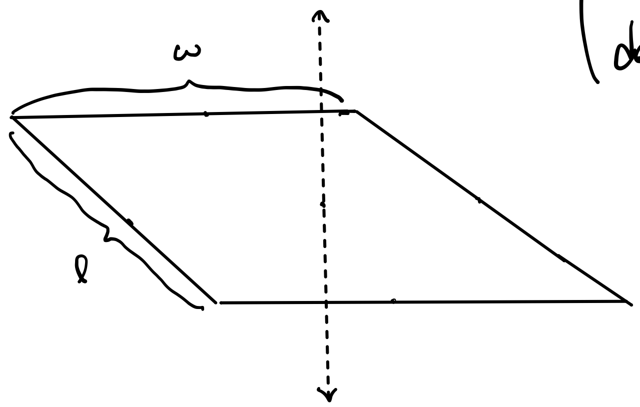
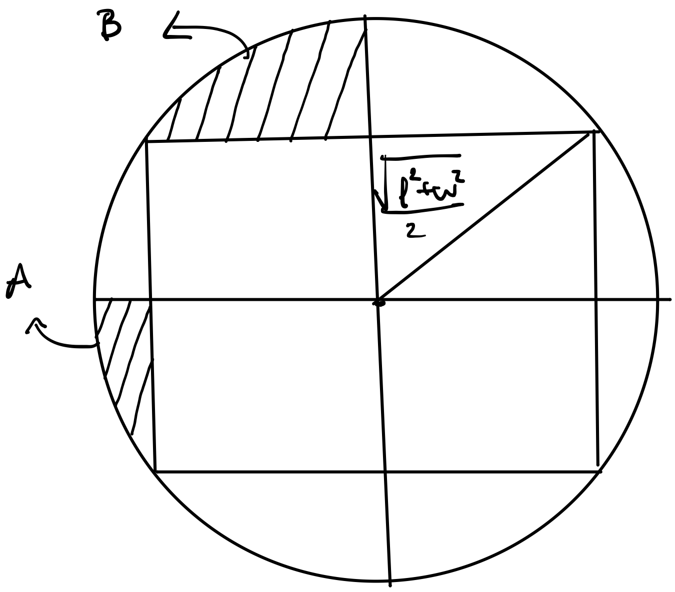
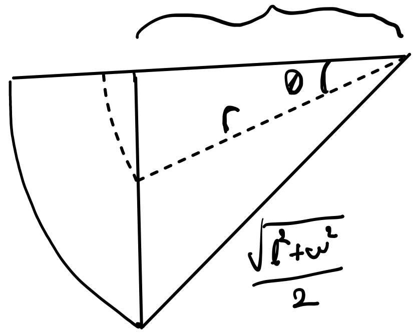
$$\begin{pmatrix} \text{mass} \\ \text{density} : \sigma \end{pmatrix} \quad \left(\sigma = \frac{M}{lw} \right)$$





$$I_{\substack{\text{outer}\\\text{circle}}} = \frac{1}{2} M R^2 = \frac{1}{8} M (l^2 + w^2)$$

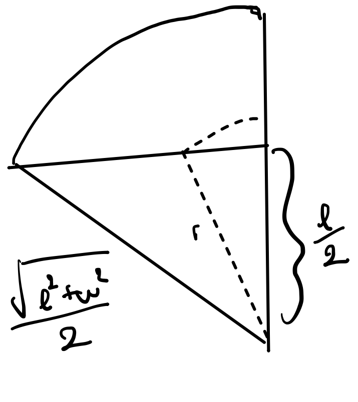
A



$$\left.\begin{aligned} dm &= \sigma\, dA \\ dA &= r \arccos\left(\frac{w}{2r}\right) dr \end{aligned}\right\} dm = \sigma r \arccos\left(\frac{w}{2r}\right) dr$$

$$I_A = \int r^2 dm = \int_{\frac{w}{2}}^{\frac{\sqrt{l^2+w^2}}{2}} \sigma r^3 \arccos\left(\frac{w}{2r}\right) dr$$

B



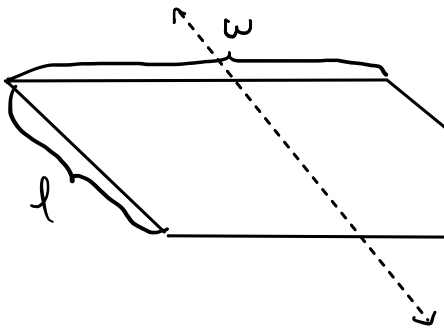
$$\left.\begin{aligned} dm &= \sigma\, dA \\ dA &= r \arccos\left(\frac{l}{2r}\right) dr \end{aligned}\right\} dm = \sigma r \arccos\left(\frac{l}{2r}\right) dr$$

$$I_B = \int r^2 dm = \int_{\frac{l}{2}}^{\frac{\sqrt{l^2+w^2}}{2}} \sigma r^3 \arccos\left(\frac{l}{2r}\right) dr$$

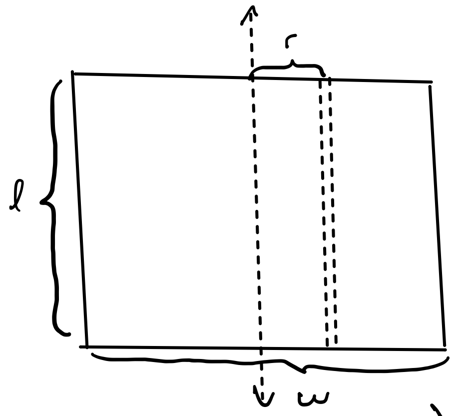
$$I_{\substack{\text{rectangular}\\ \text{slab}}} = I_{\substack{\text{outer}\\ \text{circle}}} - 4\left(I_A + I_B\right) = \frac{1}{8}M\left(l^2+w^2\right) - 4\left(\int_{\frac{w}{2}}^{\frac{\sqrt{l^2+w^2}}{2}} \sigma r^3 \arccos\left(\frac{w}{2r}\right)dr + \int_{\frac{l}{2}}^{\frac{\sqrt{l^2+w^2}}{2}} \sigma r^3 \arccos\left(\frac{l}{2r}\right)dr\right) = \frac{1}{12}M\left(l^2+w^2\right)$$

for 4 equivalents of both A and B

for a square slab with sidelength s $\longrightarrow$ $\frac{1}{6}Ms^2$



$\left(\begin{matrix}\text{mass}\\ \text{density}\end{matrix} : \sigma\right)$ $\left(\sigma = \frac{M}{lw}\right)$



$dm = \sigma l\, dr$

$$I = \int r^2 dm = \int_{-\frac{w}{2}}^{\frac{w}{2}} \sigma l r^2 dr = \frac{\sigma l w^3}{12} = \frac{lw^3}{12} \cdot \frac{M}{lw} = \frac{1}{12}Mw^2$$