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Ficha de trabalho nº 6

1) $\int_1^2 \int_0^4 (x^2 + xy)\, dy\, dx$

$\int_1^2 \left[x^2 y + \frac{xy^2}{2} \right]_0^4 dx$

$\int_1^2 \left[4x^2 + 8x \right] dx = \left[4x^3 + 4x^2 \right]_1^2$

$= \left(\frac{4 \times 8}{3} + 16 \right) - \left(\frac{4}{3} + 4 \right) = \frac{64}{3}$

2) a) a) verticalmente simples

$\iint_D f(x,y)\, dA$

$\int_1^3 \int_1^{x+1} f(x,y)\, dy\, dx$

b) horizontalmente simples

$\iint_D f(x,y)\, dA$

$\int_1^4 \int_{y-1}^3 f(x,y)\, dx\, dy$

b) $\text{vol}(S) = \iint_D f(x,y)\, dA$

$$\int_0^3 \int_1^{x+1} (2)\, dy\, dx$$

$$\int_0^3 \left[2y\right]_1^{x+1} dx$$

$$\int_0^3 \left[2x + 2 - 2\right] dx$$

$$\left[x^2\right]_0^3 = 9$$

3) $$\int_0^1 \int_0^3 \int_0^2 (xyz)\, dx\, dy\, dz$$

$$\int_0^1 \int_0^3 \left(\frac{x^2}{2} yz\right)_0^2 dy\, dz$$

$$\int_0^1 \int_0^3 (2yz)\, dy\, dz$$

$$\int_0^1 \left(y^2 z\right)_0^3 dz = \int_0^1 9z\, dz = \left[\frac{9z^2}{2}\right]_0^1$$

$$= \frac{9}{2}$$