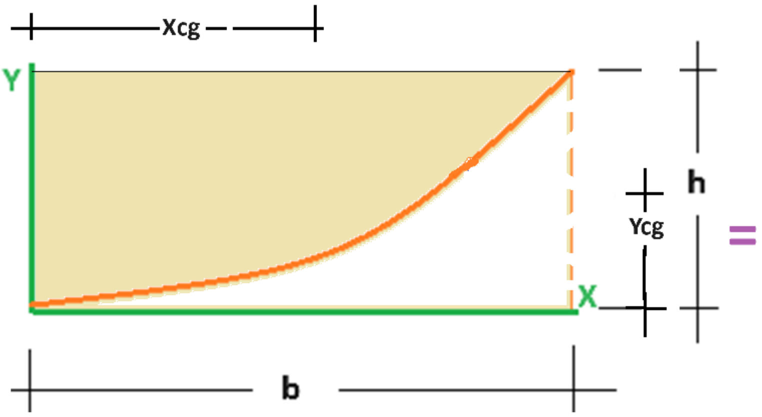
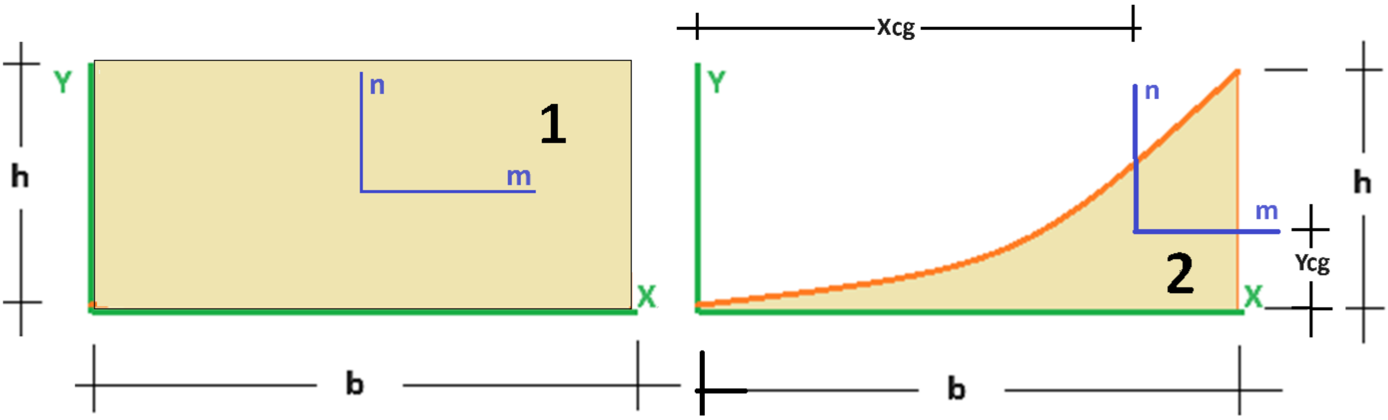




#1: [CaseMode := Sensitive, InputMode := Word, TimesOperator := Asterisk]

Resultados: Área llena 1 – Area vacía 2

Area vacía 2:
ver https://michel.udenar.edu.co/wp-content/uploads/2024/06/MediaParabola.pdf

#2:
$$\begin{bmatrix} Ix2 := \dfrac{b*h^3}{21} & Iy2 := \dfrac{b^3*h}{5} & Ixy2 := \dfrac{b^2*h^2}{12} \\ A2 := \dfrac{b*h}{3} & Xcg2 := \dfrac{3*b}{4} & Ycg2 := \dfrac{3*h}{10} \\ Im2 := \dfrac{37*b*h^3}{2100} & In2 := \dfrac{b^3*h}{80} & Imn2 := \dfrac{b^2*h^2}{120} \end{bmatrix}$$

Area llena 1:

#3:
$$\begin{bmatrix} Ix1 := \dfrac{b*h^3}{3} & Iy1 := \dfrac{b^3*h}{3} & Ixy1 := \dfrac{b^2*h^2}{4} \\ A1 := b*h & Xcg1 := \dfrac{b}{2} & Ycg1 := \dfrac{h}{2} \\ Im1 := \dfrac{b*h^3}{12} & In1 := \dfrac{b^3*h}{12} & Imn1 := 0 \end{bmatrix}$$

Inercia respecto a los ejes X e Y:

#4: [Ix := Ix1 – Ix2, Iy := Iy1 – Iy2, Ixy := Ixy1 – Ixy2]

#5: $\left[Ix = \frac{2 \cdot b \cdot h^3}{7}, Iy = \frac{2 \cdot b^3 \cdot h}{15}, Ixy = \frac{b^2 \cdot h^2}{6} \right]$

Centroide de la figura completa:

#6: $\left[A := A1 - A2, Xcg := \frac{Xcg1 \cdot A1 - Xcg2 \cdot A2}{A}, Ycg := \frac{Ycg1 \cdot A1 - Ycg2 \cdot A2}{A} \right]$

