Lecture 14
(Circular Motion)

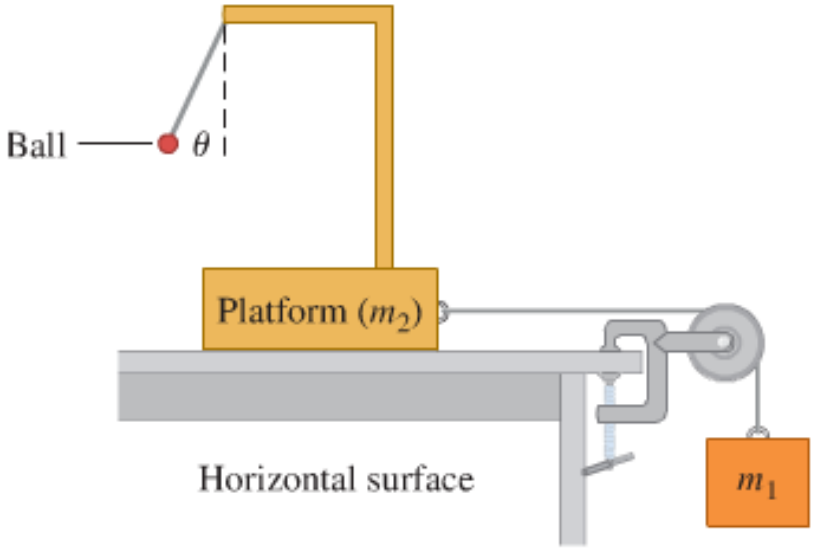
Physics 160-01 Fall 2012

Douglas Fields

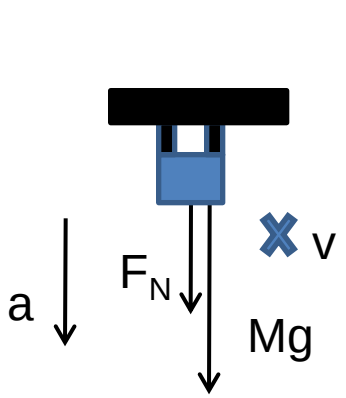
Problem 5.94

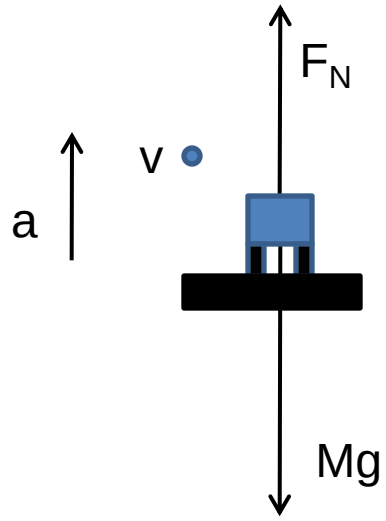
5.94. Accelerometer. The system shown in Fig. 5.76 can be used to measure the acceleration of the system. An observer riding on the platform measures the angle θ that the thread supporting the light ball makes with the vertical. There is no friction anywhere. (a) How is θ related to the acceleration of the system? (b) If $m_1 = 250$ kg and $m_2 = 1250$ kg, what is θ? (c) If you can vary m_1 and m_2, what is the largest angle θ you could achieve? Explain how you need to adjust m_1 and m_2 to do this.

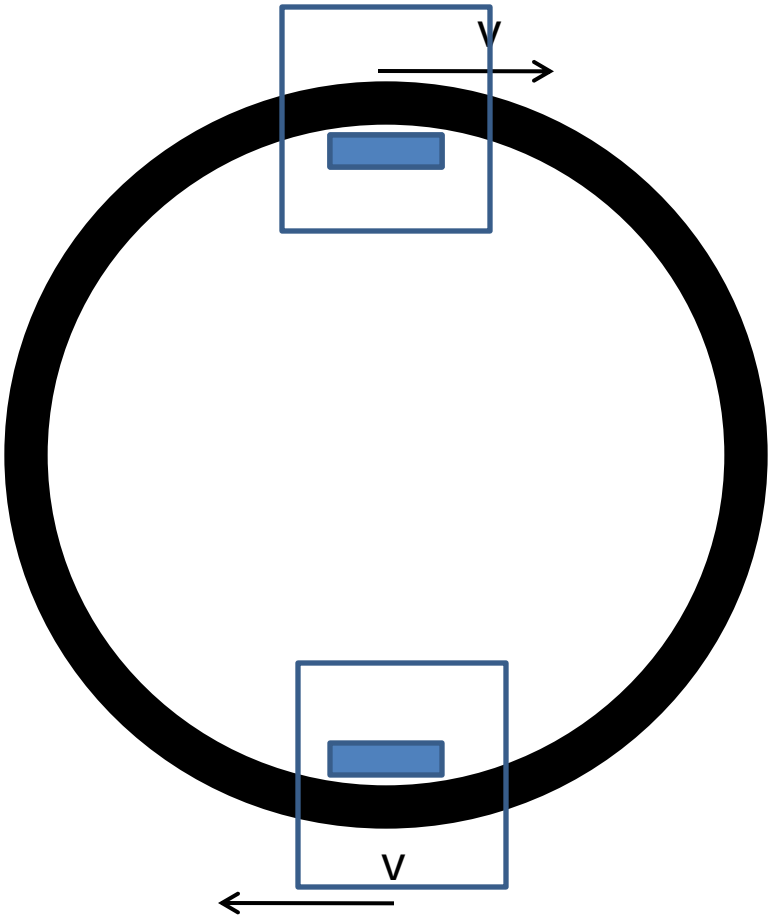
Figure **5.76** Problem 5.94.



