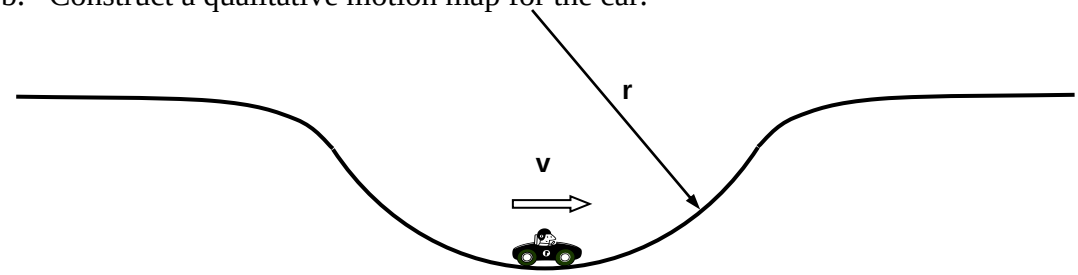
Name_____

Date_____ Pd____

Central Net Force Model Worksheet 2:
Radial Net Force

1. a. A car travels through a valley at constant speed, though not at constant velocity. Explain how this is possible.

   b. Construct a qualitative motion map for the car.



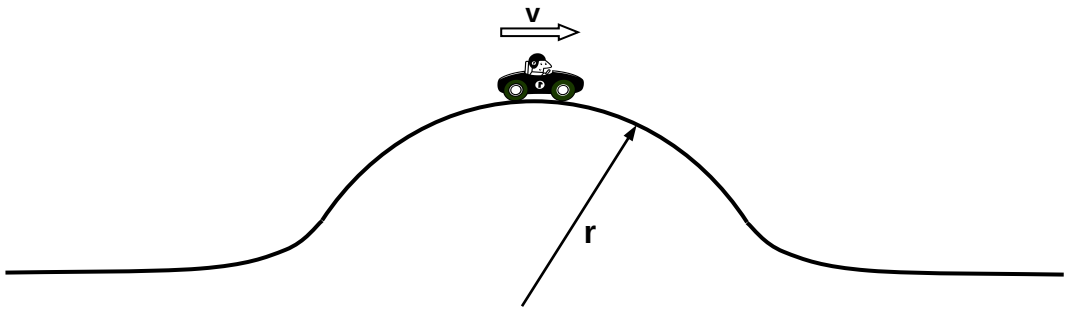
   c. Is the car accelerating? What direction is the car's acceleration? (Explain how you know.)

   d. Construct a **qualitative** force diagram for the car at the moment it is at the bottom of the valley. Are the forces balanced? Justify the relative sizes of the forces.

   e. If the car's speed is 25 m/s, its mass is 1200 kg and the radius of valley (r) is 25 meters, determine the magnitude of the centripetal force acting on the car.

   f. Construct a **quantitative** force diagram for the car at the bottom of the valley.

2. A car travels over a hill at constant speed.
   a. Construct a qualitative motion map for the car.



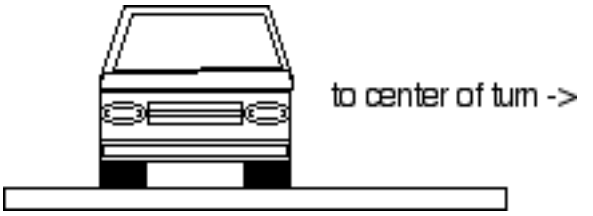
   b. Is the car accelerating? What direction is the car's acceleration? (Explain how you know.)

   c. If the speed of the car is 43 km/h, its mass is 1200 kg and the radius of the hill (r) is 25m, determine the magnitude of the centripetal force acting on the car.

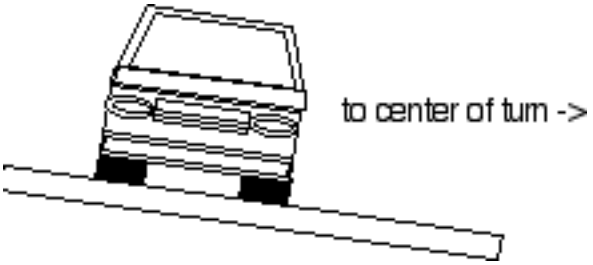
   d. Construct a **quantitative** force diagram for the car at the moment it is at the top of the hill. Are the forces balanced? Justify the relative sizes of the forces.

3. Roads are banked (tilted) in curves in order to make turning a car at high speeds safer.

a. For the situation of an unbanked road, draw a force diagram for a car coming toward you as it is turning. Which force provides the force needed to make the turn?



b. For the situation of a banked road, draw a force diagram for a car coming toward you as it is turning. Identify all of the forces and components of forces that contribute to the force needed to make the turn.



4. A yo-yo pro swings the yo-yo "around the world." Draw force diagrams for the yo-yo at each of the four positions shown: top, descending side, bottom, ascending side. For each of the positions, indicate which force or combination of forces provides the force needed for circular motion.