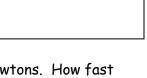HW 2.3 Centripetal Force   Period_____ Name_____

1. How much tension is in a string connected to a 0.25 kg ball that is being swung in a horizontal circle with a radius of 0.6 meters, if the ball has a period of 0.2 seconds?
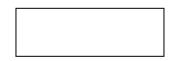
2. A cord holding a 0.4 kg ball will break if the tension exceeds 60 Newtons. How fast can the ball travel in a horizontal circle if the length of the cord is 1.3 meters?

3. How large must the coefficient of friction be between the tires of a car and the road if the car is to round a curve with a radius of 85 meters at a speed of 27 m/s?

4. If a 0.15 kg ball on the end of a string is swung in a vertical circle of radius .6 meters and makes 2 revolutions per second, what is the tension in the string at the very top of the circle?

5. At what velocity would you be traveling to feel weightless at the top of a perfectly round hill (radius = 30 m)?
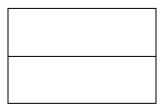
6. A 0.15 kg ball at the end of a 0.75 m string is being swung in a horizontal circle with a velocity of 12 m/s. What is the tension in the string?

7. How much force would you feel against your rear-end at the top of a roller-coaster loop with a diameter of 15 meters if your mass is 55 kg and the roller coaster car is traveling at 15 m/s? How much force would you feel at the bottom of the loop?

8. A roller coaster engineer designs a coaster so that the minimum "safe" velocity of the car at the top of the loop is 14 m/s. What is the radius of the loop?

9. A 40 kg girl on a swing is traveling at 3 m/s at the bottom of her swing. What is the tension in each of the two connecting chains if they are 2 meters long?

10. What is the minimum velocity of a ball on the end of a string if it is swinging in a vertical circle with a radius of 0.60 m?