MAT216 – Cálculo Diferencial e Integral III
Respostas da Lista de Exercícios 7

1. (a) $(a_2b_3 - a_3b_2)(x - x_0) + (a_3b_1 - a_1b_3)(y - y_0)(a_1b_2 - a_2b_1)(z - z_0) = 0$; $\vec{N} = (a_2b_3 - a_3b_2)\vec{i} + (a_3b_1 - a_1b_3)\vec{j} + (a_1b_2 - a_2b_1)\vec{k}$. (b) $x^2/a^2 + y^2/b^2 = z$; $\vec{N} = -2bu^2\cos v\vec{i} - 2au^2\sin v\vec{j} + abu\vec{k}$. (c) $x^2/a^2 + y^2/b^2 + z^2/c^2 = 1$; $\vec{N} = abc\sin u\left(\frac{\sin u\cos v}{a}\vec{i} + \frac{\sin u\sin v}{b}\vec{j} + \frac{\cos u}{c}\vec{k}\right)$. (d) $z = f(\sqrt{x^2 + y^2})$; $\vec{N} = -uf'(u)\cos v\vec{i} - uf'(u)\sin v\vec{j} + u\vec{k}$. (e) $(\sqrt{x^2 + y^2} - a)^2 + z^2 = b^2$; $\vec{N} = b(a + b\cos u)(\cos u\sin v\vec{i} + \cos u\cos v\vec{j} + \sin u\vec{k})$.

2. (a)$|abc|\cosh v\left[\left(\frac{\sin^2 u}{a^2} + \frac{\cos^2 u}{b^2}\right)\cosh^2 v + \frac{\sinh^2 v}{c^2}\right]^{1/2}$. (b) $\sqrt{128v^2 + 4}$

3. (a) $\pi a^2\sqrt{3}$ (b) $(2\pi - 4)a^2$ (c) 4 (d) $\sqrt{2}\pi a^2/4$ (e) $2\pi a^2(3\sqrt{3} - 1)/3$

5. $4\pi/3$

6. $1/2$

7. 0

8. $\pi\sqrt{2}$

9. $2\pi/3$

10. $-\pi/3$

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