Departamento de Matemática da Universidade de Aveiro

ANÁLISE MATEMÁTICA III **2007/08**

Folha 4: *soluções*

1.(a) $(\frac{5}{2}\sqrt{3}, \frac{5}{2})$

1.(b) $(-2, 2\sqrt{3})$

1.(c) $(-\frac{3}{2}\sqrt{3}, -\frac{3}{2})$

2.(a) $(5, \frac{\pi}{4})$

2.(b) $(5, 3\frac{\pi}{4})$

2.(c) $(3, -\frac{\pi}{3})$

6. $3\frac{\pi}{2}$

7. $5\frac{\pi}{6} + \sqrt{3}$

8.(a) $(x, y, z) = (-\frac{5}{2}\sqrt{3}, \frac{5}{2}, -3)$, $\quad (\rho, \varphi, \theta) = (\sqrt{34}, \arccos(-3\frac{\sqrt{34}}{34}), 5\frac{\pi}{6})$

8.(b) $(x, y, z) = (-2, 2\sqrt{3}, 1)$, $\quad (\rho, \varphi, \theta) = (\sqrt{17}, \arccos(\frac{\sqrt{17}}{17}), 2\frac{\pi}{3})$

8.(c) $(x, y, z) = (-\sqrt{2}, \sqrt{2}, -2)$, $\quad (\rho, \varphi, \theta) = (2\sqrt{2}, 3\frac{\pi}{4}, 3\frac{\pi}{4})$

9.(a) $(r, \theta, z) = (5, \frac{\pi}{4}, -3)$, $\quad (\rho, \varphi, \theta) = (\sqrt{34}, \arccos(-3\frac{\sqrt{34}}{34}), \frac{\pi}{4})$

9.(b) $(r, \theta, z) = (5, 3\frac{\pi}{4}, 11)$, $\quad (\rho, \varphi, \theta) = (\sqrt{146}, \arccos(11\frac{\sqrt{146}}{146}), 3\frac{\pi}{4})$

9.(c) $(r, \theta, z) = (2, 7\frac{\pi}{6}, -5)$, $\quad (\rho, \varphi, \theta) = (\sqrt{29}, \arccos(-5\frac{\sqrt{29}}{29}), 7\frac{\pi}{6})$

9.(d) $(r, \theta, z) = (\frac{3}{2}, 3\frac{\pi}{4}, -\frac{3}{2}\sqrt{3})$, $\quad (\rho, \varphi, \theta) = (3, 5\frac{\pi}{6}, 3\frac{\pi}{4})$

10.(a) $(x, y, z) = (-\frac{\sqrt{3}}{2}, \frac{3}{2}, 1)$, $\quad (r, \theta, z) = (\sqrt{3}, 2\frac{\pi}{3}, 1)$

10.(b) $(x, y, z) = (\frac{3}{2}, -\frac{3}{2}, -\frac{3}{2}\sqrt{3})$, $\quad (r, \theta, z) = (3, 3\frac{\pi}{2}, -3\sqrt{3})$

10.(c) $(x, y, z) = (3, \sqrt{3}, -2)$, $\quad (r, \theta, z) = (2\sqrt{3}, \frac{\pi}{6}, -2)$

11. $z = \sqrt{x^2 + y^2}$ $\quad$ (sup. cónica)

12. $y = x \wedge\ x, y \geq 0$ $\quad$ (semi-plano)

13. $x^2 + y^2 = 5$ $\quad$ (sup. cilíndrica)

14. $z = r, \quad \varphi = \frac{\pi}{4}$

15.(a) $\cos\varphi = \rho \sin^2\varphi$

15.(b) $\rho^2 = 6$

15.(c) $\cos\varphi = \sin\varphi\cos\theta$

16.(a) $r^2\cos(2\theta) = 1$

16.(b) $z^2 + r^2 = 6$

16.(c) $\theta = \frac{\pi}{4} \vee \theta = 5\frac{\pi}{4}$