

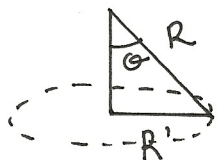
$$\vec{N} + m\vec{g} = m\vec{a}$$

$$\hat{x}: -N \sin \theta = -m a_c \Rightarrow N \sin \theta = m \omega^2 R' \quad (1)$$

$$\hat{y}: N \cos \theta - mg = 0 \Rightarrow N \cos \theta = mg \quad (2)$$

De (2): $N = \frac{mg}{\cos \theta}$

Sustituyendo en (1) $mg \frac{\sin \theta}{\cos \theta} = m \omega^2 R' \quad (3)$



pero $R' = R \sin \theta$, Así:

$$g \frac{\cancel{\sin \theta}}{\cos \theta} = \omega^2 R \cancel{\sin \theta}$$

$$\Rightarrow \omega^2 = \frac{g}{R \cos \theta} \Rightarrow \omega = \sqrt{\frac{g}{R \cos \theta}}$$

Por último, el período es:

$$T = \frac{2\pi}{\omega} \Rightarrow T = 2\pi \sqrt{\frac{R \cos \theta}{g}}$$