

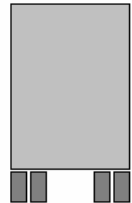
## DAY 19

### Homework Assignment (see syllabus for homework collection information)

1. Discuss whether the following statement is valid and why or why not:

*A car is controlled using a gas pedal, a brake pedal, and a steering wheel. While the gas pedal is commonly referred to as the "accelerator", all three are actually "accelerators".*

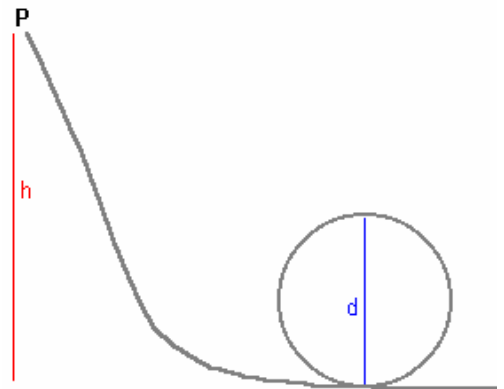
2. A trailer measures 9 feet tall (ground-to-top) and 6 feet wide. It weighs 5 tons. The c.m. point is 4.5 ft. above the ground. What is the smallest radius curve this trailer can round at 60 mph without tipping?



3. The Moon orbits the Earth at a distance of 240,000 miles. The Moon circles the Earth roughly once every month. The Moon has a mass of  $7.36 \times 10^{22}$  kg. Calculate the force the Earth exerts on the Moon.

4. Explain why a centripetal force can never do any work. Can a centripetal force ever change the Kinetic Energy or speed of anything?

5. A kid builds a "Hot Wheels" track with a loop-de-loop in it. Toy cars are released at the top of the ramp (at P) and travel down the ramp through the loop. The diameter of the loop is 1 ft. What does the height  $h$  of the ramp have to be if the cars are to pass through the loop successfully?



6. A plane with mass 3000 kg travels at 320 m/s. It banks to the left to turn. How much will it have to bank in order to execute a turn with acceleration of 0.8 g's, and how long will it take to complete a  $90^\circ$  turn with this maneuver?

7. A chunk of ice breaks loose from the flagpole on top of a domed building and begins to slide down the dome. How far down the dome will the chunk go before becoming airborne?

8. A Chevrolet Corvette can turn with a lateral acceleration of 0.89 g with the driver still maintaining control of the vehicle. What is the tightest radius turn the Corvette can make at a speed of 60 mph? How about at its top speed of 172 mph?