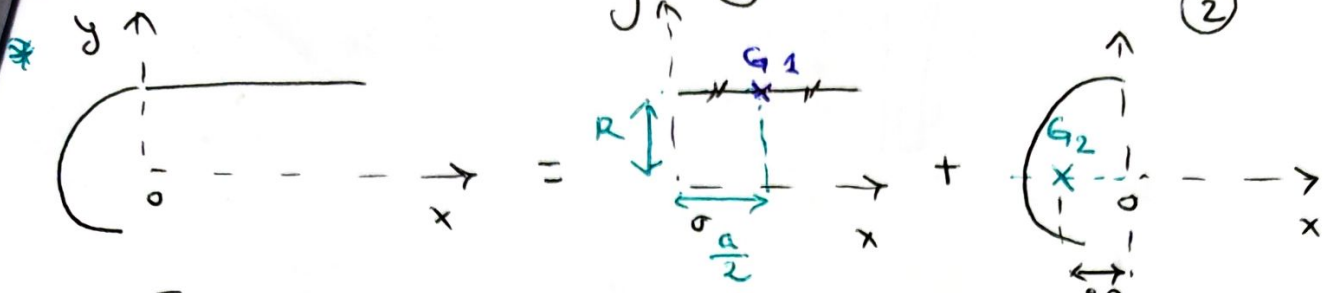


Solution 1D N° 3:

Exo 1:

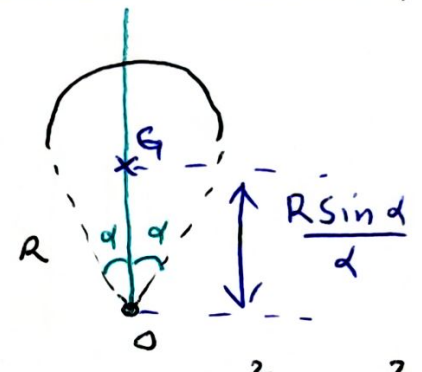


$$x_G = \frac{\sum x_i m_i}{\sum m_i}, \quad y_G = \frac{\sum y_i m_i}{\sum m_i}$$

centre de masse d'un arc quelconque

	①	②
x_i	$\frac{a}{2}$	$-\frac{2R}{\pi}$
y_i	R	0
$m_i = \lambda L_i$	λa	$\lambda \pi R$

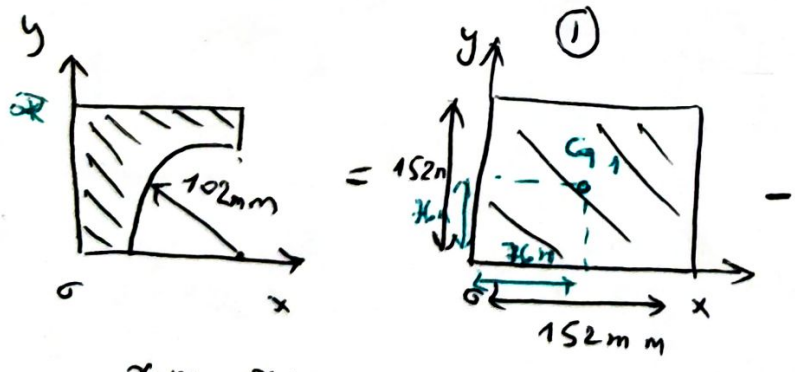
$3,14 = \pi$



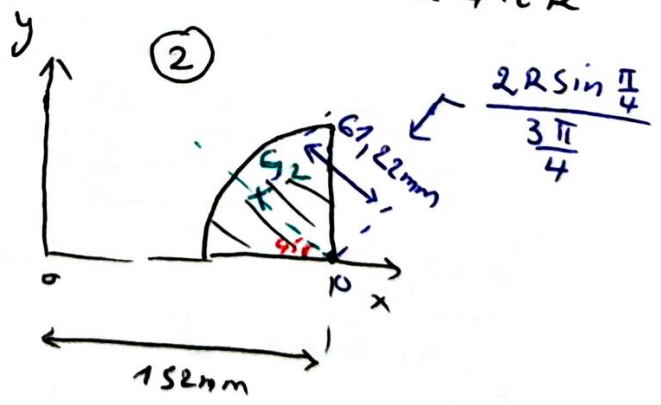
$$x_G = \frac{x_1 m_1 + x_2 m_2}{m_1 + m_2}, \quad y_G = \frac{y_1 m_1 + y_2 m_2}{m_1 + m_2}$$

$$\begin{cases} x_G = \frac{a^2 - 4R^2}{2(a + \pi R)} \\ y_G = \frac{Ra}{a + \pi R} \end{cases}$$

الكثافة السطحية λ :



