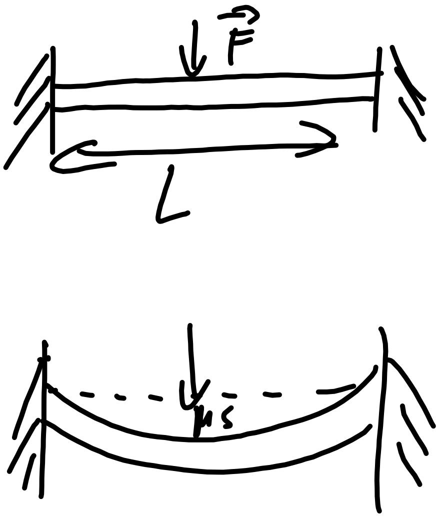
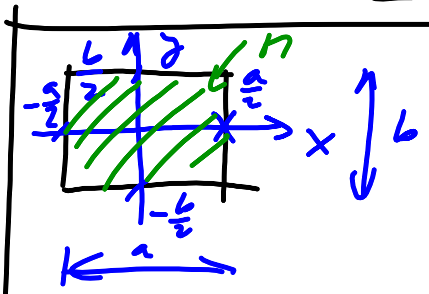


$$\delta = \frac{F\cdot L^3}{48\cdot E\cdot I}$$

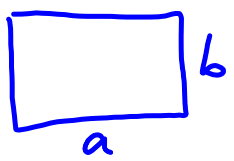


$$I(a,b) = \iint_M y^2\,dx\,dy =$$

$$= \int_{-\frac{a}{2}}^{\frac{a}{2}} \boxed{\int_{-\frac{b}{2}}^{\frac{b}{2}} y^2\,dy}\,dx = \int_{-\frac{a}{2}}^{\frac{a}{2}} 1\,dx \cdot \int_{-\frac{b}{2}}^{\frac{b}{2}} y^2\,dy =$$

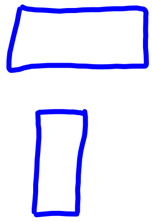
$$= \left(\frac{a}{2} + \frac{a}{2}\right)\cdot\left[\frac{y^3}{3}\right]_{-\frac{b}{2}}^{\frac{b}{2}} = a\cdot\frac{1}{3}\cdot\left(\frac{b^3}{8} + \frac{b^3}{8}\right) =$$

