

8-8

A small hollow sphere (mass  $m$  and radius  $r$ ) starts from rest and rolls without slipping down a track, as shown. The radius of the loop-de-loop is  $R \gg r$ .

From what minimum altitude  $h$  can the sphere be released and still make it over the loop-de-loop on the track?

HINT: You may want to think back to some previous examples.

