IN CLASS WORK
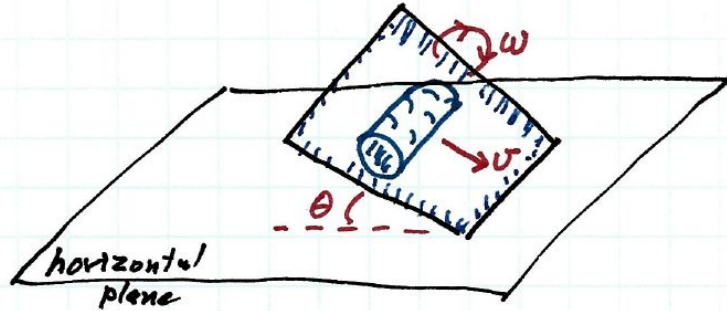
A uniform solid cylinder rolls down an inclined plane in Earth's gravity.

Parameters:

- mass = M, radius = R and length = d
- angle of incline = θ
- friction: *it rolls without slipping*
- initial state: *the cylinder is at rest with the center of mass $y_{CM} = h$ above the horizontal plane.*

(1) *Use conservation of energy to calculate the velocity v when the cylinder has descended from $y_{CM} = h$ to $y_{CM} = R$.*
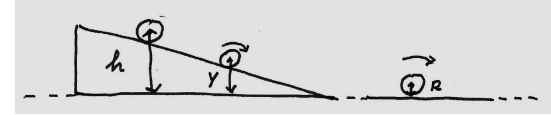
(2) The result of (1) implies that the center of mass moves down the incline with constant acceleration. *Calculate the acceleration.*

(3) Repeat the calculations of (1) and (2), but now for *a hollow cylinder.*

(4) Repeat the calculations of (1) and (2), but now *assuming there is **no friction** ;* i.e., the cylinder just slides down without rotating.

REFERENCE: Example 4.9.