UNIVERSIDADE FEDERAL DA GRANDE DOURADOS
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Cálculo III 19 de Julho de 2017

(1) Calcule as integrais triplas abaixo:

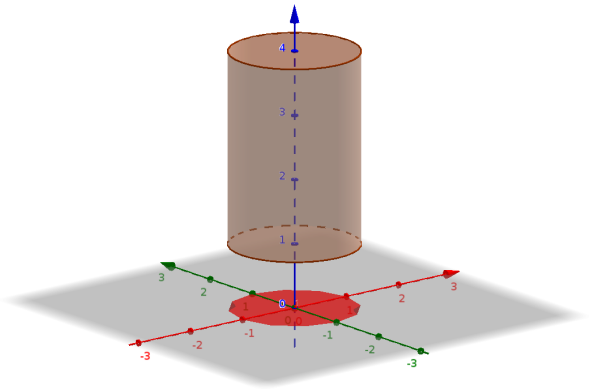
a) $\iiint_B xyz^2 dV$ onde $B = [0,1] \times [0,2] \times [1,3]$.

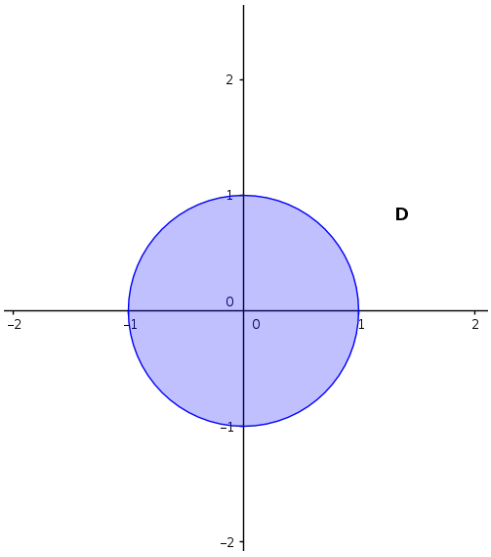
b) $\iiint_B 2y\text{sen}(yz)dV$ onde $B = [0,\pi] \times [0,\frac{\pi}{2}] \times [0,\frac{\pi}{3}]$.

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

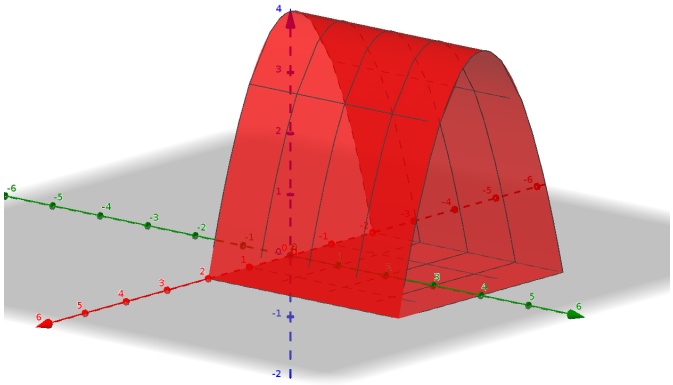
d) $\int_{1/3}^{1/2} \int_0^{\pi} \int_0^1 zx\text{sen}(xy)dzdydx$.

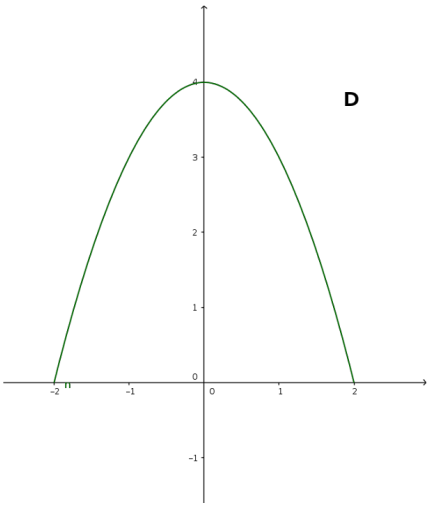
(2) Calcule $\int\int\int_E x^2 + y^2 dV$, onde E é o cilindro $x^2 + y^2 \leq 1$, $1 \leq z \leq 4$.



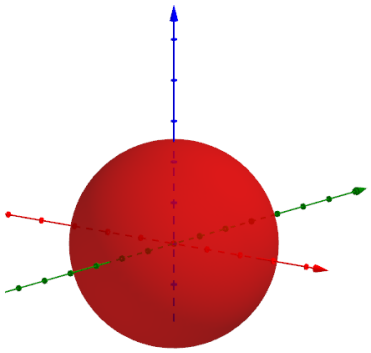


(3) Calcular $\int\int\int_E xydV$, onde E é a região delimitada pelos planos $y = 0$, $y = 4$, $z = 0$ e por $z = 4 - x^2$.

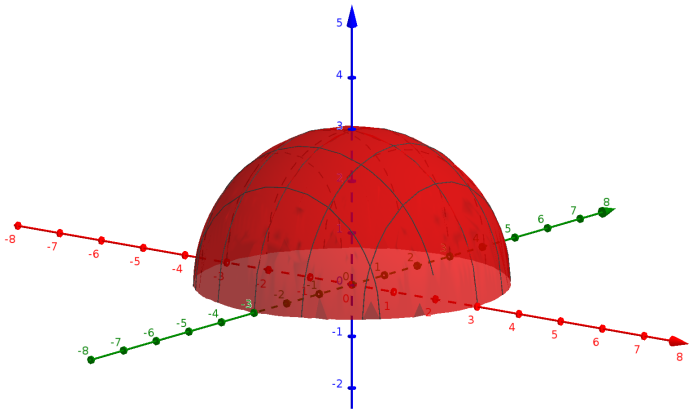




(4) Calcular $\int\int\int_E x^2 + y^2 + z^2 dV$, onde E é a esfera $x^2 + y^2 + z^2 = 25$.



(5) Calcular $\int\int\int_E (9 - x^2 + y^2) dV$, onde E é a semi-esfera $x^2 + y^2 + z^2 = 9$, $z \geq 0$.



Gabarito

(1) a) $\dfrac{26}{3}$

b) $\pi^2 - 6\text{sen}(\frac{\pi^2}{6})$

c) $\dfrac{118}{3}$

d) $\dfrac{\pi - 6 + 3\sqrt{3}}{12\pi}$

(2) $\dfrac{3\pi}{2}$

(3) 0

(4) $\dfrac{312500\pi}{7}$

(5) $\dfrac{486\pi}{5}$.