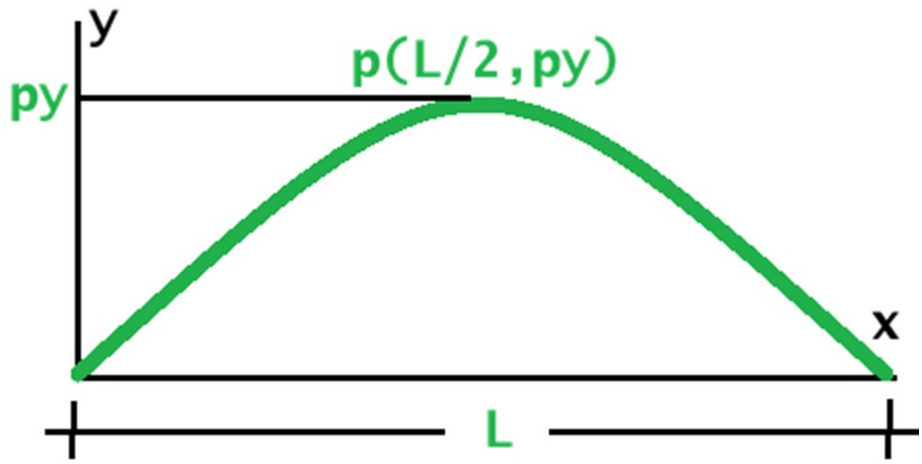


#1: [CaseMode := Sensitive, InputMode := Word, Notation := Decimal]

Encontrar centroide e inercias centroidales

Cálculo de la función:

#2: [c(x) :=, A :=, B :=, C :=, L :=, py :=, Ix :=, Iy :=, Im :=, In :=]

#3: $c(x) := A + B\cdot x + C\cdot x^2$

#4: $$\left[\begin{array}{c} c(0) = 0 \\ c\left(\frac{L}{2}\right) = py \\ c(L) = 0 \end{array}\right]$$

#5: $$\left[\begin{array}{c} A = 0 \\ A + \frac{B\cdot L}{2} + \frac{C\cdot L^2}{4} = py \\ A + B\cdot L + C\cdot L^2 = 0 \end{array}\right]$$

#6: $$\left[A := 0,\ B := \frac{4\cdot py}{L},\ C := -\frac{4\cdot py}{L^2}\right]$$

#7: $$c(x) := \frac{4\cdot py\cdot x}{L} - \frac{4\cdot py\cdot x^2}{L^2}$$

Cálculo del área total:

#8: $CT := \int_0^L c(x)\, dx$

#9: $$CT := \frac{2 \cdot L \cdot py}{3}$$

Cálculo del centroide **Xcg** y **Ycg**:

#10: $$\left[\begin{array}{l} Xcg := \dfrac{\int_0^L c(x) \cdot x\, dx}{CT} \\ Ycg := \dfrac{\displaystyle\int_0^L c(x) \cdot \frac{c(x)}{2}\, dx}{CT} \end{array}\right]$$

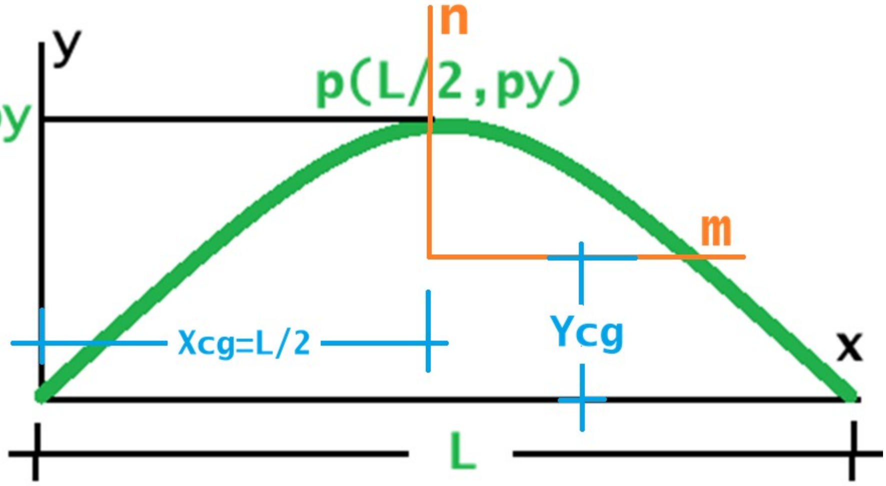
#11: $$\left[\begin{array}{l} Xcg := \dfrac{L}{2} \\ Ycg := \dfrac{2 \cdot py}{5} \end{array}\right]$$

