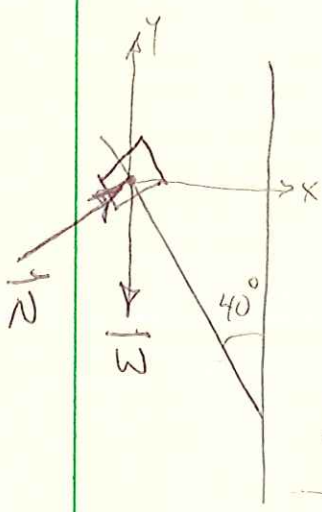


PROB. 12-55

$m = 300\text{g}$, $\alpha = 40^\circ$, $\omega = 5 \frac{\text{RAD}}{\text{s}}$

FIND r SO MASS WILL NOT MOVE.



$$\vec{N} = N[(\cos 40^\circ)\hat{i} + (\sin 40^\circ)\hat{j}]^N$$

$$\vec{W} = (-mg)\hat{j}^N$$

$$\sum F_y = ma_y : N \sin 40^\circ - mg = 0 \Rightarrow N = \frac{mg}{\sin 40^\circ}$$

$$\sum F_n = m \frac{v^2}{r} : N \cos 40^\circ = m \frac{v^2}{r}$$

$$v = r\omega$$

$$\left(\frac{mg}{\sin 40^\circ}\right) \cos 40^\circ = \frac{m}{r} (r\omega)^2$$

$$\frac{g}{\tan 40^\circ} = r\omega^2$$

$$r = \frac{g}{\omega^2 \tan 40^\circ} = \frac{(9.81 \frac{\text{m}}{\text{s}^2})}{(5 \frac{\text{RAD}}{\text{s}})^2 \tan 40^\circ} = 0.4676 \text{ m}$$