

## Cálculo Diferencial e Integral 2

### Respostas à Ficha de Trabalho 7

- (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)  $\int_{-\frac{\pi}{2}}^0 \int_0^1 f(r \cos \theta, r \sin \theta) r dr d\theta + \int_0^{\frac{\pi}{4}} \int_0^{\frac{1}{\cos \theta}} f(r \cos \theta, r \sin \theta) r dr d\theta.$
- (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)  $2 \arctan 2.$
- (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.
- $\frac{1}{16} (\sin(16) - \sin(1)).$
- (a)  $\int_0^{2\pi} \int_0^1 \int_{\rho^2}^{\sqrt{2-\rho^2}} \rho dz d\rho d\theta.$

(b)  $\int_0^{\pi} \int_1^{\sqrt{2}} \int_0^{\pi/4} r^2 \sin \phi d\phi dr d\theta.$
- $\frac{\pi}{28}.$
- (a)  $\frac{2\pi}{3}.$

(b)  $2\pi^2.$
- $\frac{\sin(1)}{3}.$
- $\frac{\pi}{8} (2e^{16} - e^4).$