$$= \frac{a}{3}\cdot\frac{b^3}{4} = \boxed{\frac{1}{12}\cdot a\cdot b^3}$$



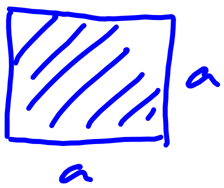
$a=2,\ b=1$

$a=1,\ b=2$

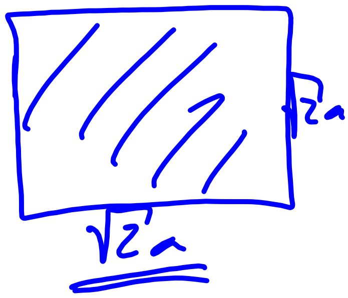


$I(2,1)=\frac{1}{6}$

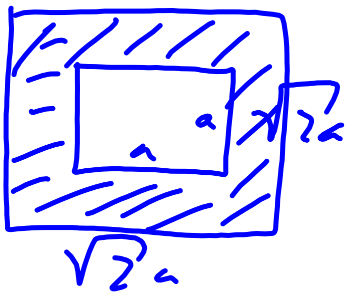
$I(1,2)=\frac{4}{6}$



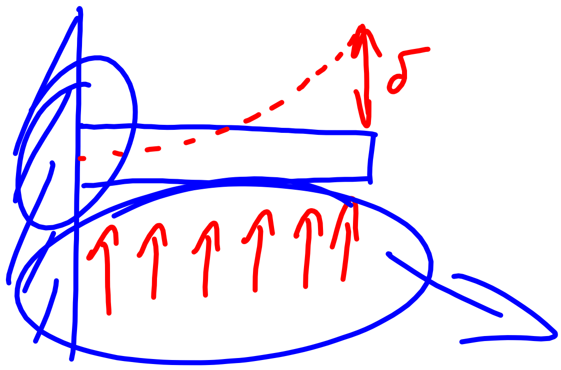
$$I_1 = \frac{a^4}{12}$$



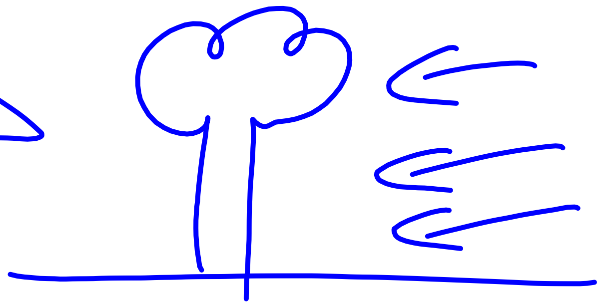
$$I_2 = 4 \cdot I_1$$



$$I_3 = 3 \cdot I_1$$

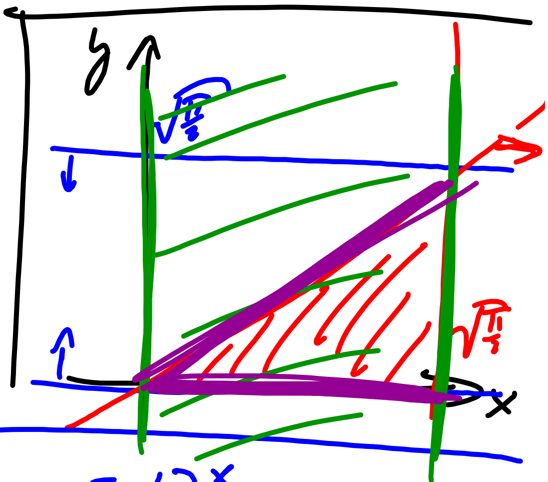


$$\delta = \frac{q L^4}{8 \cdot E \cdot I}$$



$$\int_0^{\sqrt{\frac{\pi}{2}}} \left(\int_y^{\sqrt{\frac{\pi}{2}}} y^2 \cdot \sin x^2 \, dx \right) dy =$$

$$= \int_0^{\sqrt{\frac{\pi}{2}}} y^2 \cdot \left(\underbrace{\int_0^{\sqrt{\frac{\pi}{2}}} \sin(x^2) \, dx} \right) dy$$

