Problemas sobre centroides

Miguel Hernández-Canales
Instituto Tecnológico Superior Zacatecas Occidente

***Resumen*—En el precente documento se precentan dos problemas sobre centroides con su respuesta y procedimiento correcto**

Bx= $2r^2$/4 ft (0.5 lb/ ft) =[2(4ft) / (4ft)] (0.5 lb) = 1 lb

y= 0

x= $\frac{\int_l x\ dl}{\int_l x\ dl}$

x= r cos ϑ

y= r sen ϑ

dl= $\sqrt{dx^2+dy^2}$ = $r^2\left(sen^2\theta\ d\theta^2\right)+r^2\left(\cos^2 d\theta^2\right)$

dx=- r sen ϑ =$\sqrt{r^2 d\theta^2\left(sen^2\theta+\cos^2\theta\right)}$

dy= r cos ϑ d ϑ =r ϑ

=$\frac{\int_{\frac{-2\Pi}{3}}^{\frac{2\Pi}{3}} r\ \cos\theta\ d\theta}{\int_{\frac{-2\Pi}{3}}^{\frac{2\Pi}{3}} r\ d\theta}$ =$\frac{r^2\int_{\frac{-2\Pi}{3}}^{\frac{2\Pi}{3}}\cos\theta\ d\theta}{r\int_{\frac{-2\Pi}{3}}^{\frac{-2\Pi}{3}} d\theta}$

= $\frac{r\ sen\ \theta\left|_{\frac{-2\Pi}{3}}^{\frac{2\Pi}{3}}\right.}{\theta\left|_{\frac{-2\Pi}{3}}^{\frac{2\Pi}{3}}\right.}$= $\frac{r[0.0866+0.866]}{\frac{4\Pi}{3}}$ =$\frac{300mm[1.732]}{4.189}$= 124 mm

x=$\frac{\int_l x\ dl}{\int_l\ dl}=\int_{\frac{-\Pi}{2}}^{\frac{\Pi}{2}} r\ \cos\theta\ r\theta$

x= r cos ϑ

dl= r d ϑ

$\frac{r\ sen\ \theta\left|_{\frac{-\Pi}{2}}^{\frac{\Pi}{2}}\right.}{\theta\left|_{\frac{-\Pi}{2}}^{\frac{\Pi}{2}}\right.}=\frac{r[1+1]}{\Pi}=\frac{2(2)}{\Pi}=\frac{4}{2}=1.25$

(1) $\Sigma\ fx$ Bx= 1lb

2.- Σ fy Ax= 1lb

3.- Σ ma Ay= Π lb

1.- Ax +Bx

2.- Ay -w= 0

Ay= w

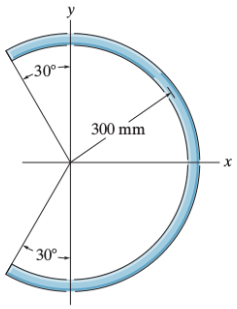
3.- -xw +Bx (4ft)= 0

-2 r/Π (0.5 lb/ft)Π + Bx (4ft) =0

-2r^2(0.5 lb/ ft) + 4 ft Bx= 0

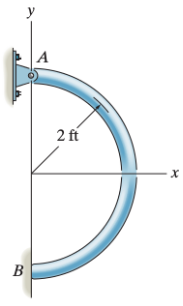
4ft Bx= 2 r^2 (0.5 lb/ft)

9–1. Locate the center of mass of the homogeneous rod bent into the shape of a circular arc.



Prob. 9–1

9–2. Locate the center of gravity $\bar{x}$ of the homogeneous rod bent in the form of a semicircular arc. The rod has a weight per unit length of 0.5 lb/ft. Also, determine the horizontal reaction at the smooth support B and the x and y components of reaction at the pin A.



Prob. 9–2