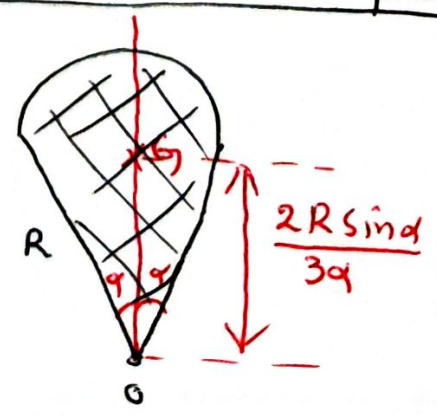
$$x_G = \frac{x_1 m_1 - x_2 m_2}{m_1 - m_2}, \quad y_G = \frac{y_1 m_1 - y_2 m_2}{m_1 - m_2}$$



centre de masse d'un disque quelq.

	①	②
x_i	76	$152 - 61,25 \cos 45 = 108,68$
y_i	76	$61,25 \sin 45 = 43,3$
$m_i = \sigma S_i$	$\sigma 152 \times 152 = 23104$	$\frac{\sigma \pi}{4} (102)^2 = 8167,1$

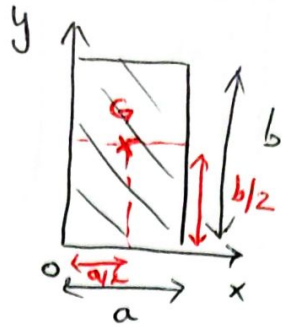
dmc $x_G = 58,17\text{mm}, y_G = 93,87\text{mm}$



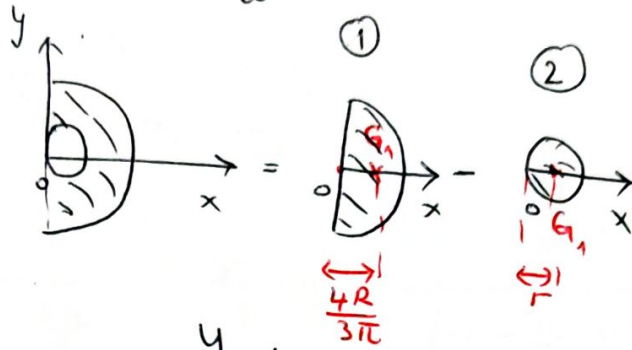
Exo2: calcul du volume des corps : $V = 2\pi S x_G$

① $S = ab, x_G = \frac{a}{2}$

donc $V = \pi a^2 b$



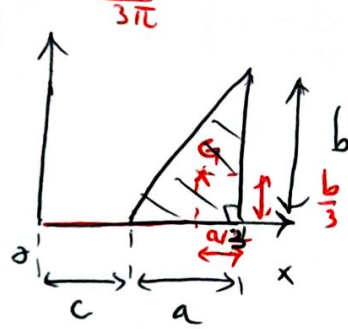
②: $S = \frac{\pi R^2}{2} - \pi r^2$
 $x_G = \frac{\frac{4R}{3\pi} \cdot \frac{\pi R^2}{2} - r \cdot \pi r^2}{\frac{\pi R^2}{2} - \pi r^2}$



donc $V = 2\pi \left(\frac{2R^3}{3} - \pi r^3 \right)$

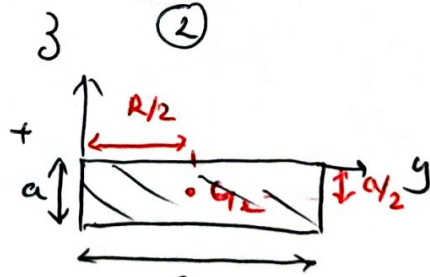
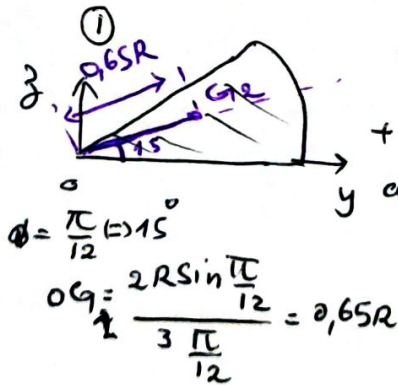
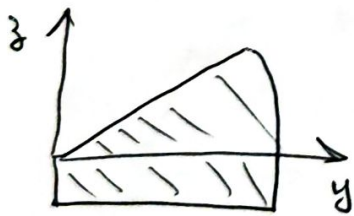
③ $S = \frac{ab}{2}, x_G = \left(c + \frac{2a}{3} \right)$

$V = 2\pi \frac{ab}{2} \left(c + \frac{2a}{3} \right)$



Exo3:

① Les coordonnées du centre de masse:



