

Centripetal acceleration

When moving along a circular path of radius R , with constant speed v , an object has acceleration directed towards the center, called Centripetal Acceleration:

$$a = \frac{v^2}{R}$$



Homework

Problem 1

A motorcycle is riding along a vertical wall, which has a shape of an interior of a cylinder of radius $R=5\text{ m}$, aka “Wall of Death” (see the picture). Find the velocity v that the rider has to maintain to make sure that the motorcycle does not slide down. Friction coefficient between the wall and the tires is $\mu=0.7$.

Problem 2.

Find the speed and period of orbital motion of the *International Space Station* around the Earth. Note that its orbit is located **400 km** above the ground. This is much smaller than the Earth radius $R=6370$. This means that you can assume the gravitational force acting on the space station to be the same as on Earth surface, Mg . Also, for simplicity, take the radius of the orbit to be equal to that of Earth.

