Homework 6.

1. A small object starts sliding from the top of a hemisphere of radius R. Find the height h at which the object will lose the contact with the surface of the hemisphere. (There is no friction).

Hint 1: try to ask "question to the question": what does it mean "to lose the contact with a surface" in terms of the normal force?

Hint 2: use energy conservation law.



- 2. We know (hopefully) that an object in motion tends to stay in motion, and we have to apply force to change the objects velocity. This law (this is one of the forms of the first Newton's law) expresses the property of objects which is called *inertia* the ability to "resist to acceleration". Let us imagine that you are in deep space (one of my favorite places, as you might have noticed). You accelerated a wheel to some angular velocity and let it rotate by itself. The motion of the wheel is accelerated motion. The questions are:
 - a) Will it rotate forever or will it stop sooner or later?
 - b) Can we introduce some measure of "rotational inertia" similarly to mass?

For the last problem I am not asking for a "quantitative" answer - I would appreciate just your opinion (with supporting arguments).