Inercia respecto al eje x e y:

#12: $$\left[Ix := \int_0^L \int_0^{c(x)} y^2\, dy\, dx,\ Iy := \int_0^L \int_0^{c(x)} x^2\, dy\, dx \right]$$

#13: $$\left[Ix := \frac{16 \cdot L \cdot py^3}{105},\ Iy := \frac{L^3 \cdot py}{5} \right]$$

Inercias centroidales usando teorema de ejes paralelos:



#14: $\left[Ixcg := Ix - Ycg^{2}\cdot CT,\ Iycg := Iy - Xcg^{2}\cdot CT\right]$

#15: $\left[Ixcg := 0.04571428571\cdot L\cdot py^{3},\ Iycg := 0.03333333333\cdot L^{3}\cdot py\right]$

#16: $\left[Ixcg := \dfrac{8\cdot L\cdot py^{3}}{175},\ Iycg := \dfrac{L^{3}\cdot py}{30}\right]$

Si el punto p(L/2,py) está en (40/2,10):

#17: $[L := 40,\ py := 10]$

#18:
$$\begin{bmatrix} \begin{bmatrix} c(x) \\ CT \end{bmatrix} & \begin{bmatrix} c(x) \\ CT \end{bmatrix} & \begin{bmatrix} c(x) \\ CT \end{bmatrix} \\ \begin{bmatrix} Xcg \\ Ycg \end{bmatrix} & \begin{bmatrix} Xcg \\ Ycg \end{bmatrix} & \begin{bmatrix} Xcg \\ Ycg \end{bmatrix} \\ \begin{bmatrix} Ix \\ Iy \end{bmatrix} & \begin{bmatrix} Ix \\ Iy \end{bmatrix} & \begin{bmatrix} Ix \\ Iy \end{bmatrix} \\ \begin{bmatrix} Ixcg \\ Iycg \end{bmatrix} & \begin{bmatrix} Ixcg \\ Iycg \end{bmatrix} & \begin{bmatrix} Ixcg \\ Iycg \end{bmatrix} \end{bmatrix}$$

#19: $$\begin{bmatrix} \begin{bmatrix} x - 0.025\cdot x^2 \\ 266.6666666 \end{bmatrix} & \begin{bmatrix} x - 0.025\cdot x^2 \\ 266.6666666 \end{bmatrix} & \begin{bmatrix} x - 0.025\cdot x^2 \\ 266.6666666 \end{bmatrix} \\ \begin{bmatrix} 20 \\ 4 \end{bmatrix} & \begin{bmatrix} 20 \\ 4 \end{bmatrix} & \begin{bmatrix} 20 \\ 4 \end{bmatrix} \\ \begin{bmatrix} 6095.238095 \\ 128000 \end{bmatrix} & \begin{bmatrix} 6095.238095 \\ 128000 \end{bmatrix} & \begin{bmatrix} 6095.238095 \\ 128000 \end{bmatrix} \\ \begin{bmatrix} 1828.571428 \\ 21333.33333 \end{bmatrix} & \begin{bmatrix} 1828.571428 \\ 21333.33333 \end{bmatrix} & \begin{bmatrix} 1828.571428 \\ 21333.33333 \end{bmatrix} \end{bmatrix}$$

#20: $$\begin{bmatrix} \begin{bmatrix} c(x) \\ CT \end{bmatrix} & \begin{bmatrix} x - \dfrac{x^2}{40} \\ \dfrac{800}{3} \end{bmatrix} & \begin{bmatrix} x - 0.025\cdot x^2 \\ 266.6666666 \end{bmatrix} \\ \begin{bmatrix} Xcg \\ Ycg \end{bmatrix} & \begin{bmatrix} 20 \\ 4 \end{bmatrix} & \begin{bmatrix} 20 \\ 4 \end{bmatrix} \\ \begin{bmatrix} Ix \\ Iy \end{bmatrix} & \begin{bmatrix} \dfrac{128000}{21} \\ 128000 \end{bmatrix} & \begin{bmatrix} 6095.238095 \\ 1.28\cdot 10^5 \end{bmatrix} \\ \begin{bmatrix} Ixcg \\ Iycg \end{bmatrix} & \begin{bmatrix} \dfrac{12800}{7} \\ \dfrac{64000}{3} \end{bmatrix} & \begin{bmatrix} 1828.571428 \\ 2.133333333\cdot 10^4 \end{bmatrix} \end{bmatrix}$$

