Honors Physics Name\_\_\_\_\_\_\_\_\_\_\_\_\_\_

Circular Motion Date\_\_\_\_\_\_\_\_\_\_\_\_\_\_

Directions: Each must turn in his\her own paper. Complete the following problems, box answers.

1. A ball, attached to a string, of mass 50 g is moving at constant speed of 2.4 m/s around in a circle of radius 1 m. Calculate the tension in the string.

2. A truck of mass 5000 kg takes a turn of radius 20 m at a velocity of 3.0 m/s. What is the frictional force needed to keep the truck in this turn?

3. A car, 1000 kg, takes a turn of radius 35 meters. The coefficient of friction between the tires and the road is 0.85. Calculate the maximum velocity the car can have in the turn.

4. If you reduce the radius of a mass in uniform circular motion by a factor of 2, how doeas this effect the centripetal force required to maintain the motion?

5. A mass of 2 kg is swinging at the end at the end of a cord 4 m long in uniform circular motion (horizontal). It takes the mass 3 seconds to complete one revolution. What centripetal force is exerted on the mass to keep it swinging at this velocity?

(Hint: Find the velocity first using x/t )

6. A mass of 1 kg is swinging at the end of a rope .5 meters long in uniform circular motion. If rope exerts a centripetal force of 10 N, calculate the time it takes the mass to complete one horizontal revolution.

(Hint: Find the velocity using Fc )

7. A turn at Arnold's Go carts has a radius of 12 m. Calculate the maximum velocity a car can have rounding the turn (us = 1.0 new tires, us = .75 old tires).

8. A mass is moving in a vertical circle of radius 20.0 meters. What is the minimum velocity the mass must have in order to make it around the top of the circle?

9. A banked turn of 18 degrees is used in remote regions where the road freezes (us = 0). Calculate the maximum velocity (m/s) that a car could have going into a 20 meter turn with this banking angle.

10. A 250 gram mass swings in a vertical circle. The radius of the circle is 2 meters. The velocity of the mass at the top and bottom position are shown. Calculate the tension in the rope supporting the mass in each position.