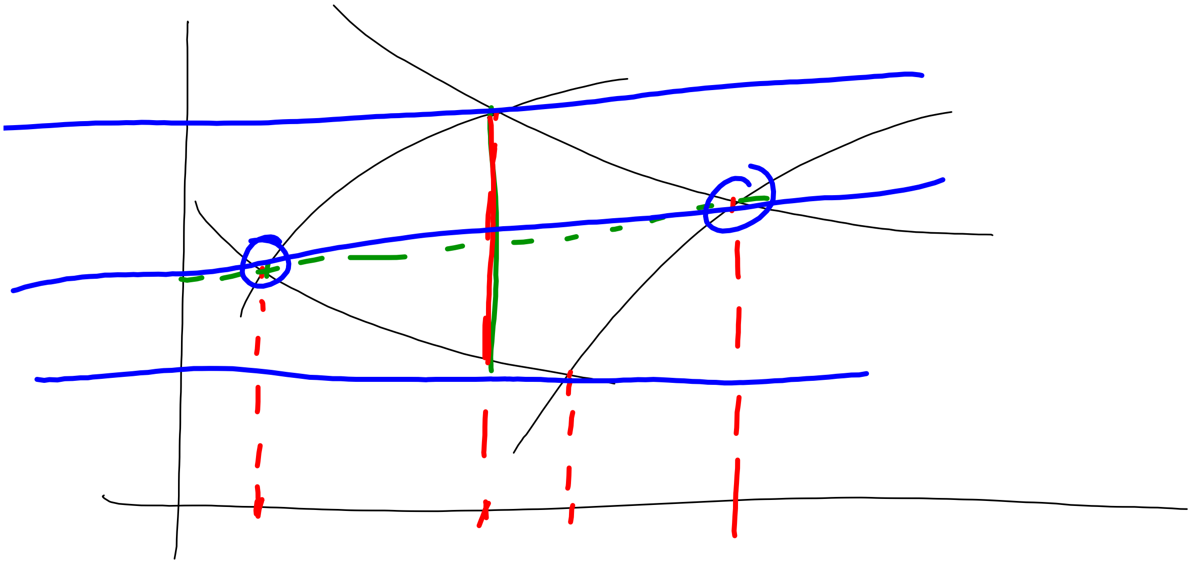


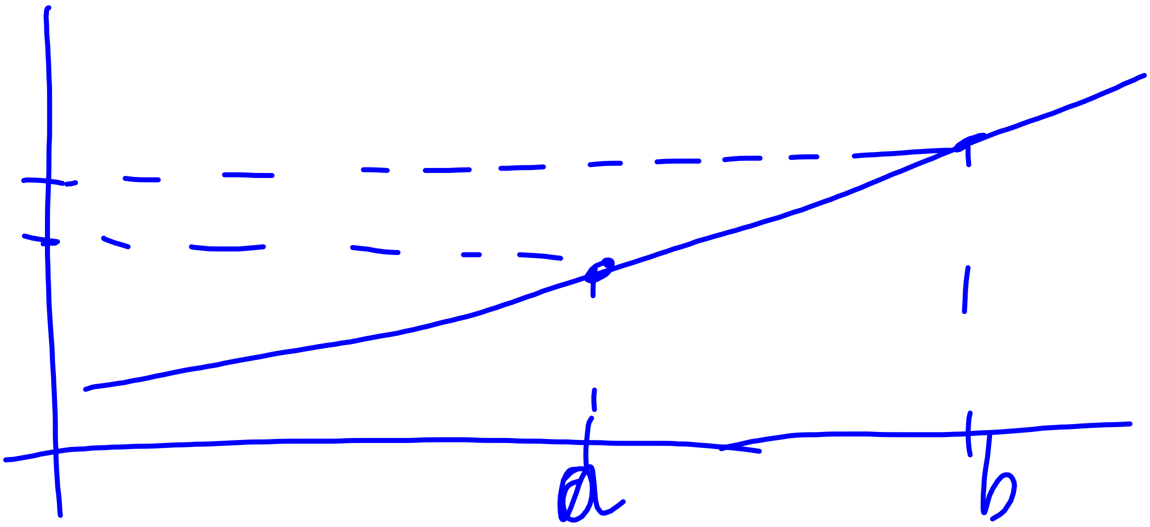
$$\int_0^{\sqrt{\frac{\pi}{2}}} \int_0^{x} y^2 \cdot \sin x^2 \, dy \, dx = \int_0^{\sqrt{\frac{\pi}{2}}} \sin x^2 \cdot \left[\frac{y^3}{3} \right]_0^x dx =$$

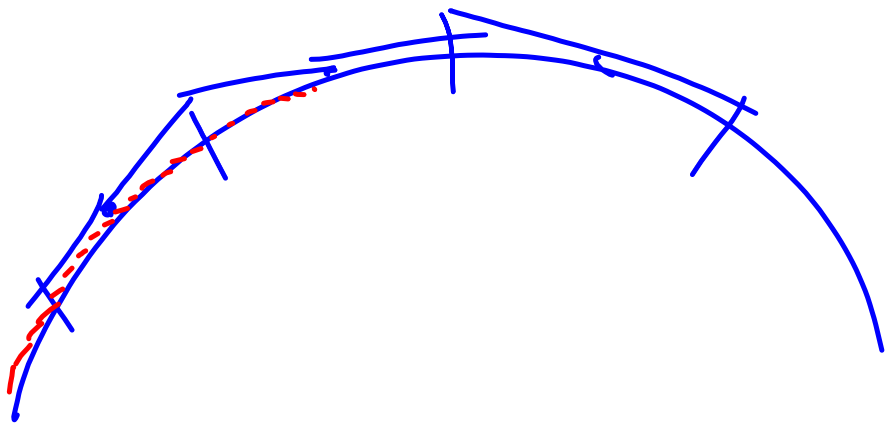
$$= \int_0^{\sqrt{\frac{\pi}{2}}} \sin x^2 \cdot \left(\frac{x^3}{3} - 0 \right) dx = \frac{1}{3} \cdot \int_0^{\sqrt{\frac{\pi}{2}}} x^3 \cdot \sin x^2 \, dx =$$