Uniform Circular Motion Revisited







CPS Question 12-1

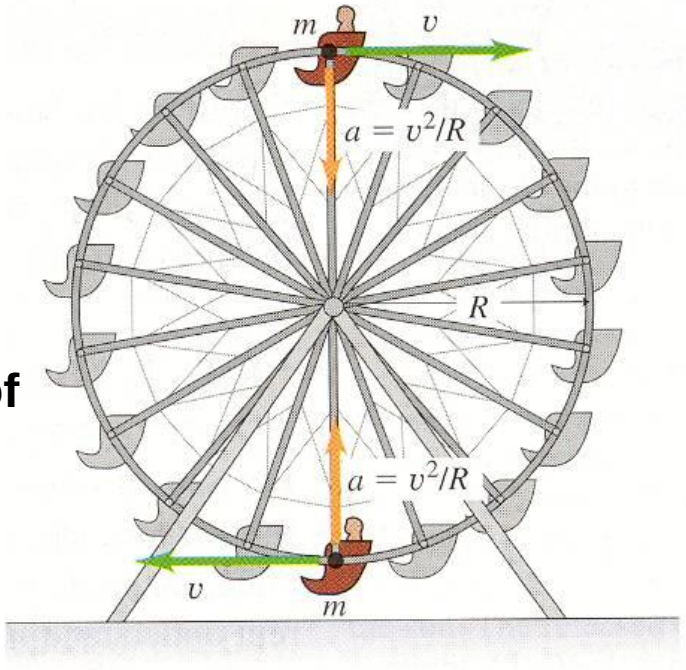
- **For the rider on the Ferris Wheel in uniform circular motion, compare the *force of the wheel on him* at the top and the bottom of the ride.**

A) They are the same, since it is uniform circular motion.

B) It is greater at the top, since there are two accelerations (gravity and circular motion).

C) It is greater on the bottom, since the force of the wheel must also overcome the force of gravity to keep him in circular motion.

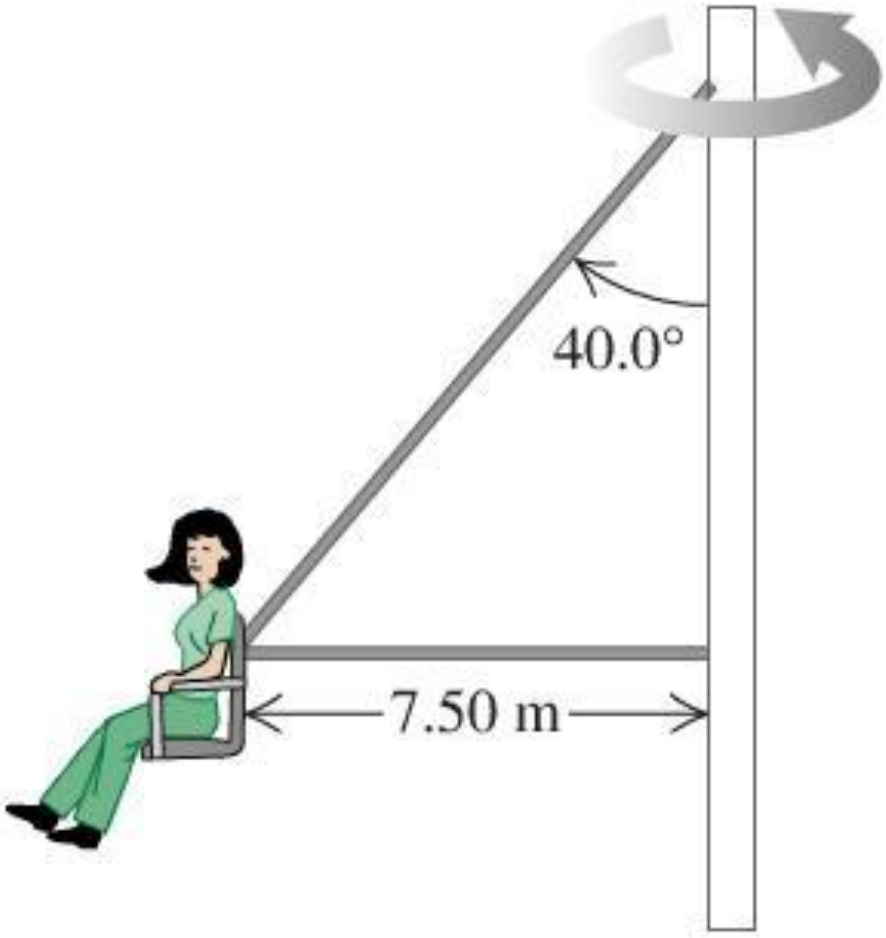
D) Not enough information to solve.