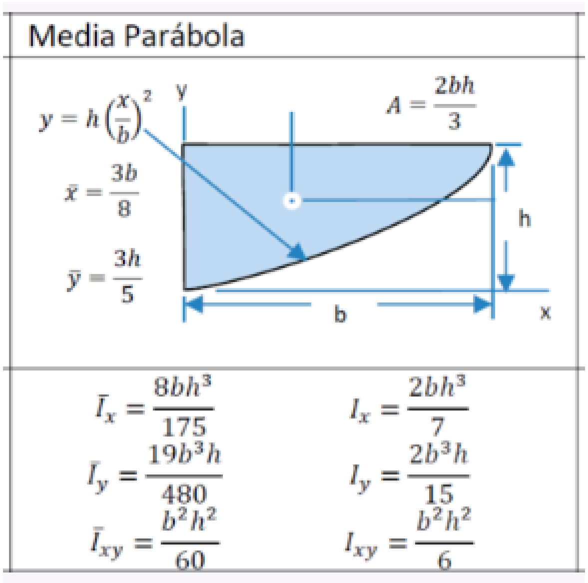
#7: $\left[A := \frac{2 \cdot b \cdot h}{3}, Xcg := \frac{3 \cdot b}{8}, Ycg := \frac{3 \cdot h}{5} \right]$

Inercia respecto a los ejes centroidales de la figura completa:

#8: $\left[Im := Ix - A \cdot Ycg^2, In := Iy - A \cdot Xcg^2, Imn := Ixy - A \cdot Xcg \cdot Ycg \right]$

#9: $\left[Im := \frac{8 \cdot b \cdot h^3}{175}, In := \frac{19 \cdot b^3 \cdot h}{480}, Imn := \frac{b^2 \cdot h^2}{60} \right]$

Ver https://clasesdemecanica.net/index.php/momentos-de-inercia/#:~:text=El%20producto%20de%20inercia%20del,ser%20positivo%2C%20negativo%20o%20cero.



Otra forma de llegar a los mismos resultados:

Función:

#10: $f(x) := c1 + c2 \cdot x + c3 \cdot x^2$

#11: $\begin{bmatrix} f(0) = 0 \\ f(b) = h \\ f'(0) = 0 \end{bmatrix}$

#12: $\begin{bmatrix} c1 = 0 \\ b^2 \cdot c3 + b \cdot c2 + c1 = h \\ c2 = 0 \end{bmatrix}$

#13: $\left[c1 = 0 \wedge c2 = 0 \wedge c3 = \frac{h}{b^2} \right]$

#14: $f(x) := 0 + 0*x + \frac{h}{b^2}*x^2$

#15: $$f(x) := \frac{h*x^2}{b^2}$$

Área y centroide:

#16: $$\left[A := \int_0^b (h - f(x))\,dx,\ Xcg := \frac{\int_0^b x*(h - f(x))\,dx}{A},\ Ycg := \frac{\int_0^b \frac{h + f(x)}{2}*(h - f(x))\,dx}{A}\right]$$

#17: $$\left[A := \frac{2*b*h}{3},\ Xcg := \frac{3*b}{8},\ Ycg := \frac{3*h}{5}\right]$$

Se usará ∂(x) tiende a cero (dx→0):

#18: $$\left[\begin{array}{c} Ix := \int_0^b \left(\frac{1}{12}*(h - f(x))^3 + (h - f(x))*\left(\frac{h + f(x)}{2}\right)^2\right) dx \\ Iy := \int_0^b \frac{1}{12}*(h - f(x))*dx^2\,dx + \int_0^b (h - f(x))*x^2\,dx \\ Ixy := \int_0^b \left(0 + (h - f(x))*x*\frac{h + f(x)}{2}\right) dx \end{array}\right]$$

#19: $$\left[\begin{array}{c} Ix := \frac{2*b*h^3}{7} \\ Iy := b^3*h*\left(\frac{dx^2}{18} + \frac{2}{15}\right) \\ Ixy := \frac{b^2*h^2}{6} \end{array}\right]$$

#20: $$\left[\begin{array}{c} Ix := \frac{2*b*h^3}{7} \\ Iy := b^3*h*\left(\frac{0^2}{18} + \frac{2}{15}\right) \\ Ixy := \frac{b^2*h^2}{6} \end{array}\right]$$

#21:

$$\left[\begin{array}{l} Ix := \dfrac{2*b*h^{3}}{7} \\ Iy := \dfrac{2*b^{3}*h}{15} \\ Ixy := \dfrac{b^{2}*h^{2}}{6} \end{array}\right]$$

Inercias centroidales:

#22:

$$\left[\begin{array}{l} Im := Ix - A*Ycg^{2} \\ In := Iy - A*Xcg^{2} \\ Imn := Ixy - A*Xcg*Ycg \end{array}\right]$$

#23:

$$\left[\begin{array}{l} Im := \dfrac{8*b*h^{3}}{175} \\ In := \dfrac{19*b^{3}*h}{480} \\ Imn := \dfrac{b^{2}*h^{2}}{60} \end{array}\right]$$