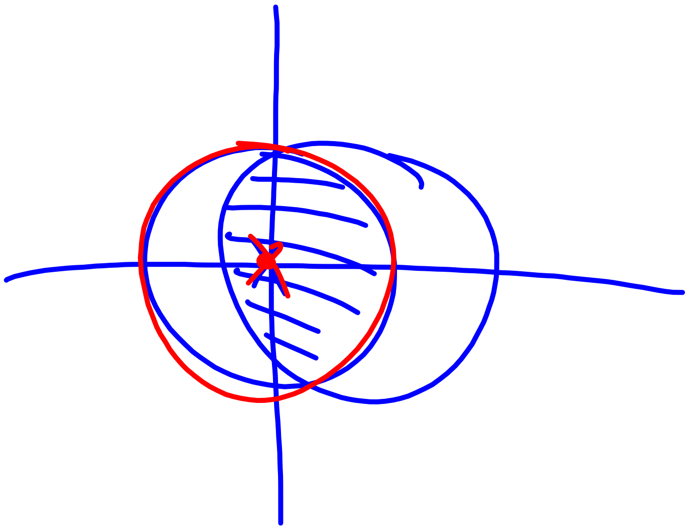
$$= \left| \begin{matrix} t = x^2 \\ dt = 2x \, dx \end{matrix} \right| = \frac{1}{3} \int_0^{\frac{\pi}{2}} \frac{1}{2} t \cdot \sin t \, dt = \frac{1}{6} \cdot \underbrace{\int_0^{\frac{\pi}{2}} t \cdot \sin t \, dt} =$$

