UNIVERSIDADE FEDERAL DA GRANDE DOURADOS
Profª. Karla Lima

Cálculo III 27 de Abril de 2019

(1) Calcule as integrais iteradas:

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

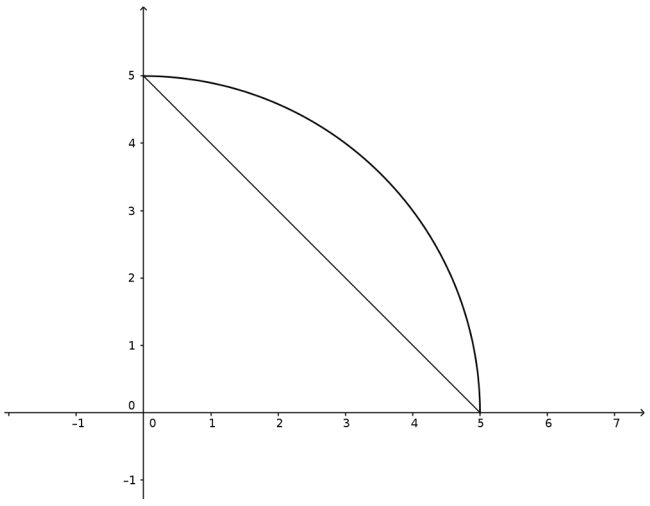
(b) $\int\int_R \frac{xy^2}{x^2+1}dA$, onde $R = [0,1] \times [-3,3]$.

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

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

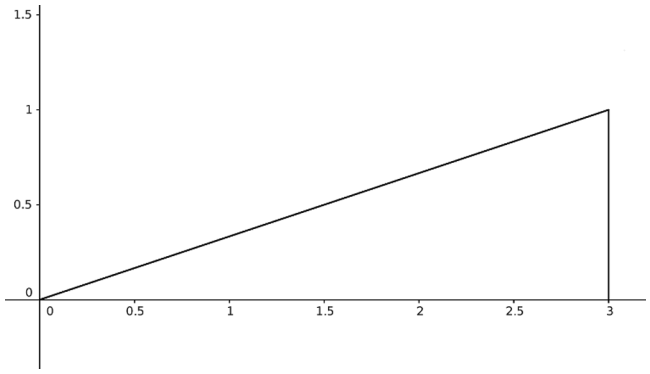
(e) $\int_1^e \int_{\ln x}^1 xdydx$.

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

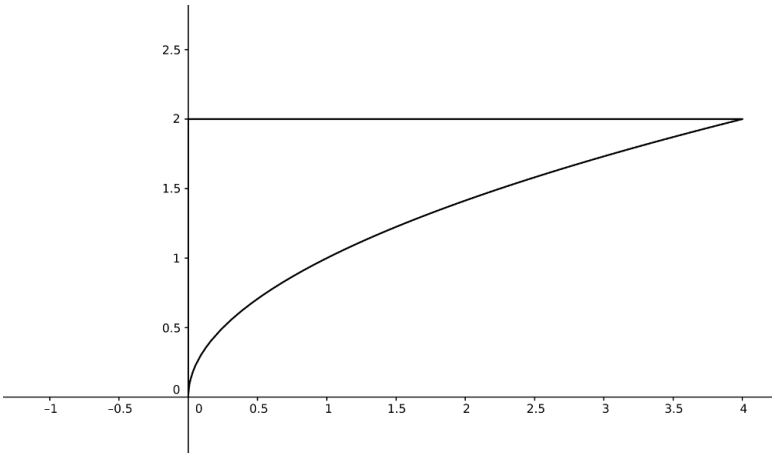


(3) Mude a ordem de integração e calcule as integrais abaixo:

