

6. Interpreting h as the height increase for the center of mass of the body, then (using Eq. 12-5) mechanical energy conservation leads to

$$\begin{aligned}K_i &= U_f \\ \frac{1}{2}mv_{\text{com}}^2 + \frac{1}{2}I\omega^2 &= mgh \\ \frac{1}{2}mv^2 + \frac{1}{2}I\left(\frac{v}{R}\right)^2 &= mg\left(\frac{3v^2}{4g}\right)\end{aligned}$$

from which v cancels and we obtain $I = \frac{1}{2}mR^2$ (solid cylinder – Table 11-2(c)).