Example Problems – circular motion

**horizontal circular motion**

1. A 0.8-kg ball swings in a horizontal circle at the end of a

 1.2 m long rope. The ball swings at a constant 3 m/s.

 (a) What is the centripetal force on the ball?

 (b) What is the tension in the rope?

2. A 2-kg object is on a horizontal rotating platform. The object is 1.5 m from the axis of rotation of the platform. The platform completes

 15 revolutions in 30 seconds.

 a. What is the speed of the object?

 b. What is the centripetal acceleration of the object?

 c. What is the centripetal force on the object?

**vertical circular motion**

3. I swing a 5-kg object in a vertical circle of radius 1.5 m. The tension in the rope when the object is at the top of the circle is 11 N.

 The speed of the object is 8.8 m/s when the object is at the bottom of the circle.

 a. What is the speed of the object at the top of the circle?

 b. What is the tension in the rope when the object is at the bottom of

 the circle?

 c. What is the minimum speed the object can have at the top of the

 circle to continue in a circular path?

4. A 200-kg rollercoaster cart goes over a circular hill with a radius

 of 5 m. What is the magnitude and direction of the force of the track on the cart at the top of the hill if the speed of the cart at the top of the hill is:

 a. 5 m/s?

 b. 10 m/s?

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