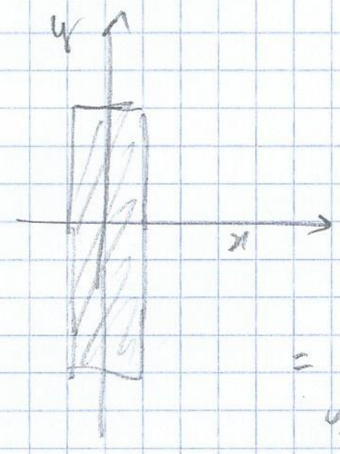
Integrais duplos

1) Calcule $\iint_R 4xy^3\,dA$ sendo $R=\{(x,y)\in\mathbb{R}^2: -1\le x\le 1 \wedge -2\le y\le 2\}$



$$\int_{-1}^{1}\left[\int_{-2}^{2}4xy^3\,dy\right]dx = \int_{-1}^{1}4x\int_{-2}^{2}y^3\,dy\;dx =$$

$$= \int_{-1}^{1}4x\left[\frac{y^4}{4}\right]_{-2}^{2}dx = \int_{-1}^{1}x\left(2^4-(-2)^4\right)dx = 0$$

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2) $\iint x\sqrt{1-x^2}\,dA$ $\qquad R=\{(x,y)\in\mathbb{R}^2: 0\le x\le 1 \wedge 2\le y\le 3\}$

$$\int_0^1\left(\int_2^3 x\sqrt{1-x^2}\,dy\right)dx = \int_0^1 x\sqrt{1-x^2}\,[y]^3\,dx =$$

$$=(3-2)\left(-\frac12\right)\int_0^1 -2x\sqrt{1-x^2}\,dx = -\frac12\left[\frac{(1-x^2)^{\frac12+1}}{\frac12+1}\right]_0^1 =$$

Area $=\iint 1\,dA$

$u=1-x^2$

$u'=-2x$

$$= -\frac{1}{\cancel{2}}\times\frac{\cancel{2}}{3}\left[(1-x^2)^{3/2}\right]_0^1 = -\frac13\left[0-1\right]=\frac13$$

$$\left(\sqrt{\text{sen}^2x+8e^y}\right)'_x = \left((\text{sen}^2x+8e^y)^{\frac12}\right)'_x = \frac12(\text{sen}^2x+8e^y)^{-\frac12}\cdot(2\,\text{sen}\,x\cos x)$$