



(1) Calcule as integrais iteradas:

(a)  $\int_1^4 \int_0^2 (6x^2y - 2x) dy dx$

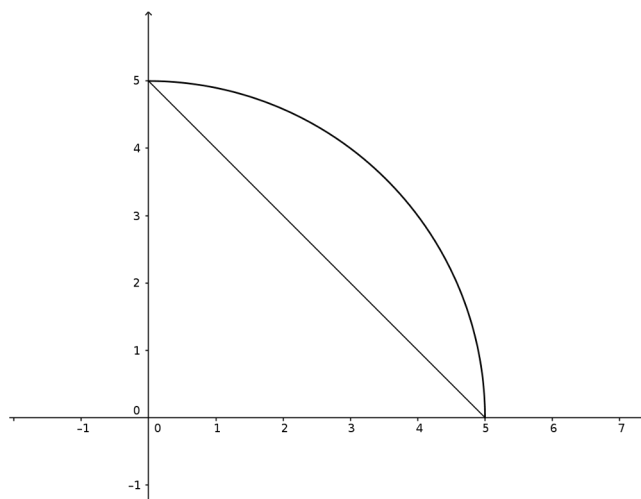
(b)  $\int \int_R \frac{xy^2}{x^2 + 1} dA$ , onde  $R = [0, 1] \times [-3, 3]$ .

(c)  $\int \int_R xe^{xy} dA$ , onde  $R = [1, 3] \times [0, 1]$ .

(d)  $\int_0^1 \int_x^{2x} (2x + 4y) dy dx$ .

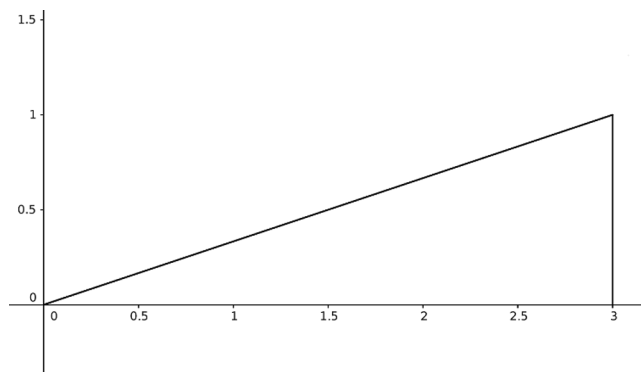
(e)  $\int_1^e \int_{\ln x}^1 x dy dx$ .

(2) Calcule  $\int \int_R y dA$ , onde  $R$  é a região do primeiro quadrante compreendida pelo círculo  $x^2 + y^2 = 25$  e a reta  $x + y = 5$ .

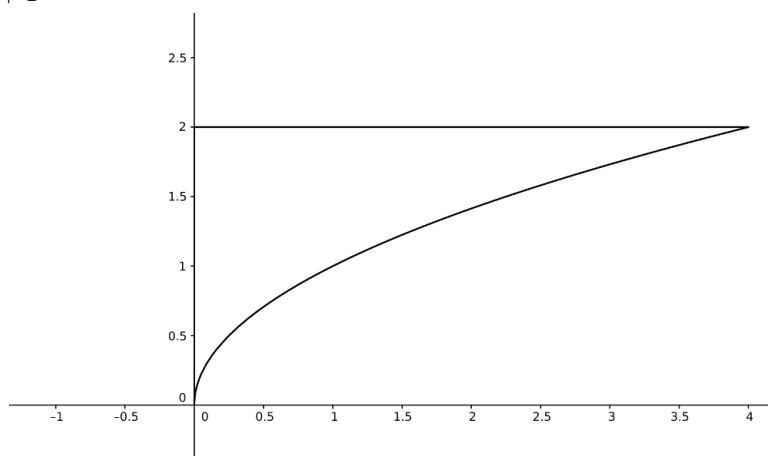


(3) Mude a ordem de integração e calcule as integrais abaixo:

(a)  $\int_0^1 \int_{3y}^3 e^{x^2} dx dy$

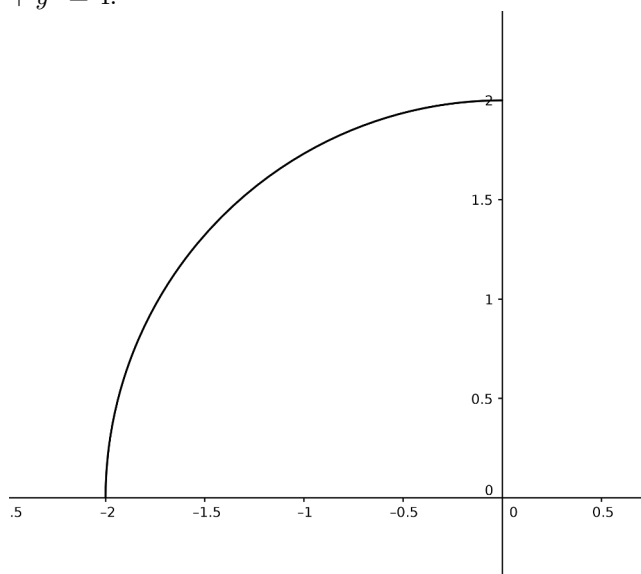


(b)  $\int_0^4 \int_{\sqrt{x}}^2 \frac{1}{y^3 + 1} dy dx$

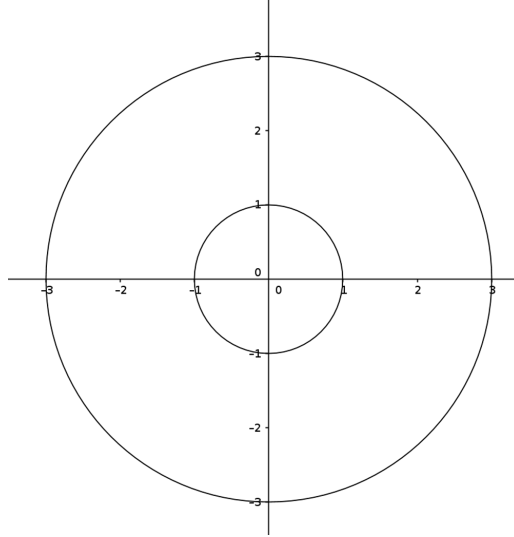


(4) Usando coordenadas polares, calcular:

(a)  $\iint_R \frac{dA}{1 + x^2 + y^2}$ , onde  $R$  é a região do segundo quadrante delimitada pela circunferência  $x^2 + y^2 = 4$ .



- (b)  $\iint_R \sqrt{x^2 + y^2} dA$ , onde  $R$  é a região delimitada por  $x^2 + y^2 = 1$  e  $x^2 + y^2 = 9$ .



- (5) Calcule as integrais triplas abaixo:

(a)  $\iiint_B 2y \sin(yz) dV$  onde  $B = [0, \pi] \times [0, \frac{\pi}{2}] \times [0, \frac{\pi}{3}]$ .

(b)  $\int_1^3 \int_x^{x^2} \int_0^{\ln z} x e^y dy dz dx$ .

(c)  $\int_{1/3}^{1/2} \int_0^\pi \int_0^1 z x \sin(xy) dz dy dx$ .

- (6) Calcule  $\iiint_E x^2 + y^2 dV$ , onde  $E$  é o cilindro  $x^2 + y^2 \leq 1$ ,  $1 \leq z \leq 4$ .

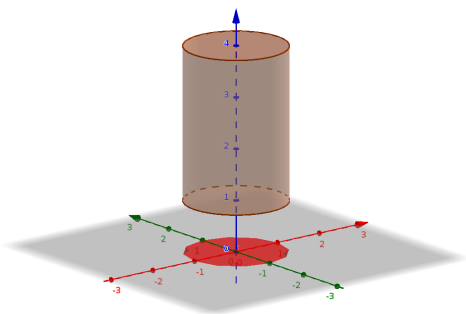


FIGURE 1. Região E

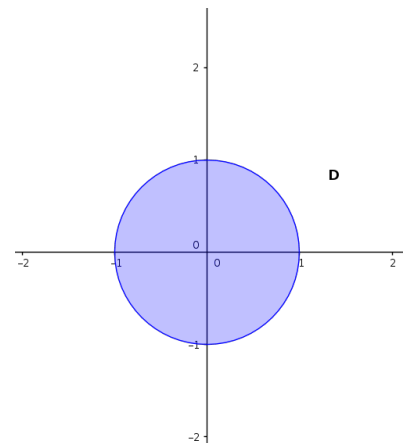


FIGURE  
2. Projecção  
no plano XY

- (7) Calcular  $\int \int \int_E xy dV$ , onde  $E$  é a região delimitada pelos planos  $y = 0$ ,  $y = 4$ ,  $z = 0$  e por  $z = 4 - x^2$ .