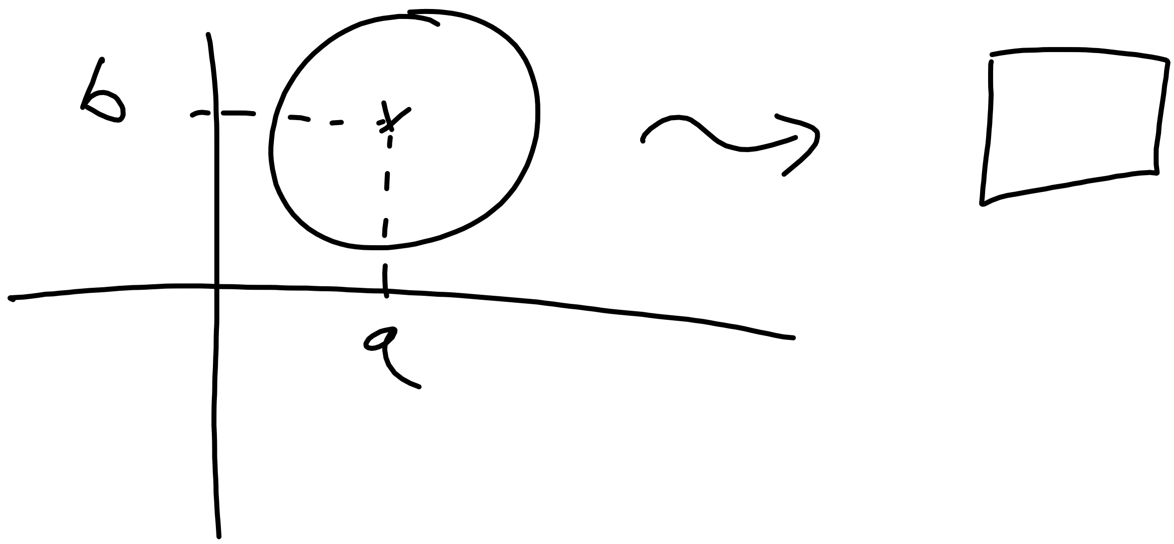
$$= \dots = \frac{1}{6}$$

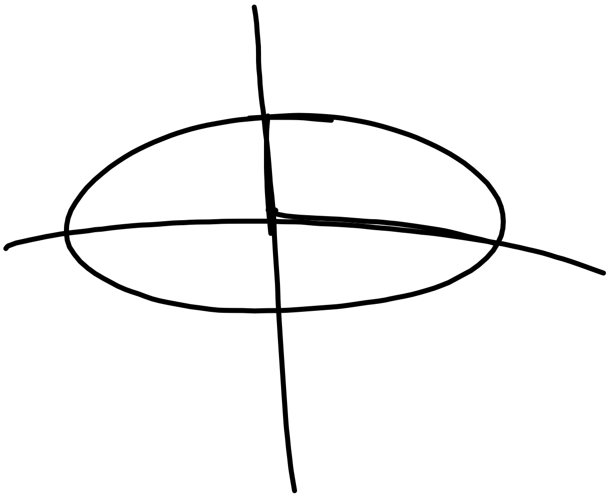


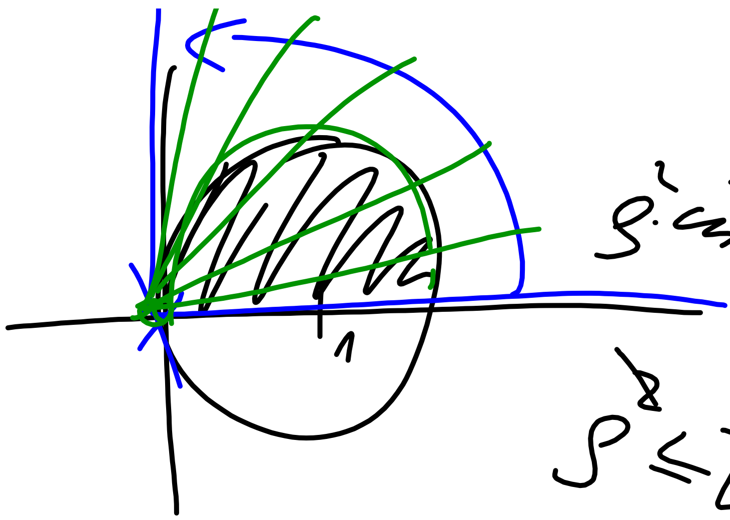

a
b






b
a





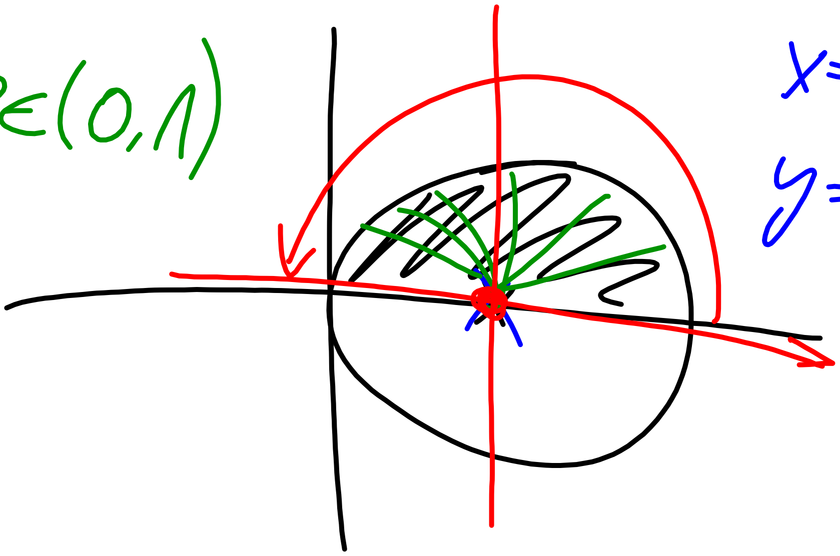
$x^2+y^2 \le 2x$

$\varrho^2\cdot\cos^2\varphi+\varrho^2\cdot\sin^2\varphi \le$

$\le 2\cdot\varrho\cdot\cos\varphi$

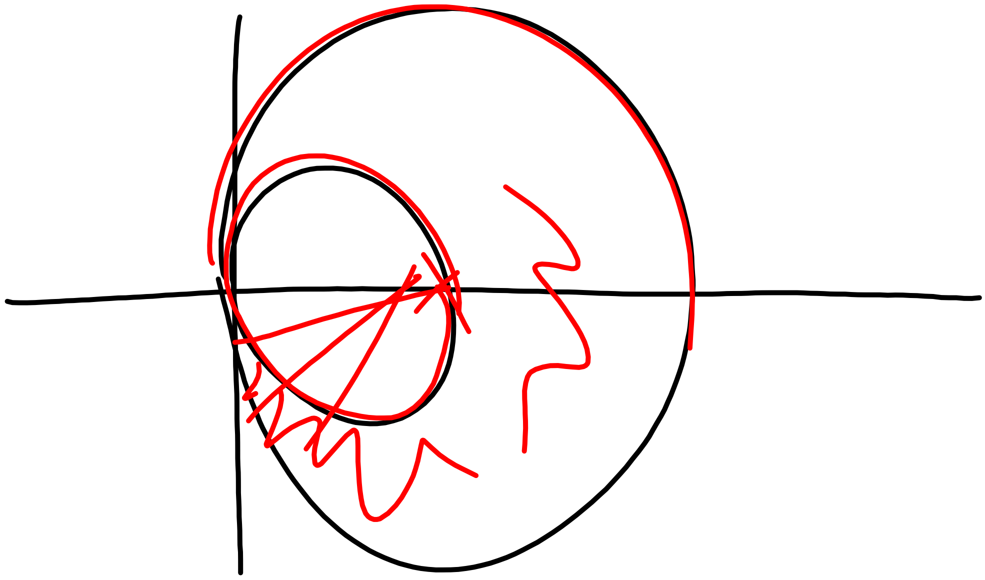
$\varrho^{\cancel{2}} \le 2\cdot\cancel{\varrho}\cdot\cos\varphi$

