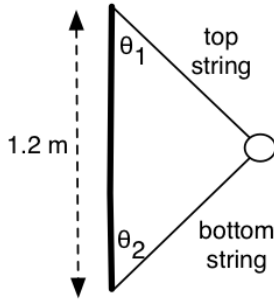


1. What is the period of a conical pendulum of length 1.0 m that describes a circle of 15 cm inches in radius?

[$t=1.55s$]



2. A 1-kg ball rotates around a vertical axis at the rate of 90 rpm, held by two 1.0 m strings as shown. What is the tension in each string ?

[$T_1=52.55N, T_2=36.28N$]

3. You weigh 150 lb and you take a ride in a giant vertical ("Ferris") wheel in an amusement park and you sit on a scale. If the wheel has a radius of 40 ft and the scale reads 125 lb when you are at the highest point, what will the scale read when you are at the bottom? [175 lbs] How fast is the wheel turning in revolutions per minute (rpm)? [3.5 RPM]

4. Assuming the earth is round, if you "weigh" 160 lb at the poles, how much would you "weigh" at the equator? [between 159.4 and 159.83 lbs depending on radius and period]

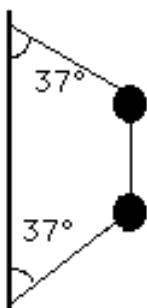
5. What minimum friction coefficient would let your car round a curve of radius 1000 ft at 50 mph on an unbanked stretch of road? [$\mu=0.168$]

6. A freeway is banked around a curve with a 200 m radius so that you can go at 60 kph without needing friction.

a. What is the angle of the bank? Here's [pict](#) of a banked curve

b. Calculate the friction coefficient needed to keep your car on the road if you are going at 70 kph on that same stretch of freeway? [$\mu=0.05$]

c. What if you were going at 45 kph?



7. balls rotate around a vertical axis at the rate of 120 rpm, held by two 0.5 m strings at the top & bottom and a connecting string as shown. If the mass of the top ball is 1.5 kg, what is the tension in each string and what is the mass of the ball at the bottom? [$T_1 = 118.1N, T_2 = 79.6N, T_3 = 85.8\text{ N}, m_2 = 1.09kg$]

