# How Fast Can It Spin?

Friday, 29 January, 2021 21:35


Lecturer: Mustafa Al-Zyout, Philadelphia University, Jordan.

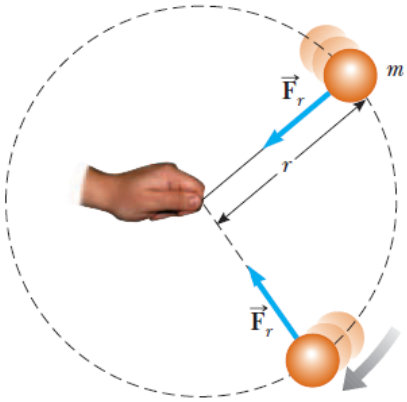
R. A. Serway and J. W. Jewett, Jr., *Physics for Scientists and Engineers*, 9th Ed., CENGAGE Learning, 2014.

J. Walker, D. Halliday and R. Resnick, *Fundamentals of Physics*, 10th ed., WILEY,2014.

H. D. Young and R. A. Freedman, *University Physics with Modern Physics*, 14th ed., PEARSON, 2016.

H. A. Radi and J. O. Rasmussen, *Principles of Physics For Scientists and Engineers*, 1st ed., SPRINGER, 2013.


A puck of mass 0.5 kg is attached to the end of a cord 1.5 m long. The puck moves in a horizontal circle as shown. If the cord can withstand a maximum tension of 50 N, what is the maximum speed at which the puck can move before the cord breaks? Assume the string remains horizontal during the motion.



# The Conical Pendulum

Saturday, 30 January, 2021 13:26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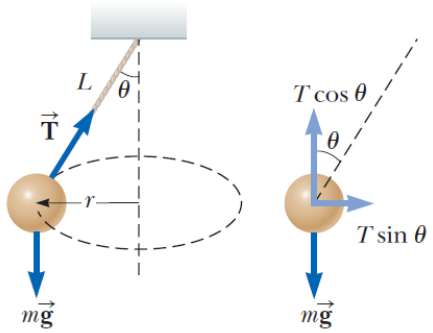
A small ball of mass (m) is suspended from a string of length (L). The ball revolves with constant speed (v) in a horizontal circle of radius (r) as shown. Find an expression for v.



# Riding the Ferris Wheel

Saturday, 30 January, 2021 13:29

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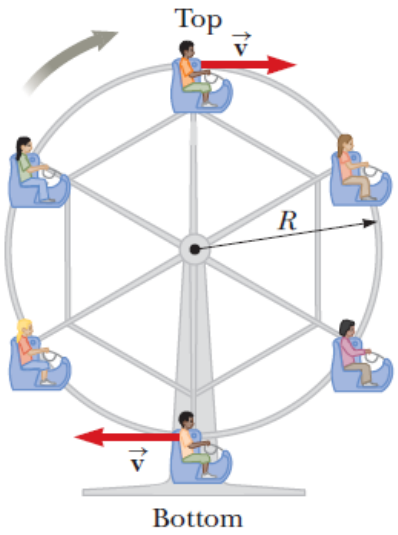
H. A. Radi and J. O. Rasmussen, *Principles of Physics For Scientists and Engineers*, 1st ed., SPRINGER, 2013.

A child of mass (m) rides on a Ferris wheel as shown. The child moves in a vertical circle of radius (r) at a constant speed (v).

- Determine the force exerted by the seat on the child at the bottom of the ride. Express your answer in terms of the weight of the child, mg.
- Determine the force exerted by the seat on the child at the top of the ride.



# Keep Your Eye on the Ball

Saturday, 30 January, 2021 13:30

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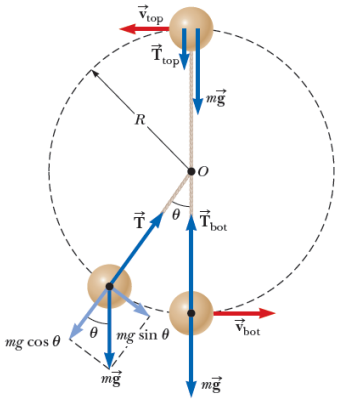
H. A. Radi and J. O. Rasmussen, *Principles of Physics For Scientists and Engineers*, 1st ed., SPRINGER, 2013.

A small sphere of mass (m) is attached to the end of a cord of length (R) and set into motion in a vertical circle about a fixed point O as shown. Determine:

- the tangential acceleration of the sphere,
- the tension in the cord at any instant when the speed of the sphere is (v) and the cord makes an angle θ with the vertical.



# Satellite

Saturday, 30 January, 2021 13:31

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R. A. Serway and J. W. Jewett, Jr., *Physics for Scientists and Engineers*, 9th Ed., CENGAGE Learning, 2014.
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Consider a satellite of mass $m$ moving in a circular orbit around the Earth at a constant speed $v$ and at an altitude $h$ above the Earth's surface, as shown. Determine the speed of the satellite in terms of $G$, $h$, $R_E$ (the radius of the Earth) and $M_E$ (the mass of the Earth).

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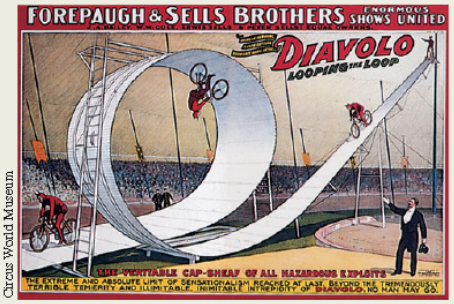
In the stunt of riding a bicycle in a loop – the – loop, assuming that the loop is a circle with radius $r = 2.7\ m$ , what is the least speed $v$ that the bicycle could have at the top of the loop to remain in contact with it there?

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(a)