

MAT 2219 - Cálculo III para Química
Semestre 2016-II / Exercícios (Lista 1)

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Exercício 1 Calcule as seguintes integrais duplas

1. $\iint_R \frac{3}{2}x^7y^5dxdy, \quad R = [0, 1] \times [0, 2].$
2. $\iint_R 3xy(x+y)dxdy, \quad R = [0, 1] \times [0, 1].$
3. $\iint_R (4x^7 + 3y^5)dxdy, \quad R = [0, 1] \times [0, 1].$
4. $\iint_R (x^3 + 3x^2y + y^3)dxdy, \quad R = [0, 1] \times [0, 1].$
5. $\iint_R \sin^2(x) \sin^2(y)dxdy, \quad R = [0, \pi] \times [0, \pi].$
6. $\iint_R \cos^4(x) \cos^4(y)dxdy, \quad R = [0, \frac{\pi}{4}] \times [0, \frac{\pi}{4}].$

Exercício 2 Descreva as regiões de integração e calcule as seguintes integrais duplas

1. $\int_0^1 \int_y^1 e^{x^2}dxdy.$
2. $\int_0^{\sqrt{t}} \int_{y^2}^t 4y \cos(x^2)dxdy, \quad t = \sqrt{\frac{\pi}{2}}.$
3. $\int_0^{\frac{\pi}{2}} \int_x^{\frac{\pi}{2}} f(x, y)dxdy, \text{ onde } f(x, y) = \frac{\sin(y)}{y}, \text{ se } y \neq 0 \text{ e } f(x, 0) = 1.$
4. $\int_0^1 \int_0^1 f(x, y)dxdy, \text{ onde } f(x, y) = 0, \text{ se } y \neq x \text{ e } f(x, x) = 1.$
5. $\iint_R xydxdy, \quad R = \{(x, y) \in \mathbb{R}^2 | 4 \leq x^2 + y^2 \leq 9\}.$
6. $\int_{\varepsilon}^1 \int_{\varepsilon}^1 \frac{x^2 - y^2}{(x+y)^4}dxdy, \quad \varepsilon > 0. \text{ Estude o caso } \varepsilon = 0.$