

Cálculo Diferencial e Integral 2

Respostas à Ficha de Trabalho 8

1. (a) $\int_0^{\sqrt{2}} \int_{-\frac{\pi}{4}}^{\frac{\pi}{4}} f(r \cos \theta, r \sin \theta) r d\theta dr.$
 (b) $\int_{\frac{\pi}{4}}^{\frac{5\pi}{4}} \int_1^2 f(r \cos \theta, r \sin \theta) r dr d\theta.$
 (c) $\int_{-\frac{\pi}{2}}^0 \int_0^1 f(r \cos \theta, r \sin \theta) r dr d\theta + \int_{\frac{\pi}{4}}^{\frac{\pi}{2}} \int_{\frac{1}{\cos \theta}}^1 f(r \cos \theta, r \sin \theta) r dr d\theta.$
2. (a) $\frac{\pi}{4} \left(1 - \frac{1}{e}\right).$
 (b) $\frac{\pi \log 3}{8}.$
 (c) $\frac{\pi}{4}.$
 (d) $\pi \left(1 - \cos\left(\frac{\pi^2}{4}\right)\right).$
 (e) $2 \arctan 2.$
3. (a) A imagem de T é $S = \left\{ (x, y) \in \mathbb{R}^2 : 0 \leq x \leq 2, -x \leq y \leq \frac{x^2}{4} \right\}.$
 (b) 2.
4. $\frac{1}{16} (\text{sen}(16) - \text{sen}(1)).$
5. área(R) = $\log \frac{5}{3}$ e massa(R) = 4.
6. (a) $\int_0^{2\pi} \int_0^1 \int_{\rho^2}^{\sqrt{2-\rho^2}} \rho dz d\rho d\theta.$
 (b) $\int_0^{\pi} \int_1^{\sqrt{2}} \int_0^{\pi/4} r^2 \text{sen } \phi d\phi dr d\theta.$
7. $\frac{\pi}{28}.$
8. (a) $\frac{2\pi}{3}.$
 (b) $2\pi^2.$
9. $\frac{4\pi}{3} \left[R^3 - (R^2 - r^2)^{\frac{3}{2}} \right].$
10. $\frac{\text{sen}(1)}{3}.$
11. $G'(x) = 3x^2 f(x^4, x^6 + x^3) - f(x^2, x^2 + x^3) + \int_x^{x^3} t \frac{\partial f}{\partial u}(tx, t^2 + x^3) + 3x^2 \frac{\partial f}{\partial v}(tx, t^2 + x^3) dt.$
12. $\frac{\pi}{8} (2e^{16} - e^4).$