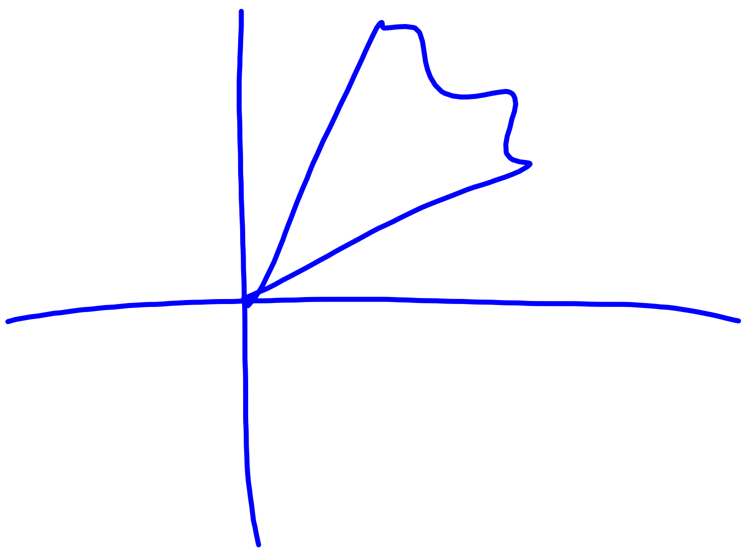
$\rho \in (0,1)$



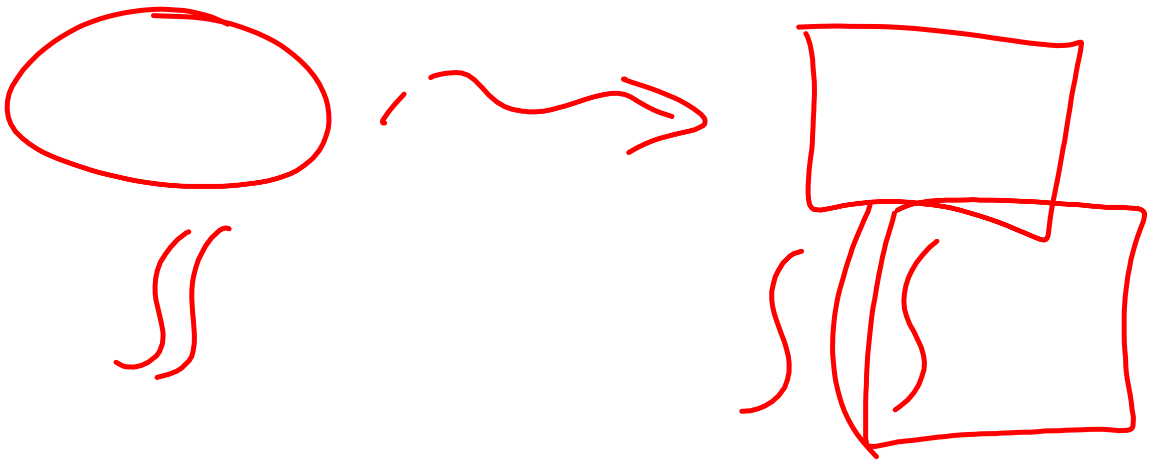
$x = 1 + \rho \cdot \cos\varphi$

$y = 0 + \rho \cdot \sin\varphi$

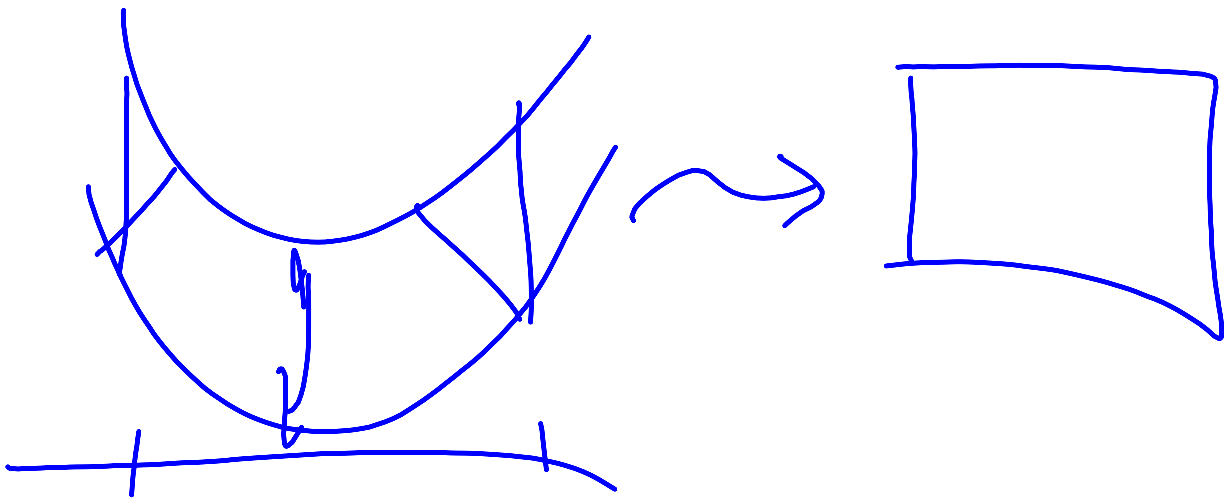




$$\int_1^5 f(x)\,dx$$



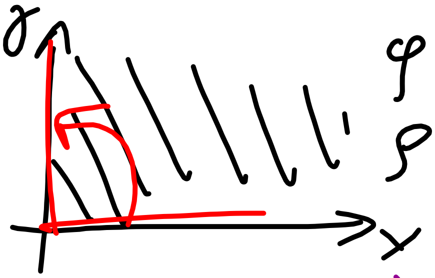
$$(x-1)^2+(y+2)^2+(z-3)^2$$



$$\int_0^\infty e^{-x^2}dx \cdot \int_0^\infty e^{-y^2}dy =$$

$\sqrt{\frac{\pi}{4}}$

$$= \int_0^\infty \int_0^\infty e^{-x^2}dx \, e^{-y^2} dy = \int_0^\infty \int_0^\infty e^{-x^2-y^2} dx\, dy$$



