

Cálculo Diferencial e Integral 2

Respostas à Ficha de Trabalho 6

1. (a) $\frac{2}{3}$.
 (b) $2 - \text{sen}(2)$.
2. (a) $\frac{1}{6}(e^9 - 1)$.
 (b) $\frac{1}{6}$.
3. (a) $\int_{-1}^0 \left(\int_{-\sqrt{1-y^2}}^{\sqrt{1-y^2}} f(x, y) dx \right) dy + \int_0^1 \left(\int_{-\sqrt{1-y}}^{\sqrt{1-y}} f(x, y) dx \right) dy$.
 (b) $\int_0^1 \left(\int_{2-y}^{1+\sqrt{1-y^2}} f(x, y) dx \right) dy$.
 (c) $\int_{-1}^0 \left(\int_0^{\pi - \arcsin x} f(x, y) dy + \int_{2\pi + \arcsin x}^{2\pi} f(x, y) dy \right) dx + \int_0^1 \left(\int_{\arcsin x}^{\pi - \arcsin x} f(x, y) dy \right) dx$.
4. A área é $\frac{7}{6}$. O centro de massa é o ponto $(\frac{5}{14}, \frac{38}{35})$. Os momentos de inércia são $I_x = \frac{673}{420}$, $I_y = \frac{13}{60}$ e $I_O = I_x + I_y = \frac{191}{105}$.
5. (a) $\int_0^1 \left(\int_0^x \left(\int_0^{1-x} dy \right) dz + \int_x^1 \left(\int_{z-x}^{1-x} dy \right) dz \right) dx$, e
 $\int_0^1 \left(\int_0^z \left(\int_{z-y}^{1-y} dx \right) dy + \int_z^1 \left(\int_0^{1-y} dx \right) dy \right) dz$.
 (b) $\int_{-1}^1 \left(\int_{-\sqrt{1-z^2}}^{\sqrt{1-z^2}} \left(\int_{-\sqrt{1-x^2}}^{\sqrt{1-x^2}} dy \right) dx \right) dz$ e $\int_{-1}^1 \left(\int_{-\sqrt{1-x^2}}^{\sqrt{1-x^2}} \left(\int_{-\sqrt{1-x^2}}^{\sqrt{1-x^2}} dz \right) dy \right) dx$.
 (c) $\int_0^1 \left(\int_{\frac{x}{2}}^x \left(\int_0^x dz \right) dy \right) dx$, $\int_0^{\frac{1}{2}} \left(\int_y^{2y} \left(\int_0^x dz \right) dx \right) dy + \int_{\frac{1}{2}}^1 \left(\int_y^1 \left(\int_0^x dz \right) dx \right) dy$, e
 $\int_0^{\frac{1}{2}} \left(\int_{\frac{z}{2}}^z \left(\int_z^{2y} dx \right) dy + \int_z^{\frac{1}{2}} \left(\int_y^{2y} dx \right) dy + \int_{\frac{1}{2}}^1 \left(\int_y^1 dx \right) dy \right) dz +$
 $\int_{\frac{1}{2}}^1 \left(\int_{\frac{z}{2}}^{\frac{1}{2}} \left(\int_z^{2y} dx \right) dy + \int_{\frac{1}{2}}^z \left(\int_z^1 dx \right) dy + \int_z^1 \left(\int_y^1 dx \right) dy \right) dz$.
6. Pode ser

$$\int_0^1 \left(\int_{-\sqrt{\frac{1-z}{2}}}^{\sqrt{\frac{1-z}{2}}} \left(\int_{\sqrt{z+y^2}}^{\sqrt{1-y^2}} dx \right) dy \right) dz$$
7. $\frac{1}{6}$.
8. (a) $\frac{1}{24}$.
 (b) $\frac{7}{48}$.
9. O volume é $\frac{1}{3}$. A segunda coordenada do centróide é 0.