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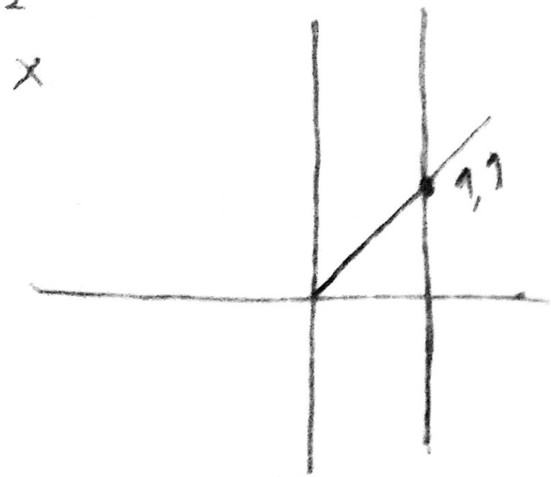
$x = 1$
$f(x) = x$



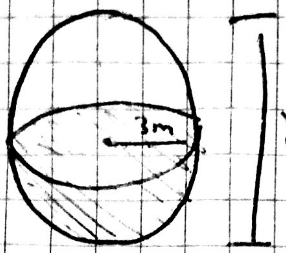
$$\overline{x} = \frac{\int_0^1 x^2\,dx}{\int_0^1 x\,dx} = \frac{\left.\frac{x^3}{3}\right|_0^1}{\left.\frac{x^2}{2}\right|_0^1} = \frac{\frac{1}{3}}{\frac{1}{2}} = \frac{2}{3}$$

$$\overline{y} = \frac{\frac{1}{2}\int_0^1 x^2\,dx}{\int_0^1 x\,dx} = \frac{\frac{1}{2}\left(\left.\frac{x^3}{3}\right|_0^1\right)}{\left(\left.\frac{x^2}{2}\right|_0^1\right)} = \frac{\frac{1}{6}}{\frac{1}{2}} = \frac{1}{3}$$

Centro masa $\left(\frac{2}{3}, \frac{1}{3}\right)$

Día Mes Añ

1



$$V = \frac{4}{3}\pi r^3$$

$$= \frac{4}{3}\pi (3)^3$$

$$= 4(3m)^2 \pi$$

$$V = 36\pi \, m^3$$

$$m = 18000\pi \text{ kg}$$

$$F = mg \approx (9{,}8 \, m/s^2)(18000\pi \text{ kg})$$

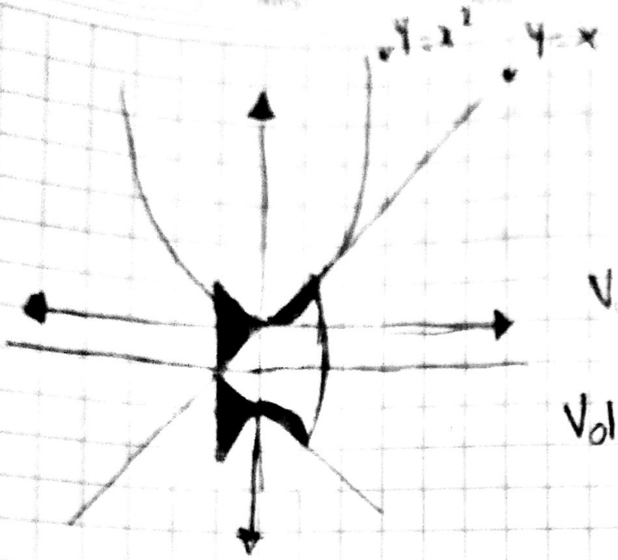
$$= 176{,}400 \, \pi \, N.$$

$$W = \int_4^7 176400 \, \pi \, dx = \Big[176400 \, \pi x\Big]_3^7 =$$

$$= 1234800\pi - 529200\pi$$

$$= 705600\pi \, J$$

Día Mes Año



entorno a $y = -1$

$r_2 = (x+1)$ $\quad$ $r_3 = (x^2+1)$

$r_1 = (x^2+1)$ $\quad$ $r_4 = (x+1)$

$$\text{Volumen} = \pi \int_0^1 (r_2^2 - r_1^2)\,dx$$

$$\text{Volume} = \pi \int_{-1}^0 (r_3^2 - r_1^2)\,dx$$

Volumen = Volumen + Volumen$_2$

$$\text{Volumen}_1 = \pi \int_0^1 (x^2+2x+1) - (x^4+2x^2+1)\,dx = \pi \int_0^1 -x^4 - x^2 + 2x\,dx$$