$\varphi \in (0, \frac{\pi}{2})$

$\rho \in (0, \infty)$

$$= \int_0^{\frac{\pi}{2}} \boxed{\int_0^\infty e^{-\rho^2} \rho \, d\rho} \, d\varphi$$

$-(x^2+y^2) = -\rho^2(\cos^2\varphi + \sin^2\varphi)$

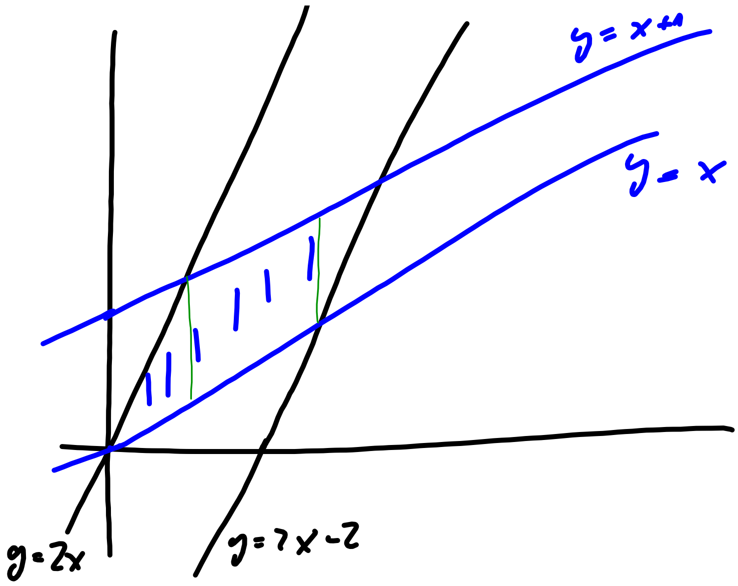
$$= \int_0^{\frac{\pi}{2}} 1 \, d\varphi \cdot \underbrace{\int_0^\infty e^{-\rho^2} \rho \, d\rho}_{\substack{t = -\rho^2 \\ dt = -2\rho\, d\rho}} = \frac{\pi}{2} \cdot \int_0^{-\infty} e^t \left(-\frac{1}{2}\right) dt =$$

