Circular Motion Scenarios
The Pendulum

IB PHYSICS | CIRCULAR MOTION

IB Physics Data Booklet

Sub-topic 6.1 – Circular motion

$$v = \omega r$$

$$a = \frac{v^2}{r} = \frac{4\pi^2 r}{T^2}$$

$$F = \frac{mv^2}{r} = m\omega^2 r$$

v – linear velocity (m s^{-1})

ω – angular velocity (rad s^{-1})

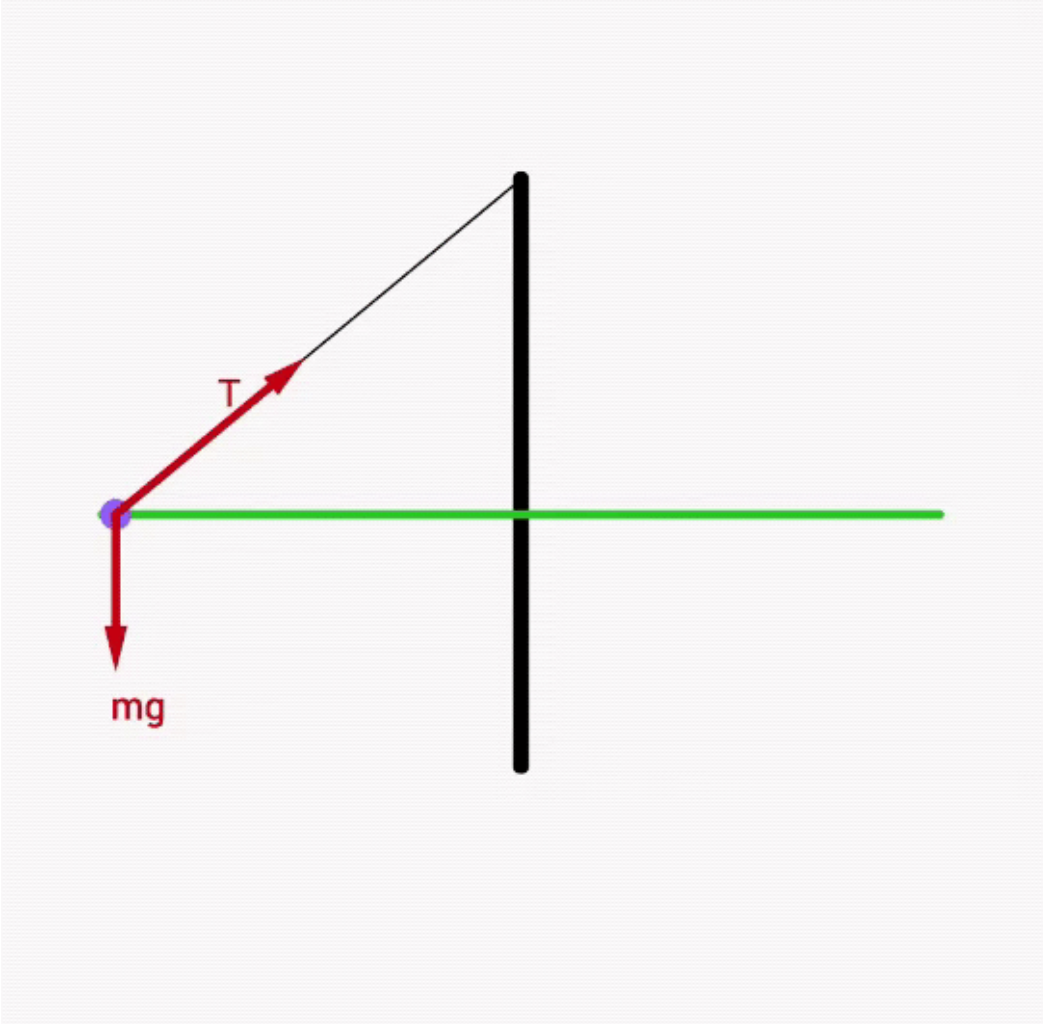
r – radius (m)

T – period (s)