$y_G = \frac{y_1 S_1 + y_2 S_2}{S_1 + S_2}$

$z_G = \frac{z_1 S_1 + z_2 S_2}{S_1 + S_2}$

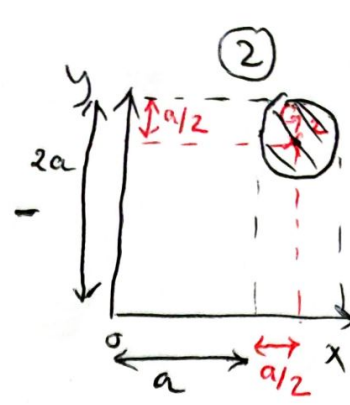
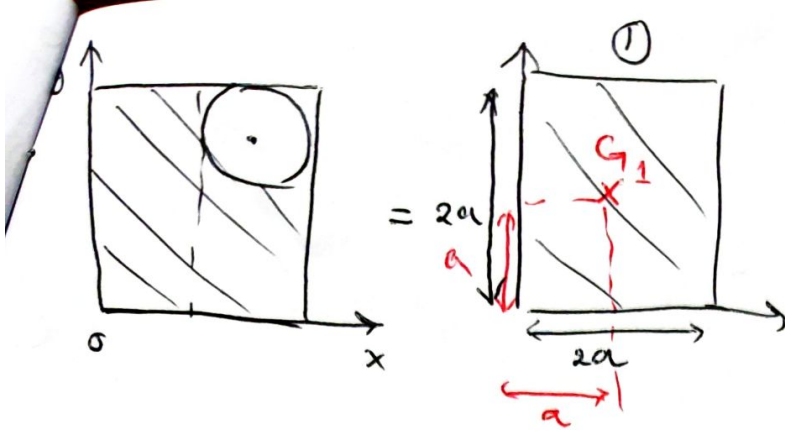
	①	②
y_i	$0,65R \cos 15^\circ$ $(0,62R)$	$\frac{R}{2}$
z_i	$0,65R \sin 15^\circ$ $(0,16R)$	$-\frac{a}{2}$
S_i	$0,26R^2$	Ra

$y_G = \frac{0,16R^2 + 0,5Ra}{0,26R + a}$

$z_G = \frac{0,04R^2 - 0,5a^2}{0,26R + a}$

② Le volume : $V = 2\pi S x_G$

$V = 2\pi (0,16R^2 - 0,5a^2)$

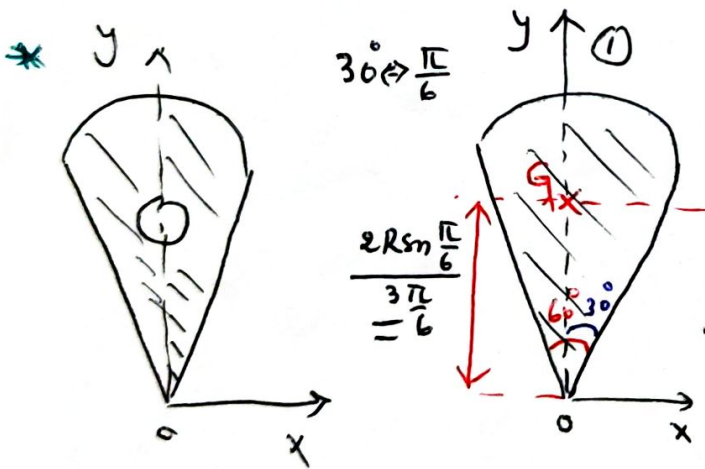


$$x_{G_1} = \frac{x_1 m_1 - x_2 m_2}{m_1 - m_2} \quad , \quad y_{G_1} = \frac{y_1 m_1 - y_2 m_2}{m_1 - m_2}$$

	①	②
x_i	a	$a + \frac{a}{2} = \frac{3a}{2}$
y_i	a	$2a - \frac{a}{2} = \frac{3a}{2}$
$m_i = \sigma S_i$	$\sigma 4a^2$	$\frac{\pi}{4} \cdot \frac{a^2}{4}$

$$x_{G_1} = y_{G_1} = \frac{(4 - \frac{3\pi}{8})a}{(4 - \frac{\pi}{4})} = 0,87a$$

. 3,14 \rightarrow σ π



Le corps est symétrique par rapport à $oy \Rightarrow x_{G_1} = 0$

$$y_{G_1} = \frac{y_1 m_1 - y_2 m_2}{m_1 - m_2}$$

$$y_{G_1} = \frac{0,32 R^3 - 157 R r^2}{0,52 R^2 - 3,14 r^2}$$

	①	②
y_i	$0,63R$	$\frac{R}{2}$
$m_i = \sigma S_i$	$\frac{\pi}{6} R^2 = 0,52 R^2$	$\pi r^2 = 3,14 r^2$