$$= \ldots = \frac{\pi}{4}$$

$M: \quad x \le y \le x+1, \quad 2x-2 \le y \le 2x$

$0 \le y-x \le 1$

$-2 \le y-2x \le 0$



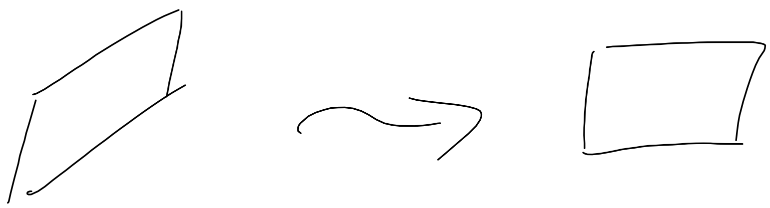
$$\boxed{\begin{aligned} u &= y-x \\ v &= y-2x \end{aligned}} \quad \begin{aligned} &u \in [0,1] \\ &v \in [-2,0] \end{aligned}$$

$y = u + x \Rightarrow v = u + x - 2x = u - x \Rightarrow \boxed{x = u - v}$

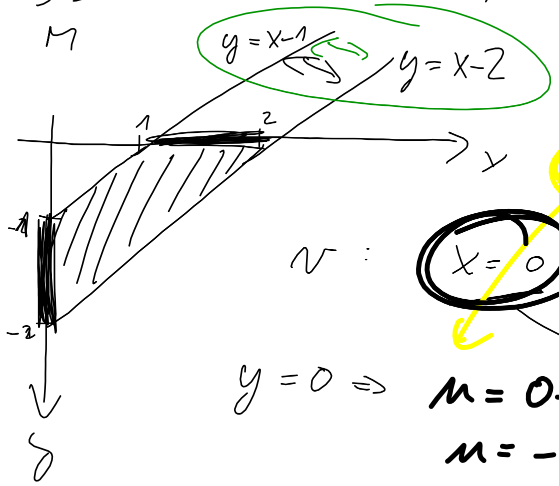
$y = u + u - v = 2u - v$

$$J(u,v) = \begin{vmatrix} x_u & x_v \\ y_u & y_v \end{vmatrix} = \begin{vmatrix} 1 & -1 \\ 2 & -1 \end{vmatrix} = -1 + 2 = 1$$

$$S = \iint_M 1 \, dx\, dy = \int_0^1 \int_{-2}^0 1 \cdot 1 \, dv\, du = 2$$



$\iint_M e^{\frac{x+y}{x-y}}\,dx\,dy$, $M: [1,0], [2,0], [0,-2], [0,-1]$



$-2 \le y-x \le -1$

$u = y-x$, $u \in [-2,-1]$

v : $x=0$ .. $y=0$ $\Rightarrow$ $v = x$ $\Rightarrow$ $v \in [0, ?]$

$y = 0 \Rightarrow u = 0-x$

$u = -x$, $x = -u$ $[0,-u]$

$u = y-x \in [-2,-1]$ | $x = v$

$v = x \in [0,-u]$ | $y = u+v$ $J = \begin{vmatrix} 0 & 1 \\ 1 & 1 \end{vmatrix} = -1$

$$\frac{x+y}{x-y} = \frac{x+y-x+x}{-(y-x)} = \frac{u+2\cdot v}{-u} = -1-2\frac{v}{u}$$

$$\Rightarrow \text{INT.} = \int_{-2}^{1}\int_{0}^{-u} e^{-1-2\frac{v}{u}}\cdot 1\,dv\,du = \dots = -\frac{3\cdot(1-e^2)}{4e}$$