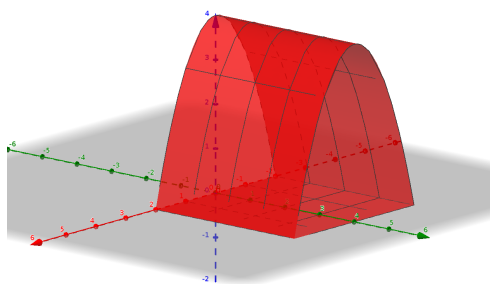


FIGURE 3. Região E

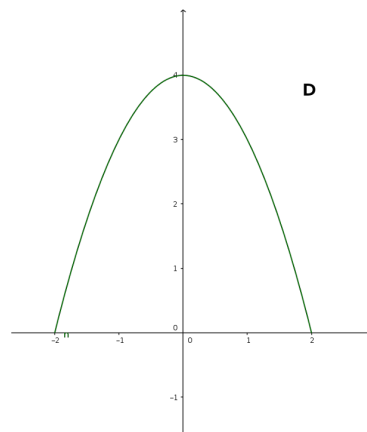
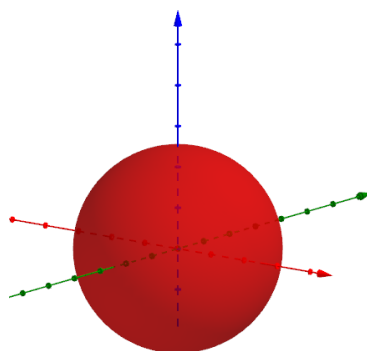
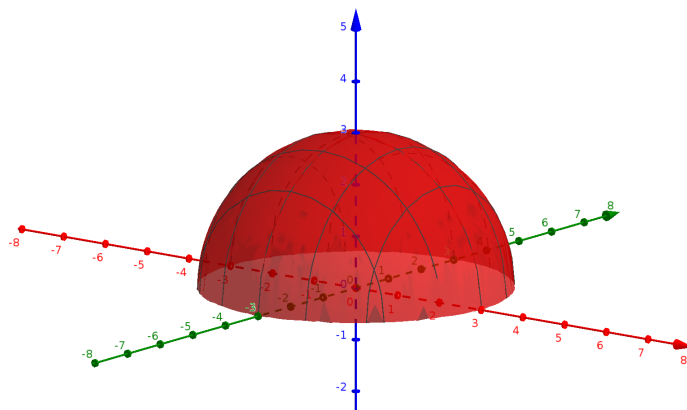


FIGURE  
4. Projeção  
no plano ZX

- (8) Calcular  $\int \int \int_E x^2 + y^2 + z^2 dV$ , onde  $E$  é delimitado pela esfera  $x^2 + y^2 + z^2 = 25$ .



- (9) Calcular  $\int \int \int_E (9 - x^2 - y^2) dV$ , onde  $E$  é delimitado pela semi-esfera  $x^2 + y^2 + z^2 = 9$  e o plano  $z \geq 0$ .



### Gabarito

- (1) (a) 222  
 (b)  $9 \ln 2$   
 (c)  $e^3 - e - 2$   
 (d)  $\frac{8}{3}$   
 (e)  $\frac{e^2 - 3}{4}$
- (2)  $\frac{125}{6}$
- (3) a)  $\frac{1}{6}(e^9 - 1)$   
 b)  $\frac{\ln 9}{3}$
- (4) a)  $\frac{\pi}{4} \ln 5$   
 b)  $\frac{52\pi}{3}$
- (5) b)  $\pi^2 - 6\sin(\frac{\pi^2}{6})$   
 c)  $\frac{118}{3}$   
 d)  $\frac{\pi - 6 + 3\sqrt{3}}{12\pi}$
- (6)  $\frac{3\pi}{2}$
- (7) 0
- (8)  $2500\pi$
- (9)  $\frac{486\pi}{5}$ .