$$= \pi\left[\frac{-x^5}{5}\Big|_0^1 - \frac{x^3}{3}\Big|_0^1 + \frac{2x^2}{2}\Big|_0^1 \right] = \pi\left[\frac{-1}{5} - \frac{1}{3} + 1 \right]$$

$$= \pi\left[\frac{-3-5+15}{15} \right] = \pi\left[\frac{7}{15} \right]$$

$$\text{Volumen}_2 = \pi \int_{-1}^0 (x^4+2x^2+1) - (x^2+2x+1)\,dx = \pi \int_{-1}^0 (x^4+x^2-2x)\,dx$$

$$= \pi\left[\frac{x^5}{5} + \frac{x^3}{3} - \frac{\cancel{2}x^2}{\cancel{2}} \right] = \pi\left[\left(\frac{0}{5} - \frac{(-1)}{5} \right) + \left(\frac{0}{5} - \frac{(-1)}{3} \right) - (0-1) \right]$$

$$= \pi\left[\frac{1}{5} + \frac{1}{3} + 1 \right] = \pi\left[\frac{3+5+15}{15} \right] = \pi\left[\frac{23}{15} \right]$$

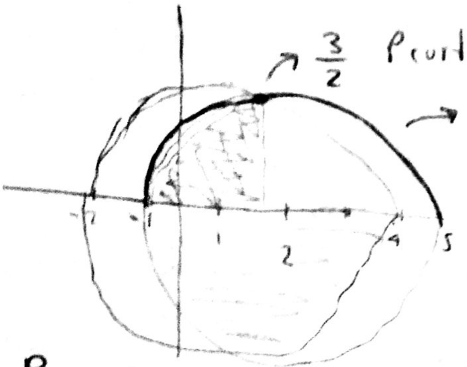
$$\text{Volumen} = \frac{7\pi}{15} + \frac{23\pi}{15} = \frac{30\pi}{15} = 2\pi$$

$(x-1)^2 + y^2 = 9$ ① $\qquad (x-2)^2 + y^2 = 9$

$r = 3$

centros ① $(0,1)$

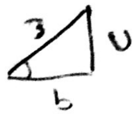
con ② $(0,2)$



$\rightarrow \frac{3}{2}$ Pcorte

$\rightarrow \sqrt{9-(x-2)^2}$

Si calculamos este area 4 veces tendremos el area de intersección.



$\operatorname{sen}\theta = \frac{U}{3}$

$\operatorname{sen}\theta \cdot 3 = U$

$d\theta \cos\theta \cdot 3 = dU$

P corte:

$y_1 = \sqrt{9-(x-1)^2} \qquad y_2 = \sqrt{9-(x-2)^2} \qquad y_1^2 = y_2^2$

$\cancel{9} - (x-1)^2 = \cancel{9} - (x-2)^2 \Rightarrow x^2 - 2x + 1 = x^2 - 4x + 4 \qquad 2x = 3 \qquad \underline{x = \frac{3}{2}}$

$A_T = \boxed{A} \times 4 \qquad u = x-2 \quad du = 1$

$$A_T = \int_{-1}^{3/2} \sqrt{9-(x-2)^2}\,dx = \int (9-u^2)^{1/2} du = \int \sqrt{9 - 9\operatorname{sen}\theta^2} \cdot 3\cos\theta\, d\theta =$$

$$\int \sqrt{9(1-\operatorname{sen}^2\theta)}\, 3\cos\theta\, d\theta = 9\int \cos^2\theta\, d\theta = 9\int \frac{1+\cos(2\theta)}{2}\, d\theta =$$

$$\frac{9}{2}\left[\int 1 + \int \cos(2\theta)\right] = \frac{9}{2}\left[\theta + \int \cos(2\theta)\right] =$$

$U = 2\theta$

$dU = 2\,d\theta$

$\int \cos(2\theta)\, d\theta =$

$\int \frac{\cos(U)}{2} dU = \frac{1}{2}\int \cos(U) d$

$= \frac{1}{2}\operatorname{sen} U \Rightarrow \frac{1}{2}\operatorname{sen}(2\theta)$

$$= \frac{9}{2}\left[\theta + \frac{1}{2}\operatorname{sen}(2\theta)\right] = \left[\frac{9}{2}\theta + \frac{9\operatorname{sen}(2\theta)}{4}\right]$$

Sustituyendo θ

$$\left|\frac{9}{2}\arcsin\left(\frac{x-2}{3}\right) + \frac{9\operatorname{sen}}{4}\left(2\arcsin\left(\frac{x-2}{3}\right)\right)\right|_{-1}^{3/2} \cdot 4 = A_T.$$