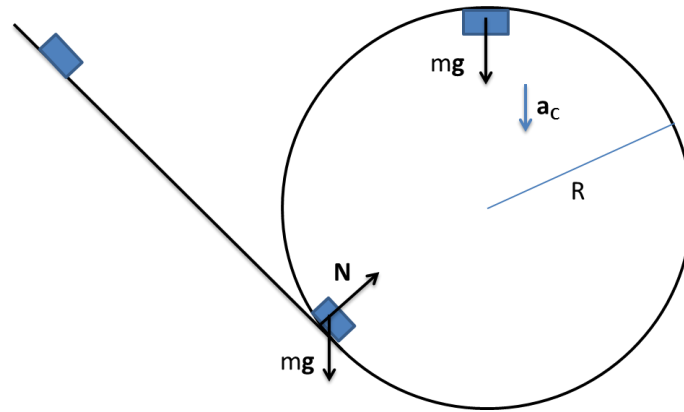


Answer on Question #43413, Physics, Mechanics | Kinematics | Dynamics

A stunt rider on a motorcycle rides down a ramp and into a vertical loop the loop. If the diameter of the loop is 7.50m, then the slowest speed the motorcycle can have at the top of the loop if it is to remain in contact with the loop is?

Solution.



The necessary and sufficient condition for rider to remain in the loop is the normal force in the highest point is more or equal to zero:

$N = 0$ Therefore from Newton's second law:

$$mg = ma_c \Rightarrow$$

$$a_c = g \Rightarrow$$

$$\frac{V_{min}^2}{R} = g \Rightarrow$$

$$V_{min} = \sqrt{gR} = \sqrt{\frac{gd}{2}}$$

Numerically:

$$V_{min} = \sqrt{\frac{9.8 \frac{m}{s^2} \cdot 7.5m}{2}} \approx 6.1 \frac{m}{s}$$

Answer: $6.1 \frac{m}{s}$