

A diagram illustrating circular motion. A red circle represents the path. Two points on the circle are shown. At each point, a blue arrow labeled \mathbf{v} represents the velocity vector, tangent to the circle. A purple arrow labeled \mathbf{F}_c represents the centripetal force vector, pointing towards the center. A purple arrow labeled \mathbf{a}_c represents the centripetal acceleration vector, also pointing towards the center. The text $v = \text{constant}$ is written in blue. A yellow box contains the equation $\vec{F}_c =$. Below the circle, the text $E =$ is partially visible.

$$\vec{F}_c = m\vec{a}_c$$

$$F_c = \text{centripetal force}$$


$$\tan \theta = \frac{v^2}{gR}$$

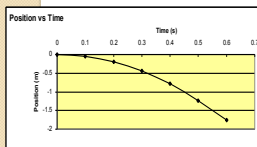
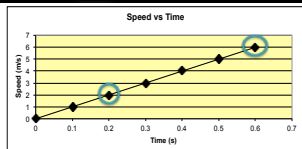
- The bike turns because it is leaning. The operator uses the handle bars around a curve, not directly to steer but to control the lean angle.
- The lean angle is needed to safely drive a motorcycle around a curve.
- It is related to the radius of the turn and the speed of the bike.

<http://www.motorcycleaccidentinjury.com/law.html>

$$\vec{F}_{net} = m\vec{a}$$

$$\vec{W} = m\vec{g}$$

$$\ominus \vec{w} = m(\ominus \vec{g})$$



$$a = \frac{\Delta v}{\Delta t}$$

$$a = \frac{6-2}{0.6-0.2} \left[\frac{m/s}{s} \right]$$

$$a = 10 \text{ m/s}^2$$

$$\tan \theta = \frac{v^2}{gR}$$

<http://www.csl.ymu.edu/~cfladd/1350/06CirMin/BasketOfCurves.htm>

The banked road is designed at a specific speed for a car to round the curve without requiring friction.

Conditions for free fall:

- **gravity** is the only force acting on the body

- distance of the body from the surface of the earth should be very small compared to the radius of the earth



$d \ll r$ (earth)

Which component is affected by gravity?

