Problemas sobre centroides

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***Resumen*—A continuación se le da solucion a los problemas mostrados sobre centroides.**

PROBLEMA 1

9.1.- Locate the Center of mass of the homogeneous ROM bent into the shape of circulating arc.

$p = \frac{m}{L}$

$m = pl$

$dm = pdl$

$\left[-\frac{2}{3}\pi,\ \frac{2}{3}\pi\right]$

$\overline{x} = r\cos\theta$

$\overline{y} = rsen\theta$

$dl = rd\theta$

$x = \frac{\int x\ dm}{\int dm}$

$\frac{\int x\ pdl}{\int pdl} = \frac{\int x\ dl}{\int dl}$

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

$= \frac{\int r\cos\theta\ rd\theta}{\int rd\theta} = \frac{r^2 \int_{-\frac{2}{3}\pi}^{\frac{2}{3}\pi} \cos\theta d\theta}{r\int_{-\frac{2}{3}\pi}^{\frac{2}{3}\pi} d\theta}$

$= \frac{r\ sen\theta \int_{-\frac{2}{3}\pi}^{\frac{2}{3}\pi}}{\theta \int_{-\frac{2}{3}\pi}^{\frac{2}{3}\pi}} = \frac{r\ [0{,}86+0{,}86]}{\frac{4}{3}\pi} = 300m\left(\frac{1{,}732}{4{,}188}\right) = 124mm$

PROBLEMA 2

9.2.-Locate the Center of gravity of the homogeneou Rod bent in the form of a semi-circular arc. The Rod you weight per unit length of 0.5 lbs / feet. Also, determine th horizontal reaction at the smooth support B and the X and components of reaction at the pin A.

$\left[-\frac{\pi}{2},\ \frac{\pi}{2}\right]$

$x = r\cos\theta$

$y = rsen\theta$

$dl = rd\theta$

$p = \frac{w}{l} = 0{,}5\frac{lb}{ft} \qquad w = \left(0{,}5\frac{lb}{ft}\right)\pi\ 2ft$

$= \pi\ lb$

$-w\ xc + (4ft)\,Bx = 0$

$Ay - w = 0$

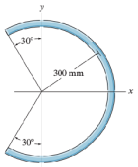
$Ay = \pi\ lb$

$-\left(\frac{2r}{\pi}\right)(\pi lb) + 4Bx = 0$

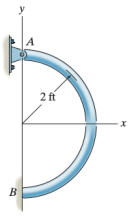
$(4ft)\,Bx = \frac{2r}{\pi}(\pi lb)1.$

$Bx = 1lb$

$Bx = Ax = \ 1lb$



Prob. 9–1



Prob. 9–2