MAT216 – Cálculo Diferencial e Integral III
Respostas da Lista de Exercícios 6

3. 0

4. (a) $\int_0^{2\pi}\int_0^a f(r\cos\theta, r\sin\theta) r\, dr d\theta$ (b) $\int_{-\pi/2}^{\pi/2}\int_0^{2\cos\theta} f(r\cos\theta, r\sin\theta) r\, dr d\theta$
(c) $\int_0^{2\pi}\int_a^b f(r\cos\theta, r\sin\theta) r\, dr d\theta$ (d) $\int_0^{\pi/2}\int_0^{1/(\sin\theta+\cos\theta)} f(r\cos\theta, r\sin\theta) r\, dr d\theta$
(e) $\int_0^{\pi/4}\int_0^{\tan\theta\sec\theta} f(r\cos\theta, r\sin\theta) r\, dr d\theta + \int_{\pi/4}^{3\pi/4}\int_0^{\csc\theta} f(r\cos\theta, r\sin\theta) r\, dr d\theta$
$+ \int_{3\pi/4}^{\pi}\int_0^{\tan\theta\sec\theta} f(r\cos\theta, r\sin\theta) r\, dr d\theta$

5. (a) $\frac{3}{2}\pi a^4$ (b) $\frac{1}{6}a^3[\sqrt{2}+\ln(1+\sqrt{2})]$ (c) $\sqrt{2}-1$ (d) $\pi a^4/8$

6. $\pi^4/3$

7. (a) $1+2u$ (c) 14/3 (d) $2+\frac{2}{\sqrt{3}}\left(\arctan\frac{1}{\sqrt{3}} - \arctan\frac{5}{\sqrt{3}}\right)$

8. (a) $4(u^2+v^2)$ (c) 0

10. (a) $\ln\sqrt{2} - 5/16$ (b) 1/48 (c) $\frac{4}{5}\pi abc$ (d) $\pi/6$

11. (a) $\int_0^1\int_{-z}^{z}\int_{-\sqrt{z^2-x^2}}^{\sqrt{z^2-x^2}} f(x,y,z)\, dydxdz$
(b) $\int_0^1\int_0^{x^2}\int_0^1 f(x,y,z)\, dydzdx + \int_0^1\int_{x^2}^{1+x^2}\int_{\sqrt{z-x^2}}^1 f(x,y,z)\, dydzdx$

12. (a) $16\pi/3$ (b) 1/6

13. (a) $\frac{4}{3}\pi a^3$ (b) $\frac{4}{3}\pi(b^3-a^3)$ (c) $\frac{4}{3}\pi R^3(a^2+b^2+c^2)^{-1/2}$

14. (a) $\frac{2}{3}\pi(5\sqrt{5}-4)$ (b) 32/9

16. No eixo, à distância de $\frac{2}{5}h$ da base.