Llista de problemes (7)

3.1 Calculen les següents integrals en $R = [0,1] \times [0,1]$

a) $\int_R (xy)^2 \cos x^3 \, dx\, dy$, b) $\int_R (ax + by + c) \, dx\, dy$, c) $\int_R \sin(x+y) \, dx\, dy$

d) $\int_R y e^{xy} \, dx\, dy$

3.2 Calculen el volum de la regió limitada pels plans xz, yz, xy, $x = 1$, $y = 1$ i la superfície $z = x^2 + y^4$.

3.3 Siguin $f: [a,b] \longrightarrow \mathbb{R}$, $g: [c,d] \longrightarrow \mathbb{R}$ contínues. Si $R = [a,b] \times [c,d]$ proveu que

$$\int_R f(x)\, g(y) \, dx\, dy = \left(\int_a^b f(x) \, dx \right) \left(\int_c^d g(y) \, dy \right)$$

3.4 Calculen

$$\int_R x(y^2 - 6x) \, dx\, dy, \qquad R = [-1,3] \times [1,2]$$

3.5 Sigui f contínua, $f \geqslant 0$, definida en un rectangle R.

Proveu que $\int_R f = 0$ implica $f = 0$

3.6 Calculeu

$$\int_R x \sin y \, dx \, dy \quad , \quad \text{on} \quad R = [0,2] \times [0, 2\pi] .$$