Problem 5.53

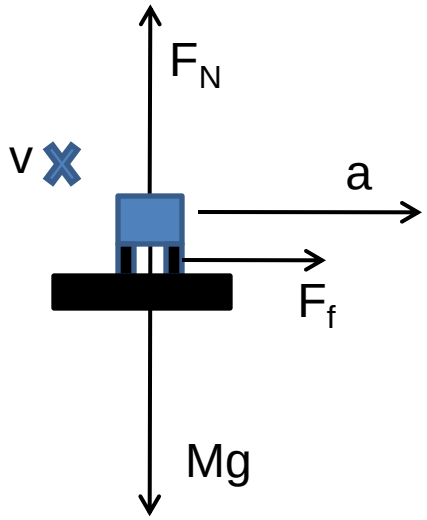
5.53. In another version of the "Giant Swing" (see Exercise 5.52), the seat is connected to two cables as shown in Fig. 5.58, one of which is horizontal. The seat swings in a horizontal circle at a rate of 32.0 rpm (rev/min). If the seat weighs 255 N and a 825-N person is sitting in it, find the tension in each cable.

Figure **5.58** Exercise 5.53.

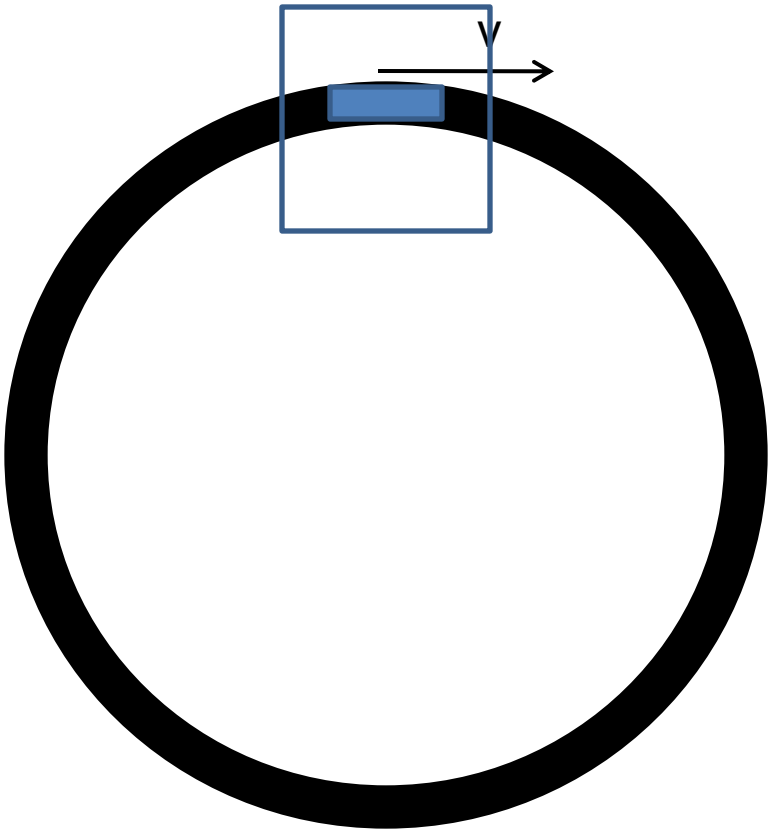


Kinetic or Static Friction?

- In which direction is the friction force?



- Is it kinetic or static?



Problem 5.95

5.95. Banked Curve I. A curve with a 120-m radius on a level road is banked at the correct angle for a speed of 20 m/s. If an automobile rounds this curve at 30 m/s, what is the minimum coefficient of static friction needed between tires and road to prevent skidding?