

Cálculo Diferencial e Integral 2

Respostas à Ficha de Trabalho 6

1. a) $\frac{1}{2}$.

b) $1 - \cos(2)$.

2. a) $\frac{\sin 4}{4}$.

b) $\frac{1}{3}$.

3. a) $\int_{-1}^0 \left(\int_0^{\sqrt{1+y}} f(x, y) dx \right) dy + \int_0^1 \left(\int_0^{\sqrt{1-y^2}} f(x, y) dx \right) dy$.

b) $\int_0^1 \left(\int_{\sqrt{1-y^2}}^1 f(x, y) dx \right) dy + \int_1^2 \left(\int_0^{2-y} f(x, y) dx \right) dy$.

c) $\int_{-1}^0 \left(\int_0^{\pi - \arcsin x} f(x, y) dy \right) dx + \int_{2\pi + \arcsin x}^{2\pi} f(x, y) dy \right) dx + \int_0^1 \left(\int_{\arcsin x}^{\pi - \arcsin x} f(x, y) dy \right) dx$.

4. A área é $\frac{5}{3}$. A coordenada x do centróide é $\frac{7}{20}$.

5. a) $\int_0^1 \left(\int_0^{1-y} \left(\int_0^{x+y} dz \right) dx \right) dy$, e
 $\int_0^1 \left(\int_0^z \left(\int_{z-x}^{1-x} dy \right) dx \right) dz + \int_z^1 \left(\int_0^{1-x} dy \right) dx \right) dz$.

b) $\int_{-1}^1 \left(\int_{-\sqrt{1-y^2}}^{\sqrt{1-y^2}} \left(\int_{-\sqrt{1-y^2}}^{\sqrt{1-y^2}} dz \right) dx \right) dy$ e $\int_{-1}^1 \left(\int_{-\sqrt{1-x^2}}^{\sqrt{1-x^2}} \left(\int_{-\sqrt{1-y^2}}^{\sqrt{1-y^2}} dz \right) dy \right) dx$.

c) $\int_0^{\frac{1}{2}} \left(\int_0^y \left(\int_y^{2y} dx \right) dz + \int_y^{2y} \left(\int_z^{2y} dx \right) dz \right) dy + \int_{\frac{1}{2}}^1 \left(\int_0^y \left(\int_y^1 dx \right) dz + \int_y^1 \left(\int_z^1 dx \right) dz \right) dy$,
 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. a) Pode ser

$$\int_0^1 \left(\int_0^x \left(\int_{x/2}^x dy \right) dz \right) dx,$$

b) 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. $\frac{7}{12}$.

9. A primeira coordenada do centróide é $\frac{4}{5}$.