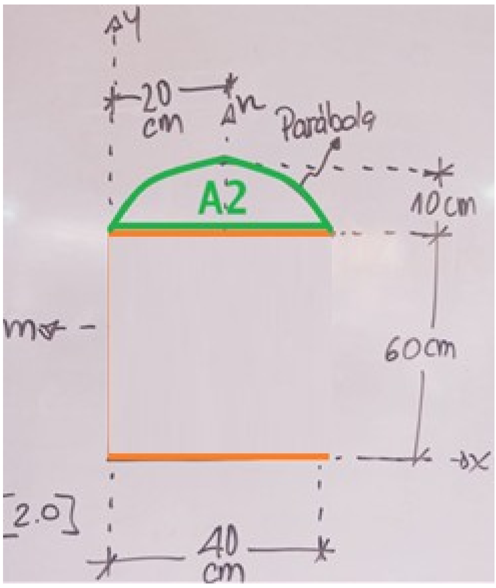
#21: $$\int_0^L \int_{60}^{60 + c(x)} y^2 \, dy \, dx$$

#22: $$6095.238095$$

#23: $$3.974095238\cdot 10^6$$

#24: $$1.094095238\cdot 10^6$$

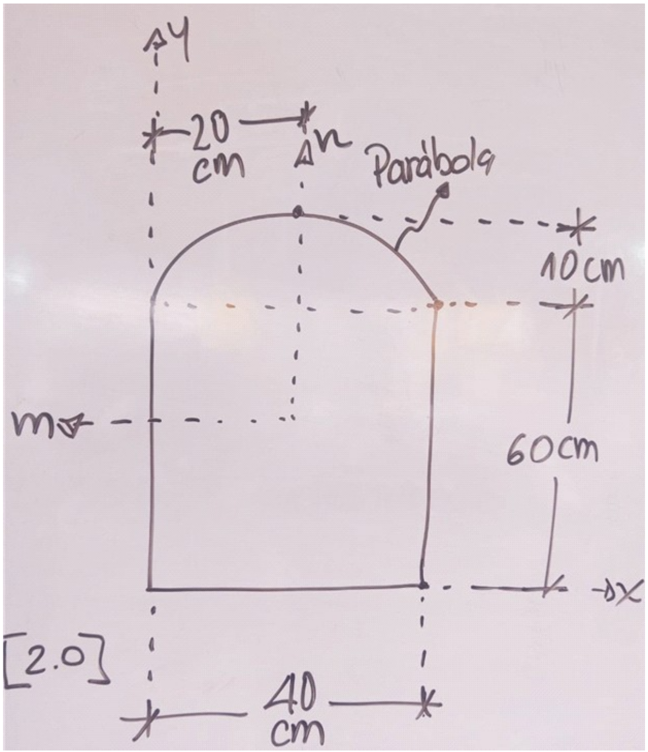
Si la parábola está sobre un rectángulo, es decir el A2:



#25: $$\left[Ix := \int_0^L \int_{60}^{60 + c(x)} y^2 \, dy \, dx, \; Iy := \int_0^L \int_{60}^{60 + c(x)} x^2 \, dy \, dx \right]$$

#26: $[Ix := 1094095.238, \; Iy := 128000]$

Si la parábola incluye un rectángulo abajo:



#27: $$\left[Ix := \int_0^L \int_0^{60 + c(x)} y^2 \, dy \, dx, \; Iy := \int_0^L \int_0^{60 + c(x)} x^2 \, dy \, dx\right]$$

#28: $$[Ix := 3974095.238, \; Iy := 1408000]$$

#29: $$CT := \int_0^L (60 + c(x)) \, dx$$

#30: $$CT := 2666.666666$$

#31: $$\left[\begin{array}{c} Xcg := \dfrac{\int_0^L (60 + c(x)) \cdot x \, dx}{CT} \\ Ycg := \dfrac{\int_0^L (60 + c(x)) \cdot \dfrac{60 + c(x)}{2} \, dx}{CT} \end{array}\right]$$

#32: $$\left[\begin{array}{c} Xcg := 20 \\ Ycg := 33.4 \end{array}\right]$$

#33: $$\left[Ixcg := Ix - Ycg^2 \cdot CT, \; Iycg := Iy - Xcg^2 \cdot CT\right]$$

#34: $$[Ixcg := 999268.5720, \; Iycg := 341333.3336]$$