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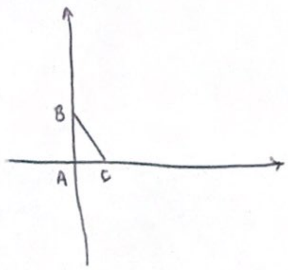
1 a $\iint_R x^2+y^2\,dxdy$ A(0,0), B(0,1), C(1,0)



triângulo ABC:
eixo x: da reta $y=1$ até $y=0$
eixo y: da reta $x=1-y$ até reta $x=0$

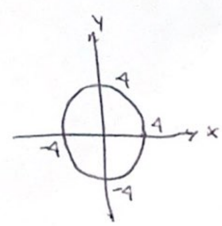
$$\int_0^1\int_0^{1-y} x^2+y^2\,dxdy = \int_0^1 \left(\frac{x^3}{3}+xy^2\right)\Big|_0^{1-y} dy$$

$$= \int_0^1 \frac{(1-y)^3}{3}+(1-y)y^2 = \int_0^1 \frac{(1-y)^3}{3}+y^2-y^3\,dy$$

$$= \left(-\frac{(y-1)^4}{12}+\frac{y^3}{3}-\frac{y^4}{4}\right)\Big|_0^1 = 0+\frac{1}{3}-\frac{1}{4}+\frac{1}{12}-0+0 = \frac{4-3+1}{12} = \frac{2}{12} = \boxed{\frac{1}{6}\ u.v}$$

b) $\iint_R 9-x^2-y^2\,dydx$ R: $r=4$ $\boxed{\begin{array}{l}x^2+y^2=16\\ 9-x^2-y^2=9-r^2\end{array}}$

$$\iint_R 9-x^2-y^2\,dydx = \int_{r_1}^{r_2}\int_{\theta_1}^{\theta_2} r\,d\theta\,dr$$



$$\int_0^4\int_0^{2\pi}(9-r^2)r\,d\theta dr = \int_0^4\int_0^{2\pi} 9r-r^3\,d\theta\,dr = \int_0^4\left(9r\theta-r^3\theta\right)\Big|_0^{2\pi} dr$$

$$= \int_0^4 (9r-r^3)\,2\pi\,dr = 2\pi\int_0^4 9r-r^3\,dr = 2\pi\left(\frac{9r^2}{2}-\frac{r^4}{4}\right)\Big|_0^4$$

$$= 2\pi\left(\frac{9.16}{2}-\frac{256}{4}\right) = 2\pi(72-64) = 2\pi.8 = 16\pi$$