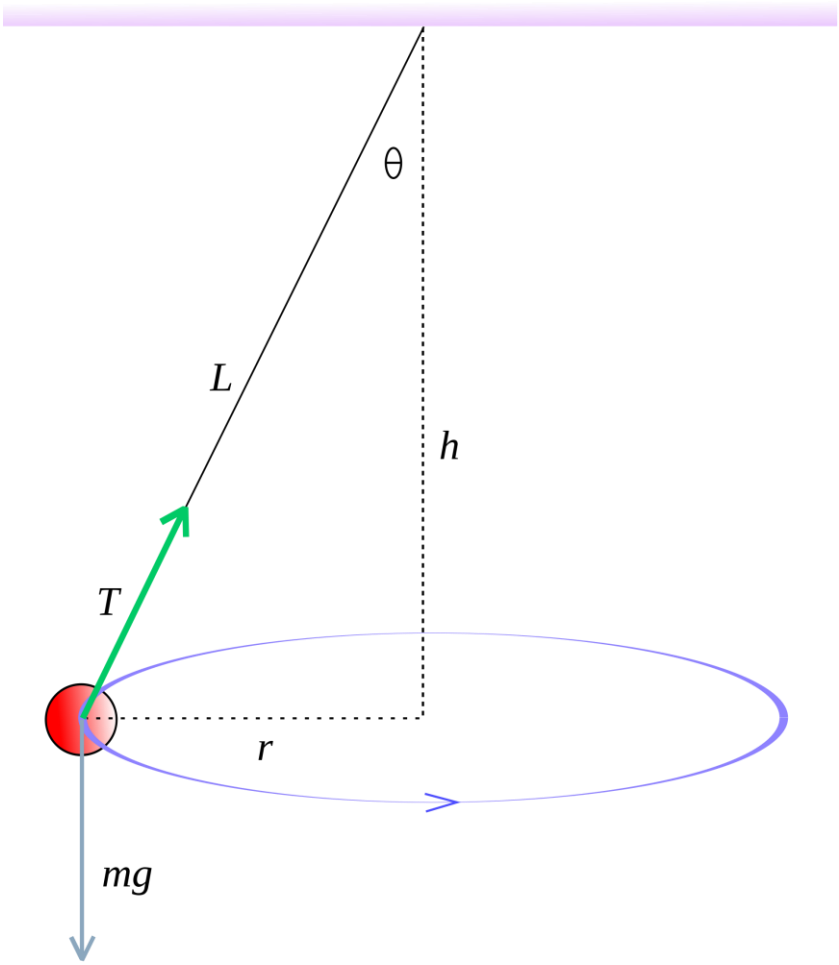
a – centripetal acceleration (m s^{-2})

F – centripetal force (N)

