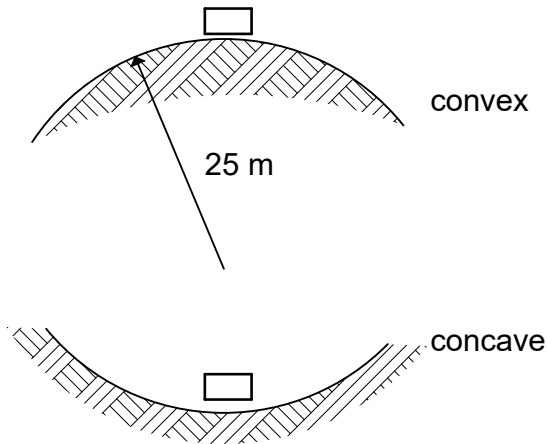


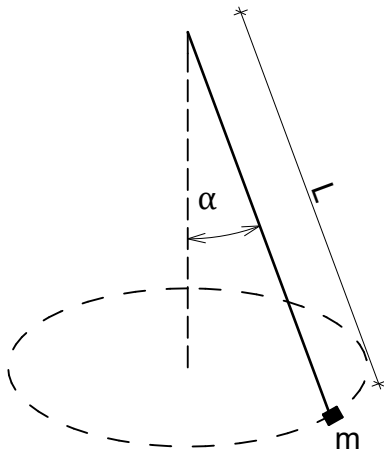
Circular motion practice problems



A car weighing 800 kg is travelling with tangential velocity of 54 km/h on a bump (small hill) which can be approximated with a vertical convex circle having a radius of 25 m.

- What is the force between the car and the road on the top of the bump?
- What would be the velocity if the contact force was 0?
- What would be the contact force if the road was concave?

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- 800 N
 - 56,92 km/h
 - 15 200 N



A point mass of m is swinging on a string of length L . The path is a horizontal circle, the string encloses an angle of α with the vertical direction.

- What is the period of the circular motion?
- What is the force in the string?

$$a) T = 2\pi \sqrt{\frac{L \cos \alpha}{g}}$$

$$b) F = \frac{mg}{\cos \alpha}$$

The planet Mars ($6,418 \cdot 10^{23}$ kg) is orbiting the Sun ($1,989 \cdot 10^{30}$ kg) on a (approximate) circular orbit of radius $2,279 \cdot 10^8$ km. What is the period of it's orbit in days?
(The universal constant of gravity is $6,67 \cdot 10^{-11} \text{Nm}^2/\text{kg}^2$)

T=686,9 days