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

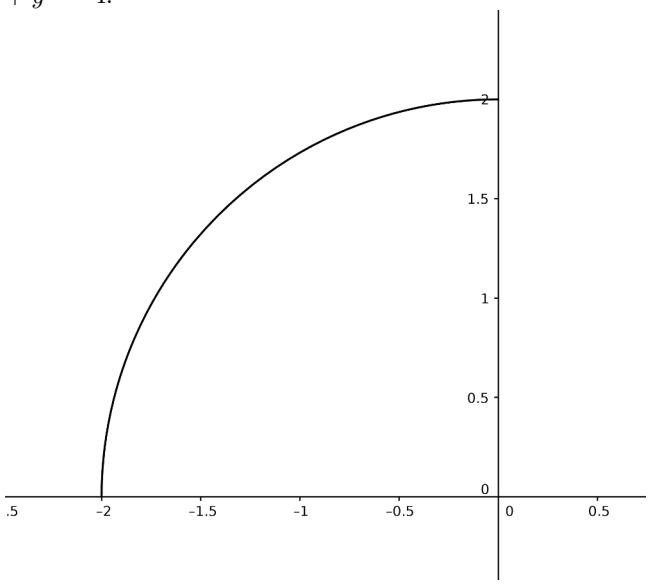


(b) $\int_0^4 \int_{\sqrt{x}}^2 \frac{1}{y^3+1} dydx$

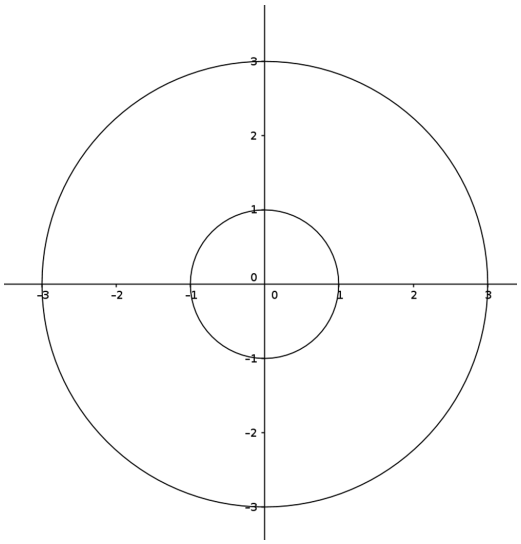


(4) Usando coordenadas polares, calcular:

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



(b) $\int\int_R \sqrt{x^2+y^2}dA$, 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) $\iiint_B 2y\text{sen}(yz)dV$ onde $B=[0,\pi]\times[0,\frac{\pi}{2}]\times[0,\frac{\pi}{3}]$.

(b) $\int_1^3\int_x^{x^2}\int_0^{\ln z} xe^y dydzdx$.

(c) $\int_{1/3}^{1/2}\int_0^{\pi}\int_0^1 zx\text{sen}(xy)dzdydx$.

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

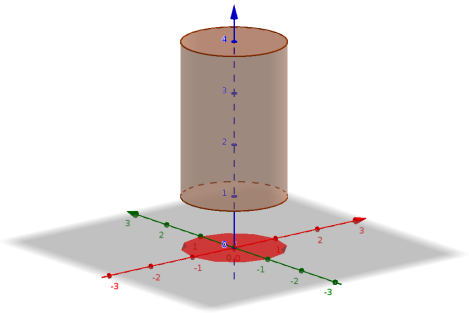


FIGURE 1. Região E

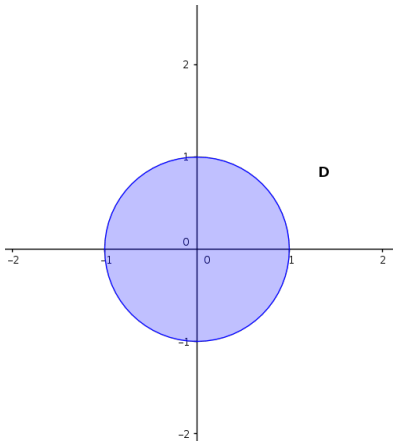


FIGURE 2. Projeção no plano XY

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

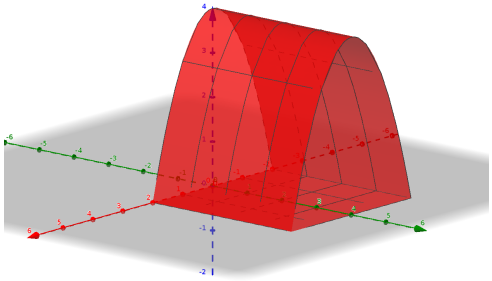


FIGURE 3. Região E

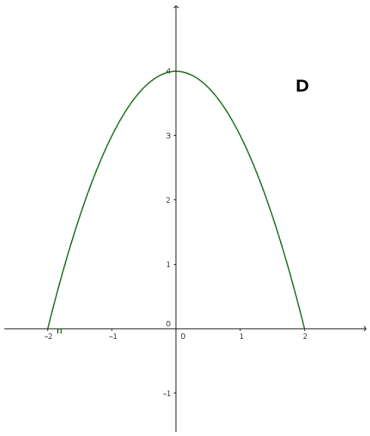


FIGURE 4. Projeção no plano ZX

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) $\pi^2 - 6\text{sen}(\frac{\pi^2}{6})$
c) $\frac{118}{3}$
d) $\frac{\pi - 6 + 3\sqrt{3}}{12\pi}$

(6) $\frac{3\pi}{2}$

(7) 0