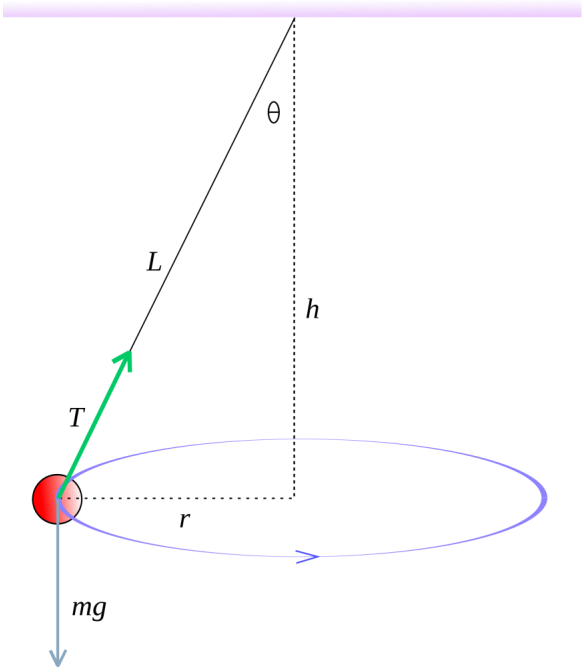
Pendulum Circle



Pendulum Circle

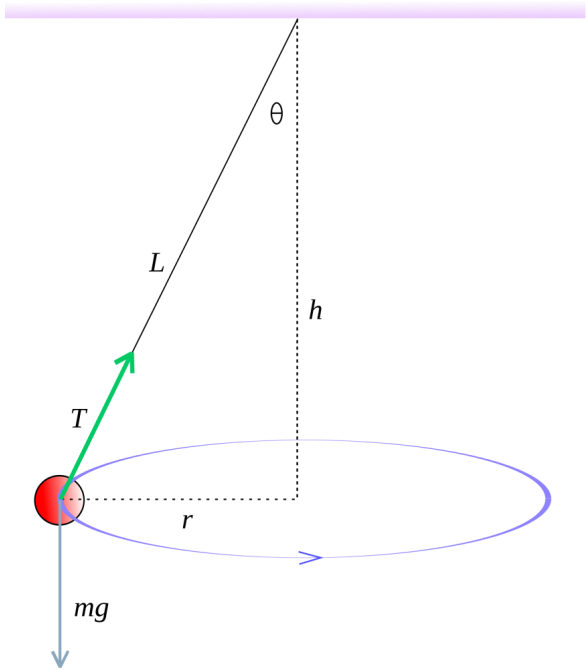


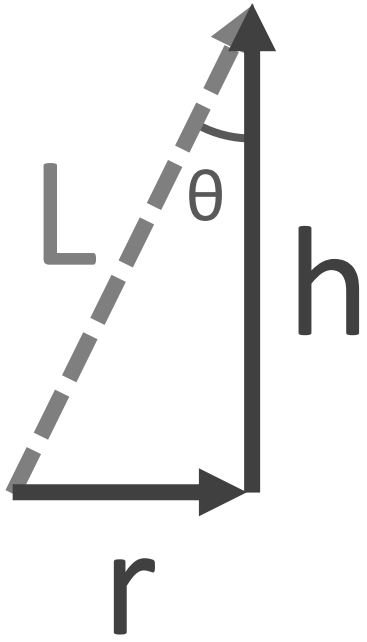
Pendulum Circle

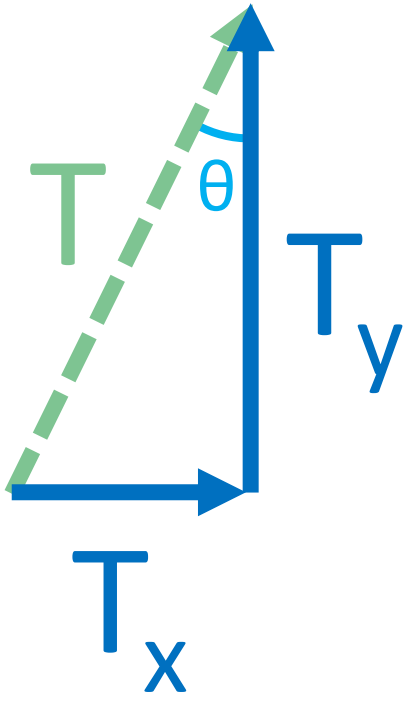


What is centripetal force required to cause a 0.12 kg mass to swing in a horizontal circle with the string at an angle of 30°?

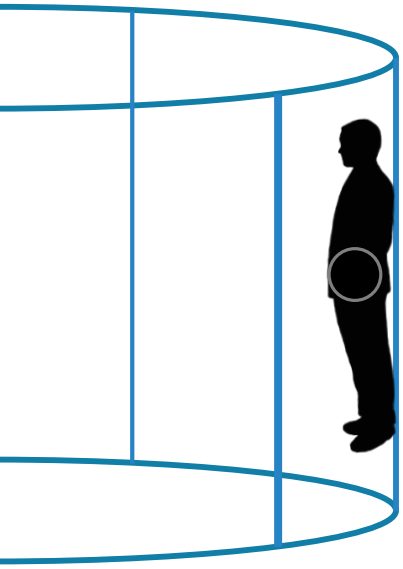
CAUTION! There are **two** triangles

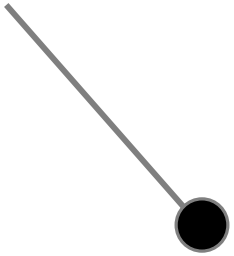






All Together Now!





Lesson Takeaways

- ❑ I can draw a free body diagram and solve a problem when circular motion is produced by **components of an angled tension force**.