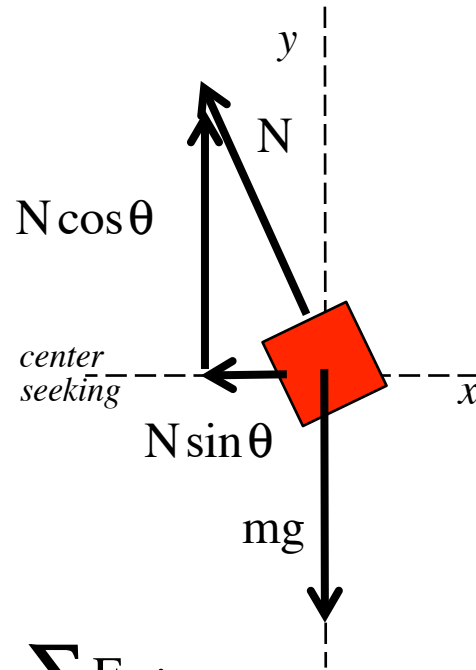


Problem 6.42

As always, identifying the direction of acceleration (centripetal) is all important. In this case, it will be in the horizontal, leaving our f.d.b. to look like:

$$\begin{aligned}\sum F_y : \\ N \cos \theta - mg &= ma_y \\ \Rightarrow N &= \frac{mg}{\cos \theta}\end{aligned}$$



$$\begin{aligned}\sum F_x : \\ N \sin \theta &= ma_c \\ &= m \frac{v^2}{L \cos \theta} \\ \Rightarrow \left(\frac{mg}{\cos \theta} \right) \sin \theta &= m \frac{v^2}{L \cos \theta} \\ \Rightarrow v &= (gL \sin \theta)^{1/2}\end{aligned}$$

