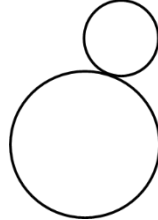Homework 12.

1. When a car comes to stop it inclines forward. Explain why.
2. Two balls of radii R and r made of the same metal are welded together as it is shown below. Find the position of the center of gravity of this construction.

3. A heavy cylinder of mass m is being lifted to the step of height h. The force F is applied to the center of the cylinder as it is shown in the figure below. The radius of the cylinder is R and it is larger than the height of the step. Find minimal force we have to apply to the cylinder to roll it on the top of the step. The moment of inertia of a cylinder with respect to the edge of the step is $(3mR^2)/2$.

To start solving this problem I would recommend you to:
- *Mark all the forces applied to the cylinder.*
- *Write all the torques applied to the cylinder with respect to the pivot point.*
- *Consider the first moment after the cylinder starts rolling on the step. What happens to the normal force applied to the "bottom" of the cylinder?*