



$$\overline{AM}^2 = R^2 + (R/2)^2 - 2(R)(R/2)\cos 40^\circ$$

$$= 0.484R^2, \quad \overline{AM} = 0.696R$$

$$\frac{\sin \beta}{R} = \frac{\sin 40^\circ}{0.696R}, \quad \beta = 112.5^\circ$$

$$\alpha = 180^\circ - \beta = 180^\circ - 112.5^\circ = 67.5^\circ$$

$$\begin{aligned} \uparrow M_o &= (F \sin \alpha) \frac{R}{2} = (F \sin 67.5^\circ) \frac{R}{2} \\ &= 0.462FR \end{aligned}$$

So the force-couple system for  $\theta = 40^\circ$  is

$$\begin{cases} F \nearrow 67.5^\circ \\ M_o = 0.462FR \quad \text{CCW} \end{cases}$$