

Cálculo Diferencial e Integral 2

Respostas à Ficha de Trabalho 7

1. a) $\frac{1}{2}$.
b) $1 - \cos(2)$.
c) $e - 2$.
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) $\int_0^1 \left(\int_{y-2}^{-\sqrt{1-y^2}} f(x, y) dx + \int_{\sqrt{1-y^2}}^1 f(x, y) dx \right) dy + \int_1^2 \left(\int_{y-2}^{2-y} f(x, y) dx \right) dy$.
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
 $\int_0^1 \left(\int_0^z \left(\int_{z-x}^{1-x} dy \right) dx + \int_z^1 \left(\int_0^{1-x} dy \right) dx \right) dz$.
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. a) $\frac{7}{12}$.
b) $\log \sqrt{2} - \frac{5}{16}$.
9. A primeira coordenada do centróide é $\frac{4}{5}$.