} \times r \times \frac{dt}{2r}$$

$$\Rightarrow -\frac{\pi}{2} \times \frac{2}{3} \left[(1+4r^2)^{3/2} \right]_0^4$$

$$\Rightarrow \boxed{-\frac{\pi}{12} [(65)^{3/2} - 1]}$$

$$\begin{cases} 1+4r^2 = t \\ \frac{dt}{2r} = 2r \end{cases}$$