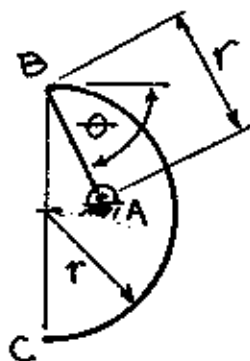


Homogeneous wire
attached to hinge, A.

Determine θ for
equilibrium (balance).

Refer to Sample Prob. 5.2

Think about this!



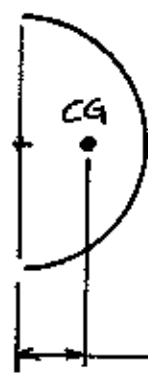
For equilibrium, there should be NO MOMENT about A.

$$\sum M_A = 0 \quad \therefore \text{No moment arm.}$$

\therefore The center of gravity must lie along a "line of action" thru pt. A $\therefore \sum \bar{x} = 0$
and $\sum \bar{x}L = 0$

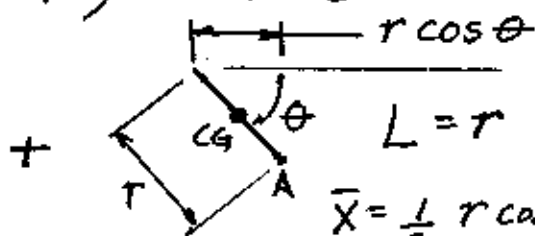
Refer to p. 216

I: Semicircular Arc (turn 90°) + II: Line



$$L = \pi r$$

$$\bar{x} = \frac{2r}{\pi} \text{ right of A}$$



$$\bar{x} = \frac{1}{2} r \cos \theta$$

Left of pt. A

neg. sign

$$\text{Since } \sum \bar{x}L = 0 = \left[\left(\frac{2r}{\pi} - r \cos \theta \right) (\pi r) \right] + \left[\left(-\frac{1}{2} r \cos \theta \right) (r) \right]$$

$$0 = 2r^2 - \pi r^2 \cos \theta - \frac{1}{2} r^2 \cos \theta$$

$$2 = \pi \cos \theta + \frac{1}{2} \cos \theta$$

$$4 = (2\pi + 1) \cos \theta$$

$$\frac{4}{(2\pi + 1)} = \cos \theta \Rightarrow \theta = \cos^{-1} \left[\frac{4}{2\pi + 1} \right] = \boxed{56.7^\circ = \theta}$$